

Over USD 1.3 million in 48 days of harvest Palau shares lessons on sea cucumber management

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Most sea cucumber fisheries in the Pacific Islands region are overfished, but as countries look for working models of sustainable sea cucumber fisheries and improved economic returns, Palau has some valuable experience to share.

Palau, like many other Pacific Island countries, experienced overfishing of its sea cucumber stocks from the 1980s to 1990s. Since 1994, Palau has enforced a ban on the commercial harvest and export of six of its main commercial species. Sea cucumber species consumed locally, referred to as “subsistence species”, were not included in the 1994 fishery ban and continue to be harvested for subsistence use: both for local sale, and for export to Palauans living abroad. Seventeen years later, in 2011, a seven-month open season was permitted in order to trial a new harvesting strategy. At a time when the beche-de-mer supply across the region was in decline, Palau had the perfect opportunity to trade its sea cucumber products at an optimal value. The harvesting season was permitted in Ngardmau State for two of the non-banned species: hairy grayfish (*Actinopyga* sp.), locally known as *eremrum*, and brown sandfish (*Bohadschia vitiensis*) locally known as *mermarc*.

New harvesting strategy

From June to December 2011, a twice-weekly harvest was permitted (on Mondays and Thursdays), with

catches landed at designated landing points in Ngardmau State. This allowed 100% coverage of observation recordings by the Palau Bureau of Marine Resources and the Ngardmau State Rangers. Harvesting was later allowed in seven other States (Ngarchelong, Airai, Aimeliik, Koror, Ngiwal, Ngatpang and Ngaraard) as it became difficult to control harvesting activities in other states and the movement of catches across to Ngardmau State. An additional three landing sites were set up in Ngarchelong, Airai and Koror to record catches from those states. Only Palauan residents of each state were allowed to harvest sea cucumbers, and they had to do so within their own state waters.

All landed catches were sold fresh to the five processors based at Ngardmau, Airai and Koror (Fig. 1a). Buyers were present at the landing site each fishing day at around 15:00 to make their purchases.

Sea cucumbers were sold fresh in a standard 18-litre bucket unit weighting 22.5 kg when full of sea cucumbers (Fig. 1b). A bucket full of brown sandfish contained, on average, 30 pieces of large size specimens and a full bucket of hairy greyfish contained, on average, 300



Figure 1. a) Boatloads of brown sandfish at a landing site in Koror (image: Eyos Rudimch, Director of Koror State Government Office) and b) hairy greyfish in a typical bucket used in Palau during the 2011 open season (image: Kalo Pakoa).

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individuals squeezed together. Sea cucumbers were sold at USD 10.00–12.00 per bucket of brown sandfish and USD 12.00–46.00 per bucket of hairy greyfish. Detailed catch data were recorded at landing sites, including the number of buckets per species by fishers, number of people per fishing group, fishing area and selling prices. During the seven-month season, fishing was undertaken in 48 days.

Landing and export production

In total, 51,573 buckets of sea cucumbers were landed, equivalent to 1,160 tonnes. The landed catches were sold to processors for a total purchase value of over USD 1.3 million. It was a windfall for local fishers in Palau; “never did fishers earn so much money so easily”, according to one fisher from Ngardmau State. This amounted to 72 tonnes of dried beche-de-mer exported at a total declared value of over USD 1.1 million. The five export operators belonged to foreign-owned companies in joint arrangement with local Palauan nationals. It was likely that only a small proportion of the exported value stayed in Palau as is usual in other Pacific Island sea cucumber fisheries. Hairy greyfish represented 70% of exported products by weight and generated 86% of purchase value at USD 1,123,208; brown sandfish made up 30% of the landed catches and 14% of the purchase value. While other species appeared in harvest records (tigerfish, greenfish, curryfish and deepwater blackfish), their quantities were minimal.

The declared total export value of USD 1.1 million was slightly lower than the total purchase value of USD 1.3 million. However, considering that all export operators were keen to renew their licenses, there is little doubt that their operations were profitable. Export values were, therefore, certainly under evaluated. Under valuation of beche-de-mer exports is a common feature of Pacific Island sea cucumber fisheries; this was revealed in a 2012 study of sea cucumber fisheries in Melanesian countries and in Tonga, in which the estimated current value of the fishery was USD 17 million, while an additional estimated value of USD 13 million could be made by these countries if the fishery was well managed and product quality improved (Carleton et al. 2013).

Product prices and lost potential

While fishers made a record income, the purchased prices of US 0.33 for a single brown sandfish and US 0.04–0.15 for a single hairy greyfish might have been too low. Local fishers would have earned an additional USD 472,596 from their hairy greyfish if the US 0.15 per sea cucumber purchase price had been set at the start of the season.

Prices paid in Palau seem low when compared with prices paid in some other Pacific Island countries. In Fiji

for instance, the purchase price of fresh brown sandfish was USD 2.14 per kg (FJD 4.00 per kg); this would be equivalent to USD 48.00 per bucket (bucket size used in Palau) or an estimated USD 1.60 per sea cucumber — almost five times the price paid in Palau. The purchase prices for medium-value hairy blackfish (*Actinopyga miliaris*), which is in the same group as hairy greyfish (genera *Actinopyga*) — and could possibly be the same species — was USD 20.00 per kg for fully dried high-grade product (Carleton et al. 2013). Hairy blackfish was sold by fishers in Fiji at FJD 6.00 (USD 3.20) per kg in 2009. At the highest bucket prices of USD 46.00 used in Palau in 2011, this would be equivalent to USD 2.04 per kg, which is 40% lower in price than the related species purchase price in Fiji.

Generally, the purchase prices of the two products could have been raised to around US 0.30 per sea cucumber or USD 90.00 per bucket for hairy greyfish and USD 1.00 per sea cucumber or USD 30.00 per bucket for brown sandfish prior to the open season. This would likely have doubled or tripled fishers’ income in Palau for the 2011 season.

Hairy greyfish (*Actinopyga* sp.)

Known locally as *eremrum*, *Actinopyga* sp. (Fig. 2) has long been incorrectly referred to as stonefish or blackfish and was referred to as “grey gold” because of its value in the 2011 harvest. It is mostly found in seagrass meadows.

The species is highly valued by the Palauan people as a food resource and as an export commodity. It is an important local delicacy eaten at home, processed into packages and sold at the local market (Fig. 3), or exported to relatives living abroad in Guam, Hawaii and the United States. But, it has not yet been correctly identified by taxonomists (Dr Alexander Kerr, pers. comm., 2014). The unidentified species is found only in Palau and the Federated States of Micronesia (in Yap proper and Pohnpei proper). The name “hairy greyfish” was given by the former Minister of Fisheries of Palau, Harry Fritz, at a sea cucumber management consultation meeting organised by SPC in December 2012 to assist with its proper identification.

Because of the high market demand, stocks of hairy greyfish are in danger of being overharvested. For example, stocks in Ngapang and Ngarchelong have been reduced by 70–90% from the 2011 harvest (Golbuu et al. 2012; Pakoa et al. in press). However, it presents certain characteristics that could make its management successful:

- ✓ it can be easily managed by communities because its habitat is restricted to seagrass beds that can be clearly marked out and protected;



Figure 2. Typical hairy greyfish aggregation (image: Kalo Pakoa).



Figure 3. Hairy greyfish meat on sale at a local shop in Koror (image: Kalo Pakoa)

- ✓ it can reach high densities within a small area; and
- ✓ it is relatively easy to locate, which is an advantage for accurate stock estimates and the monitoring of harvestable quotas.

A no-take marine protected area in Ngardmau State is an example of this; the stock held in the area was not harvested in 2011 because it was under strict surveillance during the open season by the Ngardmau State Rangers.

Lessons and ways forward

Decision-makers in Palau have learned from the experiences of overfishing sea cucumber stocks in other Pacific Islands. While fishers in Palau earned their highest income in this fishery, there is little doubt that more income could have been made if certain management measures had been put in place. The open season in 2011 has revealed gaps in the management system that need to be fixed to ensure effective control of the fishery through efficient catch monitoring mechanisms and better product pricing so that fishers receive the highest possible economic return from the resource. Actions that could be taken to fill these gaps include:

- ✓ set an open season for each state at a time that facilitates effective control;
- ✓ issue separate licenses for processors and exporters with conditions detailing areas of compliance by operators;
- ✓ establish a better recording system of products being transferred from processors to exporters;
- ✓ maintain better records of export quantities and value by species; and
- ✓ look at ways to localise the sea cucumber industry.

The total ban on commercial beche-de-mer harvesting, processing and trading activities enforced as of January 2012 was a timely step in the right direction. When there is a need for a new management strategy, it is better to close the fishery to allow stock recovery while allowing time for changes to be made and new regulatory measures to be passed. SPC and the Palau Bureau of Marine Resources (BMR) have begun developing a new sea cucumber management plan and set up resource assessment protocols for BMR and the Palau International Coral Reef Centre.

Because many countries and territories are looking for models that work best in sea cucumber fisheries, Palau's experience provides useful lessons, including:

- ✓ The sea cucumber resource belongs to the people of each state in Palau who have the right to harvest and sell the product themselves, with no support from processors and/or exporters. And because it is their resource, fishers have a sense of responsibility and respect for it and will tend to comply with management advice.
 - ✓ It is possible to effectively control harvesting activities at the fishing ground level through designated landing sites where 100% recording of catches can take place at agreed on fishing days and times.
 - ✓ With good cooperation, it is possible to get full engagement of communities, fishers, processors, local government officers and fisheries officers working together to effectively monitor and organise sea cucumber fishing activities.
 - ✓ Sea cucumber processing to produce high-grade beche-de-mer can be a costly activity that requires skills and equipment that few fishers can afford; fishers should, therefore, be given the opportunity to sell their product raw at the best possible prices; as has been proven in Palau, they can still earn a good income.
 - ✓ Sea cucumbers are a lucrative commodity and setting minimum reference purchase prices by species and for different levels of processing (e.g. live, salted, frozen, dried) must now be encouraged, where possible, to prevent unnecessary price fluctuations, which are at this stage only set by buyers, often at the disadvantage of fishers.
 - ✓ Restricting processing to licensed processors, as practiced in Palau, guarantees the production of high-grade beche-de-mer by those who possess the know-how and resources to do it. It ensures that the maximum value is derived from the resource, and minimises the production of poor-grade products and wastage resulting from many unskilled fishers processing poor-quality products.
- ✓ Closing commercial sea cucumber fishing for 17 years allowed for stocks to recover and build up; the high income earned in 2011 can be related to reaping the profits of a fixed deposit in a bank that has been allowed to earn interest over 17 years. People of Palau now know that waiting for 17 years is not a loss.
 - ✓ Extended closures and short open seasons, when resources have sufficiently built up and market values of the product are high, may be the way forward in sea cucumber fisheries. Short open seasons also facilitate effective control of compliance to management measures and create scarcity of supply, which usually increases the product's market value. For small-scale fishers, however, very short periods of high income followed by long periods of no income from the sea cucumber fishery may be an issue that will need to be addressed when establishing a sea cucumber fishery management plan.

A national report documenting the state of Palau's sea cucumber fishery will soon be published (Pakoa et al. in press).

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References

- Carleton C., Hambrey J., Govan H., Medley P. and Kinch J. 2013. Effective management of sea cucumber fisheries and the beche-de-mer trade in Melanesia. SPC Fisheries Newsletter 140:24–42.
- Golbuu Y., Andrew J., Koshiha S., Mereb G., Merep A., Olsudong D., Silil B. and Victor S. 2012. Status of sea cucumber population at Ngardmau State, Republic of Palau. Palau International Coral Reef Center. Koror. Palau International Coral Reef Center Technical Report 12-01.
- Pakoa K., Simpson R., Demei L., Olsudong D., Salong C., Rechellul P. and Fisk D. (in press). The status of sea cucumber fisheries resources and management for Palau. Noumea, New Caledonia: Secretariat of the Pacific Community.