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Socio-Economics of Pearl Culture: Industry Changes and Comparisons focusing on Australia and French Polynesia

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Clem Tisdell[2] and Bernard Poirine3

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Socio-Economics of Pearl Culture: Industry Changes and Comparisons Focussing on Australia and French Polynesia

Abstract

Concentrates on comparing socio-economic aspects of pearl culture in Australia, which mostly relies on the culture of the South Sea pearl oyster *P. maxima*, with that in French Polynesia which depends on the culture of the black-lipped pearl oyster *P. margaritifera*. Australian culture of pearl oysters dates from the 1950s whereas culture of black pearls in French Polynesia dates from the second half of the 1970s. After briefly outlining the history of pearl culture in Australia and Tahiti, this paper provides an overview of the industry, comparative structure of the industry in Australia and French Polynesia and its technologies. Socio-economic impacts, especially regional impacts, of the industry are considered. Market characteristics (such as prices of pearls and the marketing and promotion of Tahitian pearls) are given attention and observations are made about Australian export markets for pearls. There appears to be some positive correlation between the price received on average for Tahitian pearls and that obtained for Australian pearl exports, but more control is exerted over Australian supply of pearls to the market so enabling declines in the price for Australian pearls to be counteracted quickly.

Socio-Economics of Pearl Culture:
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1. Introduction

World production of cultured saltwater pearls has expanded greatly in the last couple of decades, mainly, but not entirely, due to increased supply of black pearls. Australia, French Polynesia, Indonesia and Japan are the world=s principal producers of marine pearls. French Polynesia and Indonesia have respectively been the main sources of increased supply of black pearls and South Sea pearls. Increased supply has resulted in falling pearl prices.

Australian production relies mostly on the culture of *Pinctada maxima* but some culture of the black-lipped pearl oyster *Pinctada margarifera* occurs. Western Australia is the main producer, followed by the Northern Territory, with Queensland being a minor producer. State governments regulate the industry. Producers must be licenced and are allocated annual quotas and collection areas for taking wild oysters for implanting. This is mainly to conserve parent stock and to control supply to some extent. There are for example 16 licensed companies in Western Australia and individual company quotas range from 15,000-100,000 shells with the total allowable annual catch generally being 572,000 shells. The cost of landing oysters for implanting is around $20 each. Hatcheries have recently been established in Australia to supplement wild stocks and each licensee in W.A. and N.T. can supplement his/her wild stock quotas with 20,000 oysters from hatcheries. The Australian industry is in fact dominated by a few companies. The Paspaley Pearling Company produces over a half of Australia=s cultured pearls. Most of Australia=s pearls are marketed through Japan, but independent marketing is becoming more common.

French Polynesia increased its exports of black pearls from 6.1 kg in 1977 to 5,099.6 kg in 1996 thereby making it a major world producer of marine pearls. Pearls became its largest export by value. The industry in French Polynesia is dualistic in character. On the one hand there are many small producers, some of medium size, and a few very large producers who account for the bulk of production. This sometimes leads to social conflict and inefficiencies in resource-use. In French Polynesia, unlike in Australia, production of pearls is imperfectly regulated and there are many more producers than in Australia, including many at village level.

The rapid expansion of pearl culture in French Polynesia has been made possible by the collection of natural spat, an option not widely used in Australia.

Competitive pressures faced by producers of pearls in Australia and French Polynesia have increased. It is interesting to compare the contrasting regulation methods, production techniques, industry structure and marketing strategies of Australia and French Polynesia. The paper concentrates on French Polynesia and Australia.

2. History of pearl culture

Because Western Australia is by far the major producer of pearls in Australia, producing over $200m dollars of mostly South Sea pearls annually, a brief history of the industry there is worthwhile. Pearling in Northern Queensland and the Northern Territory showed similar trends.

The economics of the early pearl industry was reliant on mother-of-pearl shell, mainly used for buttons and inlay work. Actual pearls, if found, were just a bonus. The Western Australian industry developed in the late 1800s relying first on Aboriginal and Malay divers and then Japanese divers. The industry, however, declined dramatically in the 1920s and 1930s with the introduction of plastics. Nevertheless, this had a useful side benefit B it allowed the over harvested population of wild oysters to recover.

The Western Australian pearling industry owes its recovery to the introduction of pearl culture in the 1950s. This relies primarily on the collection of wild oysters. Oysters are collected and seeded and placed in sea-bed panels, turned regularly for the next 2-3 months, and then taken to farms and held on panels suspended from longlines. They are cleaned regularly to get rid of barnacles and other marine growth.

Oysters are about 3 years old when captured and take *another* 2 years after they are seeded before they are available for harvesting.

A recent development has been the hatchery production of pearl shells. In 1992 the Western Australia Fisheries Department issued licences with a right to use 20,000 shells from hatchery stock. Given 16 licencees, if all were to exercise this option, this would imply 320,000 shells (oyster) from aquaculture. In fact, it seems that licences for about 350,000 shells in all have been given. This amounts to just over 61 per cent of the total allowable catch of 572,000 shells (oysters) in Western Australia. Most licencees are in the process of taking advantage of these quotas which have a potential to increase Australia=s supply of South Sea pearls substantially.

The pearling industry's development in French Polynesia was also associated with collection of mother-of-pearl shell originally. Presumably, it suffered a similar fate to the Australian pearl industry due to the introduction of plastics. The resurrection of the pearl industry in French Polynesia is quite recent and began in the 1970s with the emergence of a black pearl industry.

Polynesians have been diving in the Tuamotu islands to collect mother of pearl from *Pinctada margaritifera* oysters since 1820-1830. Mother of pearl was exported to make buttons and inlay works. Occasionally, a rare natural black pearl was found (about one in 15,000 black lip oysters gave a natural south sea black pearl).

In 1963, the head of the Tahitian Fisheries department, Jean Domard, experimented black pearl grafting on *Pinctada margaritifera* with the help of an Australian company, Pearls Pty Ltd, based at Kury Bay in Western Australia. This company sent grafters to Hikueru and Bora Bora. Two years later, pearls of excellent quality were obtained. In 1967 Mr Jacques Rosenthal, a reputed gem wholesaler in Paris, who had seen the pearls harvested by the Fisheries Department, hired Mr William Reed, an Australian biologist, to study the feasibility of a pearl farm on Manihi atoll (Tuamotu archipelago). He recommended spat collection, because of the shortage of natural oysters: the stocks were depleted because for years they had been collected to sell the oyster shells.

Later, William Reed was hired by the Fisheries Department to study spat collection, a project financed by a French Government grant. The project was a success, showing that spat collection was indeed possible on a large scale on Manihi, Takapoto, Hikueru, and in the atolls of the Gambier archipelago.

In 1973, William Reed founded his own pearl company 'Tahiti Perles', on Mangareva island, Gambier archipelago. The company was bought in 1975 by Robert Wan, today's foremost Tahitian pearl producer. Around this time, two other persons began pearl companies: Koko Chaze, on Manihi (Tuamotu), and, Jean Claude Brouillet, on Marutea (Tuamotu). The latter bought from the local government the stock of black pearls obtained by Jean Domard in 1965 following the 1963 grafting experiment. He had been told they were valueless because there was no market for cultured black pearls.

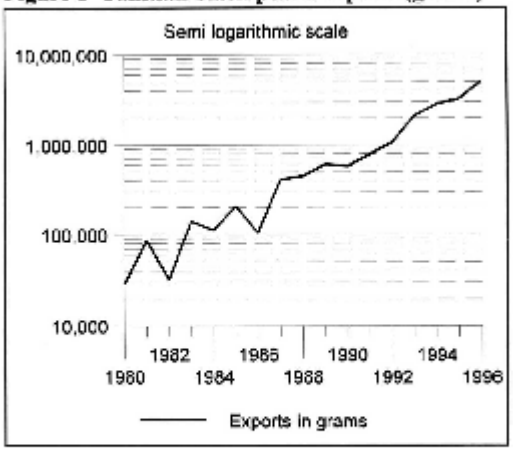
Brouillet travelled around the world to show his sample of Tahitian black pearls to famous jewellers in Paris, London, Tokyo, New York and according to his own account (Brouillet, 1984), the result was 'a pitiful fiasco' (un fiasco pitoyable). In his book he recalls a

humiliating meeting with the president of Cartier in Paris: ‘He began to smile and to play with the pearls on his desk, like a kid. Obviously, he was very much amused. Not me’. (Brouillet: 82). He nevertheless decided to go on with his project and founded Polynesie Perles, a company now owned by Robert Wan, the Chinese Tahitian ‘emperor of the black pearl’ (who nowadays controls 50% of Tahitian black pearl exports). Later, Brouillet met Salvador Assael, a New York wholesale jeweller and pearl dealer, who decided to promote the South Sea black pearl among the most famous jewellers in the United States and France. Thanks to their joint effort, the market for Tahitian black pearls began to emerge. After Brouillet sold his company to Robert Wan, he and Assael continued their joint effort to promote the South Sea black pearl on the American market. But Japan soon became the main importer, and also the main exporter of black pearl necklaces and jewels to the rest of the world.

Nowadays French Polynesia is the main producer and exporter of loose South Sea Black Pearl (with a 95% share of world exports), and its share of the world exports of loose cultured pearls reaches 27% (in 1996). Australia’s share is 30%, Japan’s 15.5% and Indonesia’s 9%.

Starting with less than 2 kilos in 1972, French Polynesia now exports more than 5 tons of black pearls (1996), 70% of those being bought by Japan. From 1980 to 1996, export growth (in grams) has been exponential: it follows approximately a straight line on a semi-logarithmic scale (see Figure 1). The average annual growth rate of pearl exports (in weight) was 30.4% over that period. More recently, production increased from 575 kilos in 1989 to 5100 kilos in 1996 (a 37% average annual increase), with a 56% increase just in 1996. Pearls now account for more than 95% of French Polynesia’s total exports of good.

Figure 1 Tahitian black pearls exports (grams)



Source: Institute Tiecritorial de la Statistique

Average annual growth rate from 1980 to 1996: 30.4%

3. Industry and Technology

The Tahitian black pearl comes from a black lipped oyster called Pinctada margaritifera. The pearls usually range in diameter from 8 to 12 mm, but may in some cases exceed 17 mm. The colour ranges from black to grey, and may also have green, blue, or gold hues. The most prized colour is 'aile de mouche' (the colour of a fly's wings). The Australian pearl comes from Pinctada maxima, a very large oyster yielding white, rose, blue or golden pearls between 10 and 18 millimetres.

In French Polynesia and Australia, the technology of grafting was imported from the Japanese, who are still very much in demand to graft black pearl oysters in French Polynesia. However, the local government has opened a grafting school from which 20 students graduate each year. Mainland Chinese grafters have also been used more recently.

In French Polynesia, out of 100 oysters, 30 to 40 will give a pearl after a first graft. A second graft on these will yield about 20 more pearls. A third graft might yield 5 more pearls. About 20 oysters out of 100 reject the nucleus after the first graft. These will be grafted again and out of these 20 one might get 8 to 10 pearls. Thus 100 oysters might eventually yield 65 to 75 pearls, most of them 'baroques' (irregularly shaped).

Most pearl farms are located on atolls of the Tuamotu and Gambier archipelagos. Atolls consist of a low coral reef barrier encircling a shallow lagoon and nothing else. The conditions are ideal for pearl farming, because inside the lagoon the ocean is calm and shallow, and all

pearling activity can take place in this naturally sheltered harbor, not in open seas. Small platforms and houses are built overwater where grafting, cleaning and other pearling activities take place. Furthermore, since atolls are sheltered from open seas, they make ideal breeding grounds for producing young juvenile oysters (spat): it is usually possible to collect them on spat collectors, made of plastic strips hanging about 2 metres deep below the surface, one every 1-2 metres, tied on 200-metre lines. This is an easy and economical way of collecting juvenile oysters since there is nothing else to do but wait about one year to collect the spat, and these sell for around 1 US dollar each. As a result, this activity, which does not require much capital, and is very profitable, has been undertaken by many families of the Tuamotu islands. It costs about 2,000 US$ to set up a spat collection station, it does not require much maintenance, and after one year the spat can be sold for 6,000 to 8,000 US $.

By contrast, wild spat collection is not (as yet) possible in the open sea fisheries of Western Australia. Juvenile wild oysters have to be collected by divers on the sea bed, and as a result they cost about $ 20 each, that is, 20 times more than in French Polynesia. The Australian operators are now allowed a quota to breed spat in hatcheries, but this is still much more costly and risky than natural spat collection in the lagoons of French Polynesia.

This difference explains why the industry structure and regulation became so different in Australia and French Polynesia. In Australia the wild oyster resource is limited since spat collection is impossible: overfishing would deplete the stock rapidly. Hence the necessity of imposing quotas. In French Polynesia some atolls have been overexploited and spat collection is not possible in everyone of them, but there are dozens of atolls where spat collection is very easy and plentiful. One big operator may have up to 1,000 spat collection stations in one atoll, each representing a 200 metres line with 2 metres long collectors hanging every one or two metres. Where spat collection is impossible, it is easy to buy oysters from another atoll and ship them in. For example, in 1997 one pearl farmer on Raiatea (leeward island in the Society archipelago) shipped in (by air) a 4 ton supply of juvenile oysters from Takaroa (Tuamotu archipelago). Furthermore, spat collection helps increase the stock of breeding oysters, since many spat survive on the collectors, which would otherwise have been killed by predators, and some of them fall on the bottom and then grow and breed. As a result natural stocks of oysters are in no danger of depletion (as it was the case when shells were being collected for mother of pearl, until the 1950s, before spat collection was found possible in the 1960s), and this is why it has not been

found necessary to protect them by means of a quota system.

In French Polynesia it is easy to set up a small scale operation: there are no expensive open sea vessels to buy, everything can be done at the same place with small boats, and a small family operation works well with family members and no salaried labour. Moreover, the maritime concession is easy to obtain (and, furthermore, not always asked for before setting up an operation)[1], the fee is relatively cheap (and often, never paid), and there is no quota on grafted oysters (even though the size of the operations on the lagoon surface is specified by the maritime concession). Furthermore, the government of French Polynesia, following a policy to promote activities to re-people the outlying islands (victims of the 'atomic boom' from 1962 on, which had led people to emigrate to the main island of Tahiti and its capital city of Papeete in search of well paid salaried jobs), has been promoting local small scale family and co-operative operations through a co-operative organisation called GIE Poe Rava Nui, which has been helping them with technical advice, marketing (an annual auction held in Papeete), and financing, with loans secured from the SOCREDO development bank[2]. Technical help is also provided to small producers thanks to an administrative body called Etablissement pour la valorisation des activities aquacoles et maritimes (EVAAM). In addition, the very high price obtained for Tahitian black pearls until the middle of the 1980s made this activity very profitable and attractive to the locals, as well as to Tahitian and Chinese entrepreneurs from Tahiti.

The following explains the very different structure of the industries in each country:

Whereas in Australia there are only 16 licensees, most of them large scale operators, in French Polynesia there is a dualistic structure of the industry. A few important companies represent at least 70% of the industry's output. They are affiliated to the Syndicat des Producteurs de Perles de Polynésie (SPPP). The four most important producers are Robert Wan, Jean Pierre Fourcade, Anatila Bréaud and Patrick Rosenthal. Rober Wan alone claims to represent at least 50% of total sales. The very small family or co-operative operations are federated by a 'groupement d'intérêt économique': GIE Poe Rava Nui. Their combined production, coming from 321 farms, represents only 3.5% of total exports. The number of family operations affiliated to GIE Poe Rava Nui grew from 13 in 1981 to 446 in 1994, and then decreased to 321 in 1996 (but only 160 of these have sold lots at the 1996 auction, which means that some of them either ceased activity or sold their harvest through other channels). Some medium-scale operators have set up yet an other association: le syndicat des producteurs de perles de Tahiti et des Iles (SPTTI), associated with GIE Tahiti Pearl Producer, a marketing

association. Among the 200 independent small scale operators many have not joined any association. But sharply declining prices since 1989 have been causing bankruptcies among medium and small sized producers in recent years.

Since 1970, 5,072 maritime concessions were granted for operations on 47 islands, of which 1,929 for spat collection. In 1996, 330 new concessions were granted, and 60 were cancelled.

Because their supplies of oysters are limited by a quota, Australian pearl farmers make every effort to maximize the number of pearls obtained from each oyster, and to obtain the highest quality possible: the limited supply encourages a strategy of maximizing quality. In French Polynesia since oysters are so plentiful and so cheap to buy, and since there is no quota imposed on grafted oysters, there is a trade off between quality and volume: it is usually more profitable to invest for increased input and output rather than to increase the average quantity and quality of pearls from a fixed supply of oysters. Falling prices since 1986 further encouraged this tendency to increase production at the expense of quality, since profit margins tend to fall and therefore higher volumes are needed to maintain profits.

The readily available and abundant supply of spat and the lack of quota imposed on producers, has made possible a spectacular growth of the supply of Tahitian black South Sea pearls: from 104 kilos in 1986, to 1,069 kilos in 1992, and 5,100 kilos in 1996, for example. The share of Tahitian black pearls in the overall world loose pearl market has been increasing from next to nothing to about 27% in 1996. It is doubtful that this market share will continue to expand at that rate forever. Therefore, it is necessary to slow down the rate of growth of supply to keep in phase with the growth rate of the world demand for pearls, in order to preserve the present level of prices. This therefore indicates that a backward-bending supply curve applies in this case.

The big operators typically deplore the ‘anarchic’ nature of the industry in French Polynesia, but at the same time they are reluctant to accept any form of regulation, such as transferable quotas that would limit their ability to increase the size of their operations, and would let the administration monitor their production. Since most of them own private atolls, they do not feel concerned about ‘tragedy of the commons’ type of problems. They think they can manage their operations in their best interest, and do not see the need for government interference to prevent over exploitation of the oyster resource.

4. Socio-economic impact

In Western Australia, about 1,000 persons are employed in the primary aspects of pearl production. Taking into account also the Northern Territory and Queensland, the total persons employed in Australia in primary production of pearls would be less than 1,500, considerably fewer than in French Polynesia. Furthermore, a considerable amount of the Australian employment is seasonal. Production is located in the warmer northern tropical waters of Australia, in areas which are sparsely populated.

The Australian industry structure is also very different from that in French Polynesia. Australia has a few large suppliers of pearls whereas French Polynesia has many suppliers and a skewed industry structure.

It is estimated that at least 4,000 persons now live from pearl farming or spat collection in French Polynesia. 800 salaried persons are employed in pearl farming according to social security statistics. More and more small family operations turn to spat collection, where the initial investment is rather low and therefore the risk less important. Big farms buy juveniles from the small scale family operations. Pearls make up more than 95% of French Polynesia's exports, and they are the second foreign exchange earner, after tourism (at the present rates of growth for both industries, pearls exports might well exceed tourism earnings in a few years).

The 'pearl boom' has had both positive and negative impacts. On the positive side, it has reversed the former emigration trend from the outer islands of the Gambier and Tuamotu archipelagos to Tahiti. The islands where black pearl farming occurs have experienced a strong return migration movement. Thus, between 1988 and 1996, the population of the Gambier archipelago has increased by 75%. Individual islands in the Tuamotu archipelago have had spectacular population growth over the same eight year period: Kauhei +191 %, Ahe +133%, Apataki +106%, Fakarava +88%, Arutua +81%, Manihi +79%, Rangiroa +46%, Takapoto +31%, Takaroa +23%. The economic impact is also positive. Living standards have improved rapidly, as shown by census figures: households are better equipped with modern amenities, including cars and even Harley Davidson motorcycles (in Arutua, where they replaced bicycles and scooters)[3] (ITSTAT, 1991, 1997, Pollock, 1978). Clearly the positive side of the industry lies in that almost all jobs are created in remote islands from which previously young people had to emigrate to find jobs, and that most of the jobs created are well suited to the kind of outdoor work that Polynesians always liked to do in the remote archipelagos, such as fishing and diving for shells. In other words, this industry offers a working environment and a way of living as close

as possible to the traditional activities of the local population.

On the negative side, this rapid growth has had some social side effects. Many small family operations got into debt to invest in pearl farming and because they knew nothing about management, and tend to confuse turnover and profits, were never able to pay back their loan to the bank. Outstanding unrecoverable loans to small pearl farmers represented at least 5 million US dollars in 1996. The considerable amount of cash generated by pearl farming has had disruptive effects on the social life of these small islands. It has increased inequalities between successful and unsuccessful families, and between islands where pearl farming is booming and islands where copra production is still the only cash resource, because pearl farming is not possible.

Moreover, there are often conflicts between locals (islanders) and outsiders from Tahiti or other islands moving in to establish pearl farms. In the recent past, big producers have been trying to encourage government regulation to limit production of small scale operators, on the ground that small producers tend to produce lower quality pearls and market them less satisfactorily than professional dealers would.

On the other hand, long time residents and landowners in the Tuamotu and Gambier islands have been complaining that the government was granting licenses to occupy the maritime public domain for pearl farming to 'aliens', i.e., people with no kin ties nor property in the island, who are mostly Chinese, Tahitians, half-Tahitians (Demis), and European businessmen from the main island of Tahiti.

Foreign pearl farming operations are not authorized, but it is said that many local operations are covertly financed by Japanese interests acting through 'straw men'.

According to Rapaport (1993), on Takaroa, almost all of the authorized pearl farming area had been allocated to alien entrepreneurs. Alien pearl farmers occupy half of the total near shore lagoon farm area, blocking more than a third of the occupied shoreline. They are also using a substantial proportion of the central lagoon area for spat collection. These activities violate previous agreements with the community as well as the authorized concession limits set by the administration[4].

In many instances, newly arrived >outsiders= were met by violent demonstrations from the 'locals', who consider the lagoon=s riches theirs by right, and that no maritime license should be given to 'aliens' (Rapaport, 1991, 1993, 1996). According to Rapaport (1996:34) 'The position of the administration is that lagoons are part of the public domain and that all residents

of French Polynesia are eligible to apply for concessions in any lagoon, providing they prove their ability to farm pearls and pay the required annual fees for the concession area. Tuamotuans, however, find themselves increasingly displaced from high valued shorefront land and lagoon space'. The reality is a little different: the local government has an unofficial policy of giving priority to the locals, but outsiders try to buy land from a local and then apply for licenses. Anticipating this behaviour, many locals apply for a maritime concession and then do not exploit it themselves, but try to form a joint venture with an 'outsider' to exploit it. As a result, in many cases, there is an element of 'rent seeking' among locals that should not be neglected. Furthermore, many farms operate without a legal concession, and when they do, they often occupy a greater portion of the lagoon than they are allowed to do. It is very difficult to enforce the law on a maritime surface as large as Europe, as most pearl farming activities take place underwater. According to Rapaport (1993), 'The violation of administrative licensing requirements, quotas, and specified spatial limits all represent a quiet exercise of indigenous traditional rights. These acts, as well as gossip, pilfering, and arson, are forms of everyday resistance to alien entrepreneurs. Lagoon rights are also openly asserted through petitions, negotiations, confiscations, expulsions, and associations of protection'.

Such problems are well documented in a note of the Ministère de la Mer (1990) describing 'an anarchic occupation of the public maritime domain, without any real control; an obsolete regulation of maritime concessions which does not take in account oyster density within the lagoon; increasing delinquency (oyster and pearl stealing); growing protests linked to granting of maritime licenses to 'outsiders' (people not originating from the island), while the French laws do not allow discrimination on the basis of residence or place of birth' (our translation).

Adverse economic side effects are also beginning to show up. The big operators such as Robert Wan often own private islands and therefore have a private interest in preventing over exploitation. This is not the case for small and medium scale operations, which share a common resource: the lagoon. This is a typical case of the 'tragedy of the commons' (Hardin, 1968, Gordon, 1954): each private farm tries to maximize the scale of its operation, even if in the long run this may lead to over exploitation and therefore massive oyster mortality, and well before that, to deteriorating pearl quality and productivity hurting each operator's profit. Massive oyster mortality has already happened in Hikueru in 1977 and Takapoto in 1985, for instance. Oyster transfers from one lagoon to the other can spread diseases from a contaminated atoll to another one. Most often over exploitation results in deteriorating pearl quality, decreasing spat collection,

and ultimately massive oyster mortality. Spat collection yields seem to provide a good advance indicator of whether or not a lagoon is overexploited. For example, in Takapoto, a once very 'rich' pearl producing atoll, spat collection has been abandoned, and pearl farming is now much less productive than elsewhere.

It seems logical, in the common interest of all operators sharing a lagoon, to 'internalize' the negative external effects in production, associated with the exploitation of a common resource, by designing a scheme of transferable quota rights: each license or concession would authorize farming and grafting only a limited number of oysters each year. The total number of oysters authorized in a lagoon at a given moment should be determined by biological and economic studies to maximize economic profits, and divided up among a limited number of licensed producers. Licenses could then be auctioned every two years (or over a somewhat longer interval), and would be freely bought and sold on the market place between auctions. Such a scheme was used from 1870 on in Holland to manage oyster banks (Van Ginkel, 1988), even though at that time the optimum level of exploitation was not precisely known, so profit margins eventually fell. To alleviate the conflicts of interests noted above opposing 'locals' to 'outsiders', some of the proceeds from the auctions could be transferred to the 'locals', through financing of communal projects or subsidizing of local co-operative pearl farming operations. Another part of the proceeds could finance promotional efforts world-wide. Some 'free quotas' could also be reserved for islanders so long as they really exploit them themselves (and do not resell them on the market).

However, such a scheme is not likely to be enforced in the near future in French Polynesia. Government regulation is almost non existent, the existing formal regulation consisting of maritime concessions granted for use of the maritime domain for an annual fee is far from being strictly enforced in reality (it is said that about only one tenth of the theoretical annual fees are paid to the administration) and the need for a public management and regulation of a common natural resource is not widely recognized as valid by most producers.

5. Marketing Aspects

Prices

Between 1990 and 1995 the average price of the Tahitian black pearl was reduced threefold, from 9,486 yen per gram in 1990 to 2,989 yen per gram in 1995 as production and exports expanded very rapidly (Table 1). Figures 2 and 3 show that the volume of exports, in grams,

tends to be inversely related to the price per gram in yen[5]. This is not surprising since the supply of Tahitian pearls is rather inelastic in the short term (it depends on the quantity of oysters grafted 18 months before, and producers do not stock their harvest from one year to the next), and therefore prices tend to go down when supply grows faster than world demand.

Table 1: Average price per gram, F CFP and yen for Black Pearl Exports of French Polynesia, 1980-1997

Year	Price per gram F CFP	100 yen (Fcfp)	Price per gram yen
1980	3,544	34.0	10,424
1981	4,669	45.0	10,376
1982	3,064	48.0	6,383
1983	5,090	58.0	8,775
1984	3,931	66.0	5,956
1985	6,742	69.0	9,771
1986	9,586	78.0	12,286
1987	5,525	76.0	7,269
1988	5,624	85.1	6,610
1989	6,182	85.0	7,273
1990	6,490	68.4	9,486
1991	5,599	75.5	7,324
1992	3,924	76.0	5,160
1993	3,666	93.2	3,936
1994	4,163	98.8	4,214
1995	2,900	97.0	2,989
1996	2,759	86.0	3,208
1997	3,011	95.0	3,169

Figure 2 **Tahitian black pearl exports, millions of yen**

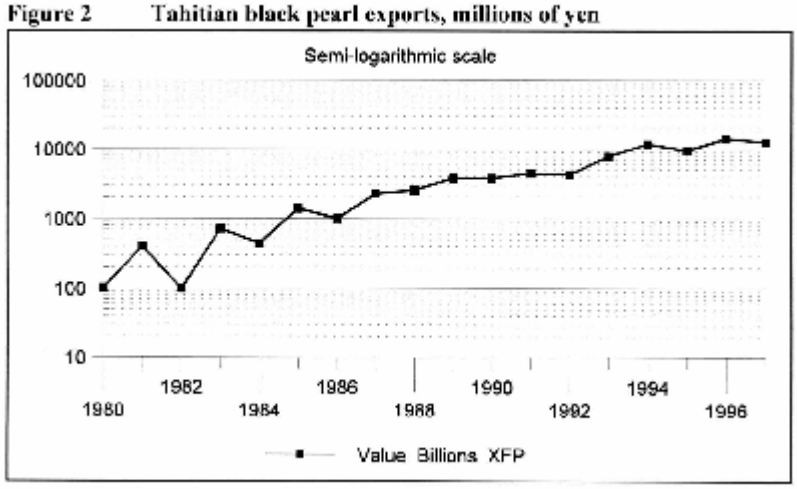
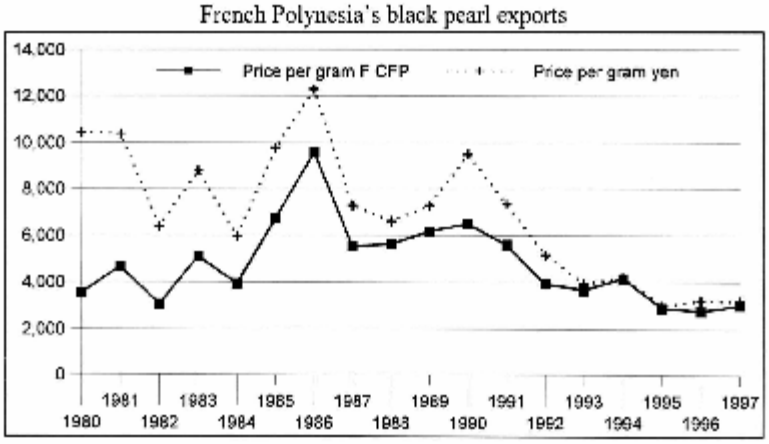


Figure 3: Average price per gram of French Polynesia's black pearl exports



A preliminary regression analysis, using a specification assuming a constant elasticity demand curve and a perfectly inelastic supply curve, yields an average price elasticity of demand of -0.36 over the period 1980-1996 (using yen values).

In 1997, production decreased by 0.54% in weight and prices increased 3.2% in F CFP, the average price per gram reached 3,011 F CFP, (US$ 28.4), compared to 2,759 F CFP (US$ 29.8) in 1996. The price in yen per gram has been increasing since 1995, when it reached its lowest ever price of 2,989 yen per gram (Table 1).

The declining price of the Tahitian South Sea Pearl (TSSP) over the past few years has helped expand its demand both in volume and in value. TSSP exports, with a 27% per cent share of the market for loose cultured pearls in 1996, now almost match the sales of Australian South

Sea Pearls (ASSP, 30 per cent of world market). In 1995 the market shares for TSSP and ASSP were almost identical, at 24,5% (GIE Tahiti Pearl). From 1995 to 1996, their combined market share increased markedly, from 49% to 57%, at the expense of Indonesian, Japanese and Chinese competition. ASSP production has been rising much less than TSSP production, helping maintain high prices, but slowing the overall increase in value.

The Tahitian black pearls are no longer an extremely rare and expensive item reserved to a privileged elite. They now appeal to a wider clientele.

It is very difficult to obtain prices for Australian pearls. (Nevertheless, see section 6). However, it should be noted that hatchery production of oysters for seeding in Australia has the potential to raise the Australian supply of pearls considerably. It removes the barrier of the availability of wild stocks. Given *current* quotas for aquacultured shells, aquaculture can increase Australian supply of pearls by 60 per cent, compared to the wild limit which appears to have been determined by biological constraints. Any constraints on aquacultured shells can be expected to be determined by market considerations. Australia relies very much on the high quality of its products to obtain premium prices for its pearls.

Distribution

Japan is still the main importer of loose Tahitian black pearls: it bought 70% of the total value of Tahitian pearl exports in 1996, much more than the USA (10%), and Hong Kong (8.6%). In 1996 Japan's share of worked Tahitian black pearls exports was 96%. The dealers in Kobe work on high volumes. This enables them to match perfectly, pearls of similar size, colour and quality to assemble strands of Tahitian black pearls. They buy directly from Tahitian producers, (big ones, like R. Wan, or J.P Fourcade, or medium and small ones). It is estimated that more than half of Japanese imports of loose Tahitian black pearls are re-exported, after processing, mainly to the USA.

However, it seems that the Japanese de facto monopoly on the world-wide marketing of Tahitian black pearls is being challenged. According to GIE Tahiti Perles during the first semester of 1997, the share of loose Tahitian black pearls bought by Japan has been only 46%, instead of 68% during the same period of 1996. More and more non-Japanese jewellers and wholesalers are buying at the annual auctions held in Papeete by GIE Poe Rava Nui and GIE Tahiti Pearl Producers (two co-operatives of small pearl farmers), and also from local wholesalers who are beginning to offer a better choice of paired pearls because they are working

on much bigger volumes than a few years ago. Tahitians are watching with interest the successful example of Australian producer Nick Paspaley, who managed to bypass the Japanese monopoly by setting up his own international auction of Australian South Sea pearls.

There is talk of regulating the profession of pearl dealer in French Polynesia to avoid direct selling from Tahitian producers to foreign jewellers and dealers. In some cases small producers hard pressed for cash have been known to sell directly to jewellers in the United States at vastly discounted prices. This has been hurting the profession=s credibility and causing prejudice to professional wholesalers.

Most Tahitian large pearl producers, wholesalers and jewellers think that it is time to issue licenses to a few professional wholesalers, or to set up a central marketing board, in order to prevent small producers from selling directly at discounted prices. However, an overabundant supply, stemming from the lack of quota schemes regulating growth, is bound to lead to such 'anarchic' behaviours as each producer strives to sell directly its harvest in order to collect for himself the wholesaler's margin, since producers' profit margins are getting smaller and smaller as prices fall. Only large producers working with high volumes can offer homogeneous lots by pairing pearls. Smaller producers have to sell heterogeneous lots, which command a lower average price. In theory, a central marketing board would be able to select only the best quality pearls, classify and pair them, and sell only homogeneous lots. This would return to the producers the important value added now by wholesalers (most of them Japanese) who are doing this work, and would enable producers to regulate the market to prevent wildly erratic price changes from one year to the next.

In Australia, since 1992, the local producers sell their annual harvest directly, through annual auctions held in Hong Kong and Japan. This, and the quota system which limits supply and incites producers to improve pearl quality, has helped obtain much higher prices than in French Polynesia. Ten years ago, average prices per gram were little different between the Australian and the Tahitian pearl (the latter used to sell for about US$100 per gram in 1986). Nowadays the Australian pearl commands a much higher price (about US$180 to $200 per gram, compared to US$25 to $30 per gram for the Tahitian pearl) because of its limited supply. As a result, nowadays the value of pearl exports is about the same in both countries, but to obtain it, in Tahiti about 10 millions oysters have been grafted[6], while in Australia the official quota for the industry is only 572,000 oysters[7].

Promotion

Much more money has been spent on promotion of the Tahitian South Sea Pearl in the last three years. An association for the promotion of the Tahitian black pearl, GIE Tahiti Perles, created in 1993, receives half the proceeds of the export tax on Tahitian black pearls (a specific tax of 160 F CFP per gram has replaced the former ad valorem tax). The proceeds from the tax have been increasing rapidly with the value of exports in recent years, and as a consequence the promotion budget of GIE Tahiti Perles has been steadily rising (+63% in 1996). Promotion was aimed at fine jewellers in 1995 and 1996 and since 1997 all efforts are made to associate Tahitian black pearls to the world of high fashion and show business. Promotion associations have been set up in Japan, the United States and Europe (France, Germany). Still, the overall promotion budget (379 million F CFP) represents only 2.7% of total sales (14 billion F CFP in 1996), a relatively modest percentage in the world of luxury goods (GIE Tahiti Perles, 1997). In Japan a similar association of black pearl import companies was created also in 1993: the Japan Black Pearl Promotion Association.

Successful promotion efforts since 1995, as well as falling prices, probably explains the growing interest for black pearls in the world of jewellery, and the increasing market share of the Tahitian black pearl in total exports of loose cultured pearls in recent years.

6. Observations from Recent Statistics on Australian Pearl Exports

Australian statistics on pearl exports are incomplete. It is only from 1994-95 onwards that figures for both volume and value of exports are available. In the initial years (94-95 and 95-96), volume of exports are only available by number of pearls, and weight in grams has to be estimated, as pointed out in note *a* to Table 2.

Table 2: Recent statistics on Australian pearl exports*: prices in dollars AUS

Reference Period (Financial Year)	Total Exports		Total Value (FOB)	Average Price/Pearl $	Average Price/Gram $
	Numbers	Weight in Grams[a]			
1994-95	976,605	2,856,569.63	210,146,225	215.18	73.57
1995-96	1,218,106	3,562,960.05	79,870,844	65.57	22.42
1996-97	937,334	2,741,701.95	191,753,714	204.57	69.94

Source: Based on data of the Australian Bureau of Statistics

Notes:

* In 1994-95, Australia exported *articles of natural or cultured pearls* (71161000) and *round cultured pearls, unworked, not mounted or set* (71012110) worth $1,307,572 and $488,713 respectively. The corresponding figures for 1995-96 were $1,625,719 and $116,028,252 respectively. Data on export weight for these two categories were not available and have been estimated as in note a.

a Initially unit of quantity was given only as *number*. In order to determine the average per gram price of a pearl, number was converted into weight (grams) using the industry estimates: Average wight of each pearl = 0.78 momme; 1 momme = 3.75 grams (Paspaley Pearling Co. Pty Ltd, Darwin – personal communication).

Table 2 gives estimates of average prices received for Australia's export of pearls. It can be seen that in 1995-96 the considerable expansion in volume of exports compared to 1994-95 was accompanied by a substantial reduction in the average price received for pearls. Price recovered in 1996-97 with volume of pearl exports being reduced to about three-quarters of that in 1995-96. The pattern of price fluctuations is similar to that observed for Tahitian black pearls. However, the relative variation in price is greater for the Australian pearl, and the recovery of price after the trough of 1995-96 seemingly stronger for Australian pearl exports. This possibly reflects a much sharper reduction in relative supplies by Australia following the 1995-96 collapse in prices. In turn, this possibly reflects the greater market concentration in the Australian industry compared to French Polynesia, and therefore superior capacity to regulate supply.

Most of Australia's exports of pearls are cultured rather than natural. Table 3 indicates that in 1996-97, for instance, more than 95 per cent by value of Australian pearl exports consisted of cultured pearls. Japan was the main market destination for such pearls followed by the US and Switzerland, with Hong Kong, Spain and Germany providing significant market outlets (Table 4). Except for the fact the UK replaces Spain, all the significant export destinations for cultured pearls from Australia are also important importers of Australia's natural pearls (Table 5).

Table 3: Contribution of natural and cultured pearls to Australian pearl exports, 1996-97

Categories	Total Export		Total Value (FOB) $	Export Share in Weight (%)	Export Share in Value (%)
	Numbers	Weight in Grams			
Natural pearls whether or not worked or graded but not strung, mounted or set	96,510	282,291.75	8,669,359	10.30	4.52
Worked cultured pearls, not strung, mounted or set	294,652	861,857.1	56,096,798	31.43	29.26
Unworked cultured pearls, not strung, mounted or set	546,172	1,597,553.1	126,987,557	58.27	66.22
Total	937,334	2,741,701.95	191,753,714	100	100

Table 4: Major export markets for Australian pearls (cultured worked - 71012201), 1996-97

Country of Destination	Quantity in No.	Value (FOB) ($'000)	Market Share in Value (%)
Japan	53011	17183.281	30.63
Hong Kong	22662	8934.125	15.93
United Kingdom	32980	7468.752	13.31
United States of America	38081	4547.85	8.11
Germany	18323	3401.825	6.06
Switzerland	10644	2869.397	5.12
Others	118951	11691.568	20.84
Total	**294652**	**56096.798**	**100.00**

Source: Based on data of Australian Bureau of Statistics

Table 5: Major export markets for Australian pearls (natural - 71011001), 1996-97

Country of Destination	Quantity in No.	Value (FOB) ($'000)	Market Share in Value (%)
Japan	16076	1580.896	18.24
Hong Kong	21547	1479.794	17.07
United Kingdom	1796	1167.659	13.47
United States of America	11582	997.737	11.51
Germany	1851	934.784	10.78
Switzerland	7881	806.005	9.30
Others	35777	1702.484	19.64
Total	**96510**	**8669.359**	**100.00**

Source: Based on data of Australian Bureau of Statistics

7. Conclusion

Obviously, it would be in the Tahitian pearl industry's interest to adopt the Australian quota system or a similar one, such as the former Dutch regulation system for oyster banks (Van Ginkel, 1988), not because of a danger of over exploitation of the oyster resource (it is estimated that it is possible to multiply the present production by three or four since many lagoons are still under exploited), but because it is necessary to limit the growth of supply to prevent a further decline in prices as well as anarchic commercial practices. However it is hard to enforce such a quota system because pearl farming occurs on 43 islands scattered on the oceanic zone of French Polynesia, which is as large as Europe. And of course, most pearling activity takes place underwater, which makes it all the more difficult to monitor, even with the help of satellite pictures. The monitoring of grafting activity is also hard to enforce as more and more local grafters are trained and become proficient in their trade. Moreover, it is much more difficult to monitor hundreds of small scale operations (many of them already operating without official licenses) than it is to monitor just 16 licensed large operators in Australia.

Notes

1. According to Rapaport (1996, 43-44), >Islanders often set up spat collection and pearl farms without an authorized lagoon concession and afterward >regularize= their operations. Of the 52 pearl farms in existence (in Takaroa Island) in 1991, 11 (22 per cent) had no authorization from the department of sea and aquaculture. Outsiders also sometimes engage in officially unauthorized pearl farming, but this is generally effected by prior agreement with Islanders from whom they have land rights (...) In 1991 (in Takaroa Island) the total authorized length of line

for spat collection was 13,000 metres, while the actual length of spat collection lines was 107,000 (thirteen times the authorized length). similarly, the total authorized area for grow-out and pearl culture amounted to 47 hectares, while the actual lagoon area occupied was 345 hectares (seven times the authorized area).

2. As of June 1996, unrecoverable debts owed to the SOCREDO bank by small pearl farmers amounted to at least 550 million Pacific Francs, that is, around 5 million US 4 (Institute territorial de la Statistique, Points Forts, 1997).

3. Personal communication by J.P. Dihlan, pearl producer and wholesaler.

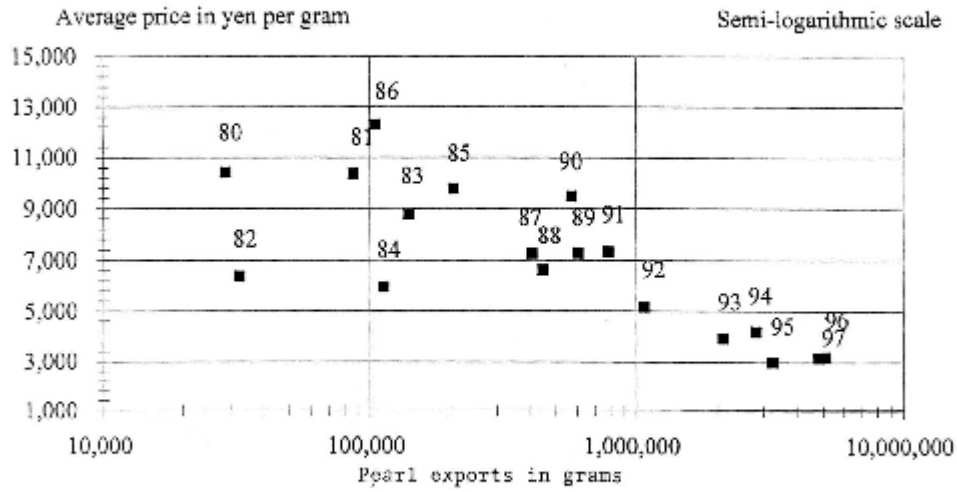
4. In the above-cited paragraph, 'alien' means 'not born on the island'.

5. The average price per gram does not take into account the varying quality of production from one year to the next and the overall increase or decrease in average quality and size over time.

6. This estimate is obtained by dividing the 5 tons harvest of 1996 by the average weight of pearl, which gives 3,700,000 oysters, and then applying a rate of one marketable pearl for every three grafted oysters.

7. Some people in the Tahitian pearl industry tend to doubt that the official Australian quota is strictly enforced, because they think that the Australian pearl supply seems higher than what would be possible given this very limited oyster quota. They think that the Australians underestimate their real production to keep prices high.

Figure 4 Price and export supply of Tahitian black pearls (1980-1998)



Source: Bernard Poirine 1997

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