

Resource aspects of the Fiji beche-de-mer industry

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Introduction

Around 10 of the holothurian species found in Fiji are of varying degrees of commercial importance. These are white teatfish (**sucuwalu**), black teatfish (**loaloa**), sandfish (**dairo**), blackfish (**driloli**), surf redfish (**tarasea**), stonefish, greenfish, curryfish, lollyfish (**loliloli**) and brown sandfish (**vula**). **Dairo** and, to a lesser extent, **vula** are the only species consumed by Fijians. The rest are export commodities valued as a food-flavouring and medicinal item by ethnic Chinese peoples.

Beche-de-mer was the second most significant factor after sandalwood in attracting Europeans to Fiji in the first half of the last century. Also known as trepang, it was a comparatively high-value, non-perishable commodity and was extremely useful as a trade item with China. Merchant sailing vessels, most of them of United States origin, would set up beche-de-mer collection and drying stations in Fiji, trading firearms for a hold full of dried trepang. The trepang would be traded on Chinese markets, often through Manila, for silks and other useful Chinese products, and the ships would return to their own countries to complete the cycle.

Like sandalwood before it, the natural resource of beche-de-mer was virtually wiped out in the early 1800s, and by the time the resource had recovered to fishable levels the market demand had dropped and other commodities had become trading items.

Until recently, 20th-century markets for beche-de-mer were found only in expatriate Chinese communities and the island outposts of Taiwan and Hong Kong. This market was easily supplied by production from the Philippines, Japan and Indonesia, and production in Fiji was limited to small quantities of the higher value species, mainly the teatfish (**sucuwalu** and **loaloa**). The Fisheries Division, with the help of the South Pacific Commission, spent considerable effort on developing this industry in the period 1978–1985, but never made much headway. Teatfish are deeper-water species preferring smaller-island habitats and were never of a high enough export value to mitigate the difficulties of intensively collecting them.

However, in the mid-1980s, trade started to open up again with mainland China, particularly from

Hong Kong, and it was discovered by traders that beche-de-mer was a very useful barter item to overcome problems in currency transactions. The market opened up very rapidly and a whole range of species – even the lower value species – became valuable. These lower-value species were mainly found in shallow, inshore areas around the main islands and, whilst they were easy to collect in large quantities, they were also easy to over-exploit.

Beche-de-mer exports from Fiji boomed in 1985. The annual level of exports of dried beche-de-mer had never been more than 50 t/yr for the past hundred years, but rapidly climbed to over 700 t in 1988. The real figure was probably nearer 1,000 t, since a considerable amount appeared to go through Customs classified as "Miscellaneous molluscs". Bearing in mind that beche-de-mer shrink to one-tenth of their fresh weight during processing, a total of 10,000 t of beche-de-mer was probably harvested from Fiji reefs in 1988. This was easily Fiji's biggest single fishery, in terms of tonnage, and the export value (extrapolating the figures quoted by Customs) would have been around F\$4 million (F\$4 per kg). The average value quoted by Customs rose to F\$5 per kg in 1989, F\$9.50 in 1990 and was F\$8.22 per kg in 1991. In the first three quarters of 1991, 285.4t were exported; the figure is likely to rise to 380 t by the end of the year, for a total (Customs-quoted) value of F\$3 million.

The Fisheries Division, and several exporters we have talked to, expects the volume of exports to tail off much further in the future, due to increasing resource-availability problems. Although the level of exports has remained around 400 t for the past three years, it seems that this level is only being maintained by exploiting new or more distant reefs, and by exploiting different and lower-value species. In 1988, the vast majority of the trade was in blackfish (**driloli**) but more recently there have been increasing quantities of other species such as greenfish, redfish and stonefish. In other words, this graph is the sum of what is probably a series of sharper peaks and declines for individual species.

Problems

1. Resource problems

There were fears in 1987/88 that the huge increase in production of beche-de-mer (1000% in three

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years) would lead to devastating effects on the natural resource. Beche-de-mer, like most other tropical sedentary resource fisheries, tends to have a 'boom and bust' cycle of exploitation. A new market demand or a rise in price stimulates investment in the fishery. It becomes overharvested after a certain period, but new investment still continues, based on the previous year's prospects, and the fishery collapses. It is some time before the natural resource regenerates sufficiently for the cycle to start all over again, and this regeneration time is even longer when investors are unable to abandon infrastructures and are forced to keep eating into the "resource capital" (the remaining natural broodstock) to try and service their investments. This cycle has been noted for many fisheries, including the Fiji beche-de-mer fishery itself in the last century, and the trochus and beche-de-mer fisheries in New Caledonia before World War II.

This boom-bust cycle can only be avoided by very comprehensive regulatory measures – measures which are far beyond the current capacity of the Fiji Fisheries Division, particularly in a policy climate of deregulation and cutbacks in civil service expenditure. However, measures can be taken to minimise the problem.

As a first approach to controlling inevitable over-exploitation, Cabinet approved a 3in minimum size limit on the export of beche-de-mer in 1988. The major export species had become blackfish (**driloli**). **Driloli** is the smallest commercially important species. Individuals reach sexual maturity at a size of about 5in. Experiments and observation showed that a 5-in individual would shrink to 2.5in when processed, so the 3in minimum size for exported beche-de-mer was designed to ensure that individuals of the major exported species would have a chance to release eggs before being liable to harvesting. There was no hope of sustaining exports at 1988 levels and the main aim of this regulation was to slow down the rate of the predicted resource "crash". Without resource protection, exports would continue at a high level for a couple of years and then fall to virtually zero. With protection, the resource could be harvested for a longer period, even if at a lower level.

This strategy was effective for a while, as can be seen from the drop in exports after the law came into force in 1989 (although a large part of this drop was probably also due to a decline in total abundance of the resource). However, enforcement is a problem, particularly as there is no legal requirement for exporters to notify the Fisheries Division of shipments and the size limit is only enforceable at the point of export. Increasing

quantities of undersized product came back into the market in 1990 and at the end of the year Cabinet approved a further amendment enabling the Fisheries Division to enforce the size limit in the factory. Still, enforcement of this regulation across the board is difficult under the limited resources available to the Fisheries Division (which has 26% of its posts vacant). Stricter guidelines for the inspection of export shipments have now been introduced.

It was hoped in 1988 that this measure might stabilise the fishery at levels of indefinite sustainability (which would probably be in the region of 100–200t per year) but subsequent experience has shown that this hope is very unlikely to be realised. Too much of the original standing stock has already been harvested to sustain full yearly regeneration.

It may be wiser from the national point of view to accept the "boom and bust" cycle of the fishery and to maximise export earnings by allowing harvesting to continue for a further period, followed by a complete closure of the fishery for several years to allow full regeneration. This would allow a further cycle of maximum earnings rather than a continuous very low level of return.

If exploitation is to continue at present levels of effort, the most likely scenario is that beche-de-mer fishing will dwindle to unprofitability. However, if fishing still continues, even at low levels (likely if the world price continues to rise), beche-de-mer stocks will never get the 'breathing space' to regenerate to former levels. Without a moratorium or ban, Fiji might expect exports to drop to less than 50t a year for the next 10 years (500t total). With a five-year moratorium, followed by five years of fishing, we might expect the same level of exports as over the past five years (over 3,000t total), for that 10-year period.

2. Socio-economic problems

(a) **Dairo**, *Holothuria scabra*

One potential problem that was identified early was the likelihood that **dairo** resources would be quickly wiped out. **Dairo** is one of the highest-value species for the export market, but is the one species that is consumed locally. It is an important subsistence food-source in times of hardship and following cyclones. There was the added worry that **dairo** is more exacting to process than other species, due to its chalky coating, and there was every likelihood that a lot of product would be rejected and wasted. A ban on the export of **dairo** was approved by Cabinet in 1988, although an exemption clause in the Fisheries Regulations

allowed the Minister for Primary Industries to allow exports in special cases.

The intention was to allow exports of **dairo** only by companies with a good reputation and proven ability to produce an acceptable product and only in cases where the owners of customary fishing rights were completely willing to exploit their **dairo** stocks. It would thus be up to the traditional owners to decide whether they wanted to trade off cash in hand against the loss of future subsistence fisheries.

The Fisheries Division has no wish to meddle unduly in the rights of customary fishing rights owners to manage the resources under their control, but it is noticeable that **dairo** levels have dropped remarkably on many reefs, and that it is increasingly difficult to find **dairo** being sold in municipal markets.

(b) Foreign vs. local exporters

Another problem has been the vast number of companies wishing to enter the business. In 1986 there were just three exporters of beche-de-mer. By 1988 there were 24, with more applying all the time. Many of these new companies were foreign-dominated and, whilst they provided a multitude of outlets for village fishermen and competition on prices, there was no way that the beche-de-mer resource could support this many companies for long at profitable levels for all.

In 1989, the Beche-de-mer Exporter's Association was formed. The idea was that membership of the Association would be limited to reputable companies – companies with an established stake in the future of Fiji – excluding the agents of overseas companies who came into the country with a pocketful of money, travelling round the districts buying from the processing stations set up by locally-based companies. By agreement with Customs, exports of beche-de-mer would only be allowed to those exporters holding an export permit from the Fisheries Division and the Division would only give permits to members of the Association.

Whilst a good idea in principle (the Trade Advisor to the Forum Fisheries Agency hailed it as one of the most progressive developments in the South Pacific fisheries sector for years), the Association generated considerable controversy and the Ministry had to withdraw the export licensing linkage in December 1990. The main problem was the perception by non-members that a "cartel" was controlling the industry for their own profit, and that there was no chance for new companies, particularly Fijian companies, to get involved in the export side of the fishery.

However, the Association appears to have been of considerable benefit. For a time it managed to reduce the total number of exporters to 12 established companies: a reasonable figure that permitted free competition on prices to the benefit of fishermen, but allowed those companies more freedom to invest in village fishing operations (loans and grants of boats, equipment and fuel, as well as processing gear) without worry about commercial "poachers". During 1989/90 there was a noticeable rise in the standard of processing and hence in the reputation and value of Fiji's exports. According to Customs, this was accompanied by a marked rise in the per-kilo value of Fiji's beche-de-mer exports over the period 1988-90. Also according to Customs-declared prices, that value has since fallen again.

However, it might equally be said that the rise in per-kilo value was due to a rise in world market prices, and that the recent fall has been due to the greater percentage of lower-value species being processed.

Conclusion

Beche-de-mer will not become extinct in Fiji. They are too adept at hiding under rocks, and of too low a value individually to make it worthwhile to collect every last one. They do not face the fate that threatened the **vasua dina** before exports were banned in 1988 and that is still threatening the turtle. But the people who make a living out of this fishery face economic hardship if stocks fall below commercially fishable levels.

The beche-de-mer fishery has been of considerable economic benefit to rural fishermen over the past five years. The peak years of the fishery, in 1987 and 1988, coincided with the peak of Fiji's economic troubles, and many rural areas were able to survive on the proceeds of their beche-de-mer fishing. Fisheries Division records show that many fishermen were able to pay off the Fiji Development Bank (FDB) loans on their fishing boats in record time during this period, although, regrettably, the diversion of effort into beche-de-mer fishing was one of the main factors in the failure of the seaweed farming industry to get established and in people being unable to repay FDB seaweed loans.

Fortunately, the beche-de-mer fishery has not taken rural people out of their traditional context. They are not totally dependent on this part-time fishery and will slip back into their normal activities as the fishery declines. It is a different story for the exporters. Many of the new seafood companies set up over the past five years have based most of their operations on beche-de-mer and face a very uncertain future if their mainstay disappears. There

are not very many marine resources, apart from tuna and outer-island reef-fish, left to exploit, since most of the higher-value, easy-to-collect resources are low in numbers.

After the controversy generated by the trade protectionism inherent in the Beche-de-mer Exporters Association, the Fisheries Division will not become willingly involved again in trade regulatory measures. Such measures can only be imposed effectively through harmonised Government policy, and implemented by an appropriate Government agency. The Fisheries Division will continue to advise Fiji Trade and Investment Bureau (FTIB) and other trade bodies that further investment, particularly foreign investment, in beche-de-mer exporting is undesirable. However, the Division has concentrated its resources on more appropriate measures, particularly the protection of immature beche-de-mer, and measures designed both to reduce the rate of the likely forthcoming collapse and to speed the eventual regeneration of the resource.

One helpful measure would be for owners of traditional fishing rights to prohibit beche-de-mer fishing in certain reserve areas. The Fisheries Division has no legal powers to set up such reserves,

but the Fisheries Act allows ample scope for resource custodians to endorse fishing permits accordingly, and to ban fishing for a particular species in a particular area under their control. Such areas would provide a protected breeding ground for "broodstock" beche-de-mer, whose spawn would help to replenish surrounding areas and enhance the fishable stock. Recent research shows that some species of beche-de-mer tend to spawn together in synchrony, and a cloud of larvae drift down-current to settle on a suitable reef. Protected areas would thus be best placed upstream in the prevailing current. The Fisheries Division hopes to perform more research on this phenomenon, but local knowledge and common sense are likely to be just as useful as scientific research in this case.

It is extremely unlikely that reseeded reefs with artificially cultured beche-de-mer will ever make an impact on the problem. An enormous amount of basic research still has to be done on tropical beche-de-mer species, both to culture them and to determine which areas should be reseeded. Attempts will be made to gain this knowledge, and to request the resources necessary to do that research, but it would be far more efficient and cost-effective to protect that part of the natural resource that we still have and to encourage natural regeneration.

Beche-de-mer poster for Papua New Guinea

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In support of the Papua New Guinea Department of Fisheries and Marine Resources' research work on beche-de-mer, carried out by Paul Lokani at the Kavieng Fisheries Laboratory, SPC is providing technical and financial support for the preparation of a poster on beche-de-mer species.

Although compiled in response to a request from PNG, the final version of the poster is likely to be of interest to fisheries officers, traders and those involved in marine resource education in all Pacific Island countries, especially those with large beche-de-mer fisheries.

The poster will be principally aimed at fisheries inspectors and other fisheries officers, and is intended to help them identify beche-de-mer correctly down to species level, in order to improve export statistics on this group of animals. At the present time, there is much mixing and most beche-de-mer exports are not classified by species. This makes it difficult for fisheries research staff, who are expected to provide advice to the government on management of the fishery, to understand how

heavily the various different sea cucumber species are being exploited.

Because inspection of beche-de-mer happens after processing, the poster will mainly feature photographs of the various types of finished product, although for each species treated, pictures of the live or fresh animal will also be shown. As well as distinguishing the various beche-de-mer types, the poster will also show examples of differences in quality to help inspectors check on grading and on the approximate relative values of export consignments.

Earlier in the year Detlef Blumel, Graphic Arts Officer at SPC's Regional Media Centre in Suva, Fiji, spent some time working with SPC scientist Garry Preston, visiting beche-de-mer traders in Fiji to photograph as many types and grades of beche-de-mer as possible. These were pasted up into a mock-up and forwarded to Papua New Guinea for comment. Feedback from PNG has been received and will be incorporated into the final version of the poster.