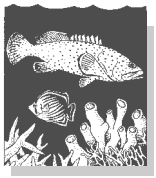

The live reef fishery in the Seychelles

by Nokome Bentley[1] *& Riaz Aumeeruddy*[2]

Overview

The Republic of Seychelles consists of over 100 small islands lying north of Madagascar between four and ten degrees south of the equator. The population of about 80,000 people comes from a number of ethnic backgrounds including African, Chinese, European and Indian. Most live on the largest, granitic islands of the Mahe Plateau in the north. Most of the coral reefs in the country occur on the atolls several hundred kilometres to the south. These include Providence and Cosmoledo Atolls and the World Heritage listed Aldabra Atoll (Figure 1).

Fishing is an important part of the nation's economy and fisheries products account for 95% of the value of exports. This is largely due to the oceanic tuna resources within the large Seychelles Exclusive Economic Zone. However, coastal and coral reef fish species are an important part of the diets of local people. In 1997, the artisanal catch on the Mahe Plateau was about 4000 t and made up mostly of jacks (*Carangoides* spp.), jobfish (*Aprion virescens*) and mackerel (*Rastrelliger* spp.). Groupers (*Epinephelus* spp.) usually represent between 3 and 5 per cent of the artisanal catch. The Napoleon wrasse is not common around the main islands and is not usually targeted by local fishers.

Live food fish

The fishery for live reef fish in the Seychelles is very new. During 1997 there were a number of requests from Hong Kong-based companies to fish for, and export, live reef fish. However, according to Seychellois legislation, foreign companies are not permitted to fish for demersal species, and so all requests were denied.

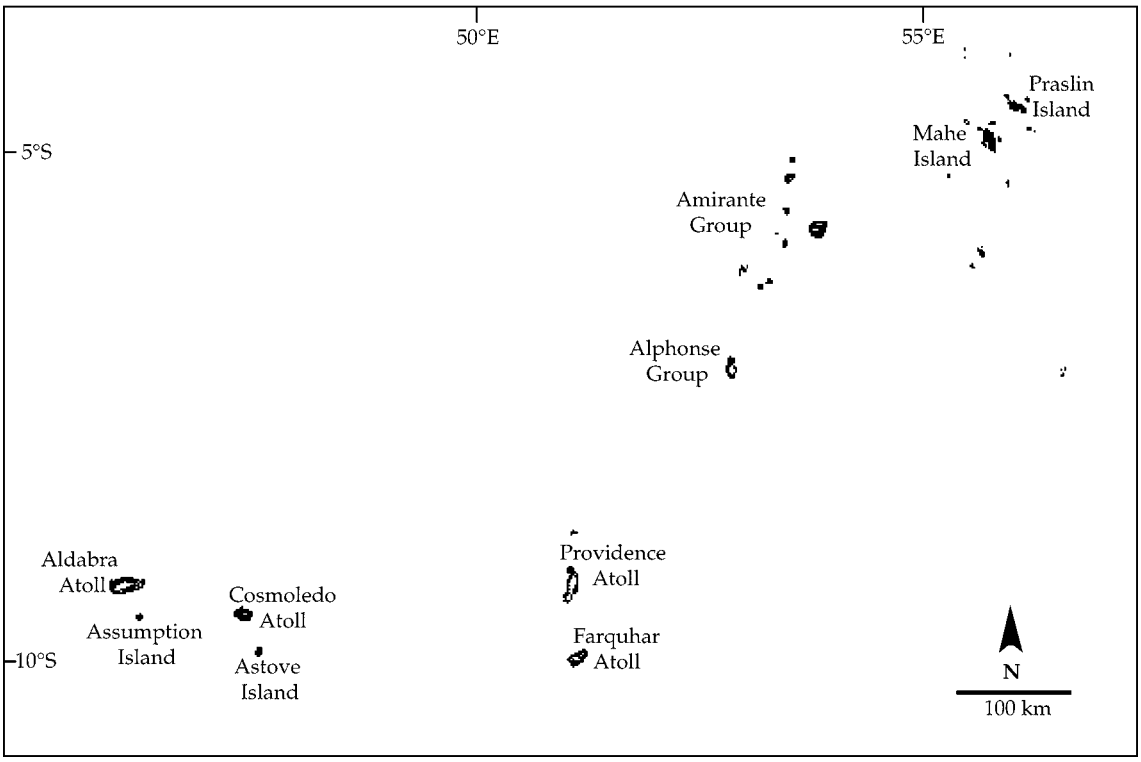

Figure 1. **Map of the Maldives.**

1. Trophia Research and Consulting, P.O. Box 60, Kaikoura, New Zealand
2. Seychelles Fishing Authority, P.O. Box 449, Victoria, Seychelles

In 1998, a Seychellois company made a similar request to the Seychelles Fishing Authority (SFA). The Government granted permission for the company to begin live food fish exporting on an 'experimental', or trial, basis. The fishery was limited to a maximum of 40 t of exports of fish caught from Farquhar Atoll only, for a period of seven months, February to August 1998. Farquhar Atoll was chosen because it had a sufficient area of coral reef to support such a trial, is visited only occasionally by local fishers because of the distance to Mahe Island, thus reducing the likelihood of competition for fish.

All the fishers for the trial were brought from China. The SFA felt that this was acceptable since local fishers did not have experience in the capture of live fish and were not being displaced from traditional fishing grounds. The operation had to be land-based, no mother-ship was allowed and all staff lived on land. Only hook and line was allowed and no compressed air equipment was permitted on vessels. The company chose to use leaded hooks and small dories with outboard motors and two crew each. These dories were not suited to the rougher seas outside of the atoll and all fishing occurred within the lagoon in about 10–15 m depth.

An observer from the SFA was based at Farquhar Atoll to monitor the fishing operations and record the daily catch, effort, fish mortality and exports. During the trial, a total of 33 t of live reef fish were exported consisting mainly of coral trout (*Plectropomus* spp.), grouper (*Epinephelus* spp.) and Napoleon wrasse (*Cheilinus undulatus*). It is estimated that an additional 8.7 t of fish died before export. The fish caught were of variable size ranging from 1 to 25 kg although those of 1.5 to 2 kg were most sought after because of their higher value.

After the trial fishery finished in mid-1998, the SFA assessed whether such operations should continue. In January 1999, the company was granted a licence to continue the fishery for another year in accordance with a 20-point contract specifying the conditions of operation (based on the recommendations of Johannes & Riepen (1995) and Smith (1997).

The reefs of Cosmoledo Atoll, Assumption Island, Astove Island and Providence Atoll are now open to the fishery (Figure 1). Farquhar Atoll was closed to provide it with a rest after the trial fishery in 1998. The total allowable exports are set at 100 t with a maximum of 25 t to be taken at Providence Atoll. A total of 25 t of by-catch, excluding sharks, can be taken but must be sold on the local market.

Only one mother-ship is allowed but there is no limit on the number of fishing dories. A mother-ship from Indonesia was used with 17 single-man dories and a foreign crew. Again, the SFA felt that this was acceptable as, due to poor living conditions, it was unlikely that local fishers would want positions onboard the foreign mothership. All vessels must be licensed by the Seychelles Licensing Authority and display registration numbers.

The transport vessel is not allowed to carry out any fishing operations, and none of the vessels are allowed to possess, store, transport or use any explosives or noxious substances, including sodium cyanide. The mother-ship and dories are not to possess, store, transport or use any compressed air equipment for diving.

According to the contract, holding cages are only to be located at Farquhar Atoll where they can be monitored by an officer of the Seychelles Island Development Company or the SFA. The mother-ship is only allowed to unload catches at these holding cages, and all transhipments for export take place there under the supervision of SFA officers. As the live fish are transferred to the transport vessel SFA officers weigh all fish using their own scales.

The company is required to maintain logs of catch—effort, mortality and feeding. The catch—effort logs record the number and weight of fish in four species / species groups taken by each dory on each day and are submitted to the SFA each month. In addition, the mother-ship is required to regularly report its position to the SFA.

The contract includes the provision for the SFA to impose other restrictions such as size limits, species specific quotas or closed areas. The company is required to pay the SFA a royalty of Rs 3 (US$0.60) per kilogram of fish caught, excluding sharks, to assist with the costs of managing the fishery. The failure to comply with any of the conditions of the contract will result in a suspension of the license.

Several further enquiries have been made by Chinese companies for establishing live reef fish operations in the Seychelles. However, the SFA has declined any requests for further expansion of the fishery. They consider that it would be unlikely that more than one operation could operate given the current estimate of the maximum sustainable yield of 100 t. Furthermore, the SFA recognises that its regulations are far easier to enforce with only one company operating.

Aquarium fish

There have been several inquiries made to the SFA for the export of aquarium fish but these have all

been declined. The Authority considers that the risk of damage to reefs, as suggested from experience in other countries, is greater than the potential benefits to the country.

Other threats to coral reefs

During 1998 there were extended periods of unusually high water temperatures on the Mahe Plateau. This caused the widespread bleaching of corals in the area. Around the islands of Mahe, Praslin and La Digue up to 90% of corals were bleached. However, the majority of the countries' reefs in the south of the country appear to have been less affected.

Dynamite fishing has not been traditionally used in the Seychelles, and its use as well as that of noxious substances is strictly prohibited by the Fisheries Act. The fishery on the Mahe Plateau for coral reef fish destined for the local and export markets is not considered to be heavily overexploited. However, the SFA is encouraging local fishers to shift towards offshore pelagic resources to reduce the pressure on demersal fish stocks.

Discussion

The Seychelles Fishing Authority has managed the fishery for live reef fish to minimise damage to coral reefs and reduce the risk of overexploitation. From the beginning, the SFA has maintained a high level of control over the fishery through the clear definition and effective enforcement of licence conditions. The risk of overfishing is reduced by placing limits on the area fished and the quantity of fish caught. Damage to reefs has been minimised by allowing only hook and line fishing. These central conditions are supported by ancillary conditions that make enforcement easier. Effective enforcement has been possible because the number of licences allocated—only one—is appropriate given the enforcement resources of the SFA. Considering that some of the islands are as far as a thousand kilometres from the main island, regulations would be difficult to apply if more licenses were allocated.

Despite the success in managing the fishery, the SFA is still considering its future. The situation will be reassessed at the end of the present license, but it is clear that the SFA will not encourage the further development of the fishery. With the present level of the export quota, the logistics and costs involved in fishing at the southernmost islands of the Seychelles and costs of transport of fish to the markets in Hong Kong, the fishing company itself is not sure whether the venture is viable.

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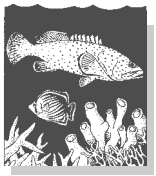

Live reef food fish trade in the Banggai islands (Sulawesi, Indonesia): A case study

by Mochamad Indrawan [1]

Abstract

A field survey of the live reef fish (LRF) trade in the Banggai Islands was conducted in 1997, ten years after the trade began to flourish systematically. Napoleon wrasse had initially been the main target fish, but attention had shifted more toward the groupers. The structure of the LRF trade was relatively simple, involving mainly exporter and buyer. Johannes and Riepen' (1995) indicators of decline were encountered during this survey. The impacts of over-exploitation will be borne mainly by resident fishing folks and not by the exporter, making it a classic case of externality. There seems to be no easy way out of this problem, but some priorities were identified for consideration including the need to develop local stewardship and alternative livelihoods.

1. WWF –Indonesia Programme, Jalan Kramat Pela No°3, Gandaria Utara, Jakarta Selatan, 12140, and YABSHI–Indonesian Foundation for the Advancement of Biological Sciences, Jalan Tanah Baru Raya 98, P.O. Box 103, Depok 16401.