

Since no legislation has been effective in controlling the exploitation of this resource, Fisheries Enforcement Officers have so far based their actions on their individual judgement and experience in the field. This approach leads to inconsistency, as there are no written rules on which to base prosecutions. In addition, problems arose when there was a national strike and new employees recruited — it is difficult for them to recognise undersized dried beche-de-mer. Beche-de-mer exporters could export undersized animals, knowing that they could not be prosecuted because there was no legislation by which Fisheries Officers could secure convictions.

Export data are usually given to the Fisheries Department, indicating tonnage collected per given area. However, these do not show which species are more heavily exploited than the others. Fisheries Officers realised that it might not be absolutely necessary to adopt legislation from other member countries, because environmental conditions influ-

encing the growth and survival of sea cucumbers might vary between countries. In addition, concern is also being raised over differences in shrinkage among species, which would of course have an effect on the size limit of the processed animals. It might be necessary to have processing trials on various commercial species to be able to come up with size limits for different species. This could include legislation covering species of commercial importance.

The quality of dried beche-de-mer in the country must also be effectively controlled when competing with the rest of the market in the region. In Vanuatu, especially in the areas where beche-de-mer fishing is most popular, the only means of transport is by boat. And since the sun-dried method is the only method used for processing this resource, organisms such as fungus tend to infest the processed animals, making them unsuitable for sale. In one case, 3.5 tonnes of sun dried beche-de-mer had to be discharged due to fungal infection.

### Status and management of inshore fisheries in the Kingdom of Tonga: Beche-de-mer

*by Ministry of Fisheries*

The fishery began in Tonga in the early 1980s. It is based in the Ha'apai island group with its abundant coral reefs, although product is also harvested from the Vava'u and Tongatapu island groups. The fishery began to develop rapidly after the introduction of assisted underwater breathing apparatus (scuba and hookah) in the late 1980s–early 1990s. Despite an absence of recorded data, it is likely that the fishery peaked in 1994.

After fishers collect the sea cucumbers, they either clean and process them themselves before selling to an exporter, or they sell them fresh to either a middleman or direct to an exporter who cleans and processes them. Generally the fisher is paid between T\$5 and T\$7 [1 T\$ = US\$ 0.75] per plastic bucket for sea cucumbers, regardless of species composition. On occasion, the fisher is paid in the way he prefers—using a sliding fee per animal, depending on the species and size. There are ten registered exporters in Tonga, seven of whom are active.

The Beche-de-mer fishery in Tonga is attractive to fishers, as the animals are easy to collect, dried product keeps without ice, and there is always a market. These features, combined with the 'open-access nature' of Tongan fisheries, are causing a rapid demise in the stocks of sea cucumbers in

Tongan waters. As higher-valued species are becoming less abundant, lower-valued species are being harvested in increasing amounts. Information from the Ministry of Fisheries seven-month-old export fisheries database has supported this observation. This information includes the following:

- ☞ Higher value sea cucumbers are not being collected in increasing amounts. For example, sandfish free-on-board (FOB) value is T\$25.00 but exports have remained static and average 116 kg/month;
- ☞ Higher prices are being paid for less popular species. For example, elephant fish were T\$2.00/kg FOB in November, but now fetch T\$7.00 FOB;
- ☞ The quantities of lower-valued species exported has increased. For example, greenfish was not exported until January 1995 (334 kg), yet by March, 13,025 kg was exported;
- ☞ Despite either stable or increased prices, regularly increasing production has occurred in only three of the 15 species traded, and there are species fetching T\$7.00 or less FOB prices;

- ☞ Larger and/or more valuable sea cucumbers are now coming from waters either only accessible to scuba and hookah divers (i.e. stocks within free diving and reef-walking limits are fished out) or from previously unfished areas, or both;
- ☞ Smaller and smaller pieces of dried product are being exported. A one kg bag of dried greenfish recently exported contained an estimated 350 pieces;
- ☞ Even though the price fishers receive is very small compared to the value of the dried product, there are reports of fishers earning enough from sales to build their own homes. Such rewards must represent many tonnes of fresh product per family. Six fishers selling their product to a middleman in Talu, Vava'u group, harvested 55,776 surf redfish (telehea) over the four-month period January to April this year (i.e. 2,324 telehea/man/month).
- ☞ Changing market preferences, coupled with a decline in stocks of many species, has meant that species traditionally used in the subsistence diet (e.g. for lomua) are being harvested.

#### MANAGEMENT PLANS

The major ones are:

- ☞ a widespread public awareness campaign, particularly directed at fishing communities;
- ☞ strict implementation of the fisheries regulations by the Ministry of Fisheries, pertaining to sizes for both the fresh and dried form (legal minimum sizes have been declared for some species already);
- ☞ nomination of minimum sizes for unregulated species;
- ☞ a restriction on the number of exporters to ten, with no additional licences offered;
- ☞ immediate ban on the use of scuba and hookah gear for collecting sea cucumbers, and effective policing of the ban;
- ☞ spot surveys in areas previously (1984, 1990) surveyed, to allow an assessment of the extent of the harvesting and to permit nomination of quotas.

Supporting management measures are: encouraging community management; designating a beche-

de-mer liaison officer; schedule a closed season at the end of each year (when most species are spawning); nominate and police closed areas; conduct an economic survey into the fishery; carry out research on wet-weight/dry-weight conversions, biology, and appropriateness of measurements; undertake aquaculture studies on inducing fission in local species; and teach better handling and processing procedures in communities.

**Table 1: Total recorded exports of beche-de-mer from 1990 to November 1994 (source: Customs Department) and for 1995 (Source: Ministry of Fisheries)**

Year	Quantity (kg)	Value (T\$)
1990	no record	no record
1991	9,767	47,978
1992	no record	no record
1993	35,367	427,745
1994	61,449	805,816
1995 (5 mths)	60,160	515,305

**Table 2: Information on exports of product by species from November 1994 to end of May 1995)**

Species	Total exports (kg)
Sandfish	2,089
Surf redfish	23,385
Stonefish	7,554
Black teatfish	2,976
White teatfish	6,650
Greenfish	17,931
Tiger/leopardfish	1,194
Prickly redfish	1,300
Curryfish	5,400
Brown sandfish	680
Blackfish	760
Lolly fish	19,295
Black lollyfish	672
Elephant's trunk fish	1,345
Black sandfish	980
(unstated)	1,030