SARS and the live food fish trade in Indonesia: Some anecdotes

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Background

The live reef food fish trade is still going strong in Indonesia, fuelled by high prices and supported by expansion into the remoter parts of eastern Indonesia where there are still some grouper resources that were previously little exploited. For example, a scientific expedition conducted during May 2003 in Wakatobi National Park (Tukang Besi Islands in Southeast Sulawesi) observed a large mothership supporting some 30 small canoes trolling for grouper and catching 200 live fish during three days. The mothership transported these fish to Makassar in Southwest Sulawesi for export. Additionally, interviews at local fish cages in Wakatobi Park confirmed that a vessel from Hong Kong recently loaded 500 live grouper (60 were rejected). From the interviews it appears that this vessel visits two to three times per year. Accounting for rejects and a conservative estimate of 5 per cent mortality during capture and holding, at least 1150–1750 fish are going through this particular trade chain annually. Considering the other holding pens observed during the expedition through Wakatobi Park, the total number of grouper taken from Wakatobi reefs and subsequently exported must be several times this amount (Pet-Soede and Erdmann 2003).

According to official Indonesian catch statistics, the production of wild-caught grouper increased from nearly 16,000 tonnes (t) in 1990 to 48,500 t in 2000[4] (Fig. 1) (DKP 2002). The same statistics indicate that Sumatra is the major area for the capture of wild grouper (38% of total production in 2000), followed by Sulawesi (22% of wild-caught production in 2000). Production of farmed grouper has been increasing slightly. In 2000, another 7000 t of grouper were added to the total production. Kalimantan is the largest grouper farming coastal area with 55 per cent of total farmed production, followed by Sulawesi with 27 per cent.

Species commonly targeted for live export include Serranidae (groupers), including *Cromileptes altivelis* and species in the genera *Cephalopholis*, *Plectropomus* and *Epinephelus*, and the Napoleon wrasse (*Cheilinus undulatus*), a member of the Labridae family. As an indication of trends in prices, inflation-adjusted prices paid to fishers for *Plectropomus* species increased steadily from approximately USD 2–4 per kilogram (kg) in 1990 to USD 5–12 per kg in 1995 (Erdmann and Pet-Soede 1996) to USD 7–14 per kg in 2003. These high prices continue to provide sufficient incentive for a vast number of live grouper fishers to participate in the fishery, offsetting the higher expenses of expansion into remote areas. Prices paid to exporters also increased during this period, maintaining their ratio of approximately two to five times the price paid to fishers. This price increase allowed many traders to export their live fish via airplane, shortening the transport time significantly.

The high export prices are supported by continued high demand in places such as Hong Kong,

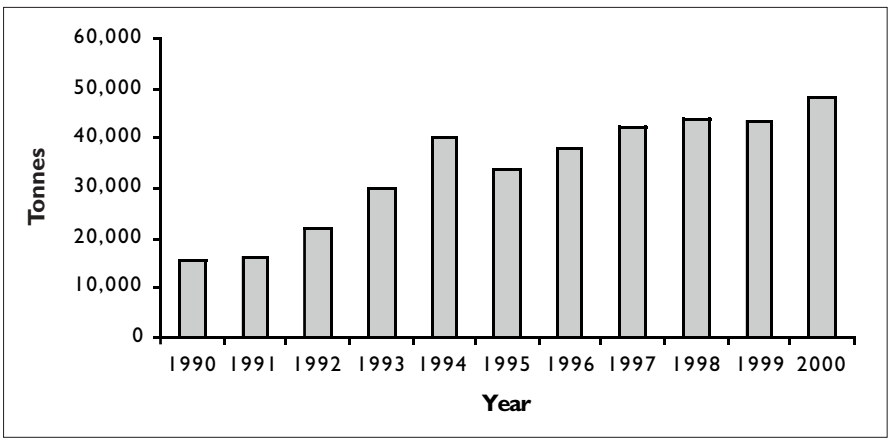

Figure 1. Trends in production of wild-caught grouper in Indonesia, based on official Indonesian fisheries statistics.

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3. Yayasan Taka, Semarang Indonesia. Email: yayasan_taka@yahoo.com
4. In Indonesia, official statistics only include data on general wild-caught and farmed grouper production, not specifying which are kept alive for export, yet these trends are likely similar for live grouper.

Singapore and mainland China. Recent Hong Kong import statistics show that Indonesia ranked fifth as a supplier of live grouper and Napoleon wrasse combined, contributing some 1200 t, or 11 per cent, to the total imports of live food fish into Hong Kong (Chan 2003).[5] Interestingly, wholesale, and especially retail, prices in Hong Kong seem to have dropped significantly in recent years.[6] For example, the retail price for *Plectropomus leopardus* in the 2000–2003 period (Chan 2003) was down to almost half of its retail price in 1997, as reported by Lau and Parry-Jones (1999).

Adverse effects of the live reef food fish trade include destruction of reef habitat from cyanide use and the breaking of coral during capture, and overfishing of grouper stocks, particularly at grouper spawning aggregation sites. These effects are thought to contribute to an imminent collapse of grouper populations. At many reefs in Indonesia it is currently rare to observe significant numbers of target species, especially the high valued grouper species *Plectropomus leopardus* and *Cromileptes altivelis*. Even when some remain, their small sizes often indicate high local fishing pressure. For example, the scientific expedition in Wakatobi National Park reported significant numbers of grouper species only in deeper waters. Among the 647 individuals of Serranidae observed during the expedition, only 100 were species sought after by the live reef food fish trade. Additionally, 29 Napoleon wrasse were observed. Even though these observations may under-represent the actual presence of these highly valued species, 129 individuals observed in 25 dives that totalled nearly 20 hours does not appear to be very much (Pet-Soede and Erdmann 2003).

Conservationists have for a long time tried to reduce the pressure on grouper populations by influencing the market demand and reducing trade. For example, awareness campaigns in importing countries were conducted by The Nature Conservancy (TNC) and the International Marinelife Alliance (IMA) to increase consumers' understanding of the fact that groupers were not sustainably harvested and ecosystems were damaged as a result. Cultured grouper was promoted as a good alternative to wild-caught grouper. Awareness and education campaigns were conducted in exporting countries calling for stricter enforcement of existing bans on the use of cyanide and other illegal substances in the fishery. Policy campaigns were initiated, calling for new protective measures in the form of in-country fisheries regulations and new international trade agreements. However, in spite of these campaigns the market has continued to exert a strong demand. Furthermore, at some locations enhanced enforcement of nationwide bans on the use of cyanide as well as hookah gear have reduced the local use of cyanide, yet grouper stocks continue to face high pressure because of a lack of limits or restrictions on the capture of grouper with hook-and-line or traps. Attempts to regulate the trade of Napoleon wrasse through the application of size regulations and by allowing only farmed individuals to be exported have not resulted in significantly reduced pressure on natural stocks, as legal loopholes in the laws have been found and used. The law treats wild-caught Napoleon wrasse that have been fattened for some time in holding pens or other facilities as farmed fish, allowing them to be exported.

Interestingly, only recently, when consumers in Hong Kong and Singapore chose to reduce their outdoor dining as a result of the acute outbreak of SARS (severe acute respiratory syndrome) did some Indonesian industry members start reporting reduced demand, with resulting reduced prices for live grouper. The SARS outbreak kept the world in its grip for several months. The number of infected people and casualties peaked in early 2003. The disease, a pneumonia caused by coronavirus, was first seen in Guangdong Province in China in November 2002 and quickly spread to Hong Kong, Singapore and even Canada and the USA, carried by international travellers.

The IMA team in Hong Kong reported that 7 per cent of the restaurants normally visited for data collection were closed temporarily or permanently during the April–June 2003 period. The IMA team could not collect price data in February, April or May 2003 because of the risk of SARS infection. The impact of the SARS outbreak on Indonesia as a live reef fish producing country appears different from the impact of the Asian financial crisis in 1997. The financial crisis actually intensified the live reef food fish fisheries in Indonesia due to much higher prices offered to fishers in local currency and the greater profit margins available to exporters as a result of the collapse of the local currency against the US and HK dollars (Erdmann and Pet 1999).

In order to assess the impact of the SARS outbreak on Indonesia's live reef food fish industry, we examined some of the trends in Hong Kong wholesale and retail prices using data made available by IMA (Chan 2003) and we investigated anecdotal reports from South Sulawesi in eastern Indonesia

5. The relative contributions of imports from Indonesia vary by species. For example, Indonesia contributed 17 per cent of all Hong Kong imports of Napoleon wrasse, 50 per cent of *Cromileptes altivelis* and 50 per cent of "other groupers" (Chan 2003).
6. This assumes that the price data were corrected for differences in currency rates and adjusted for inflation.

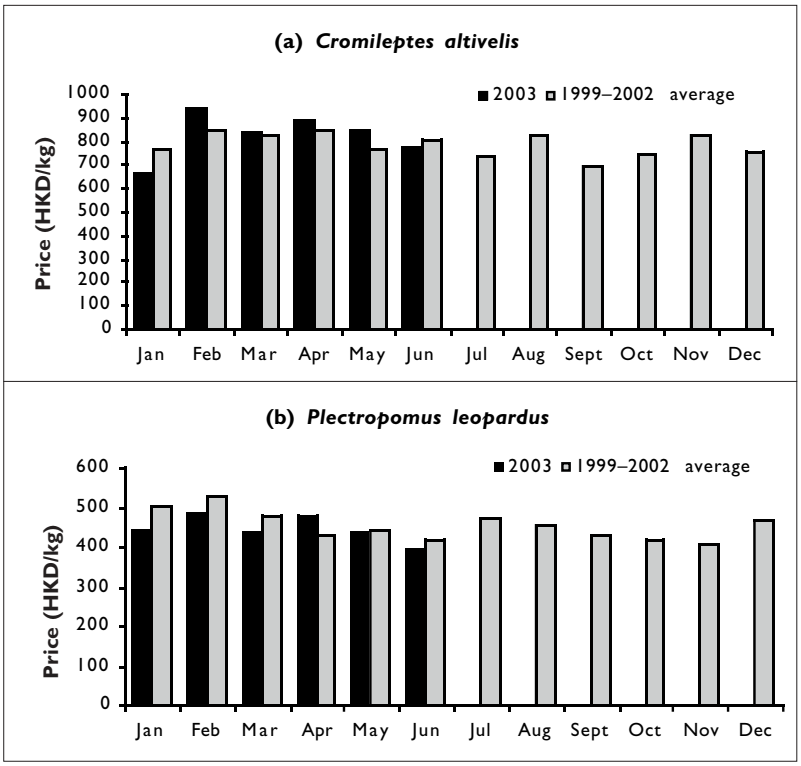

Figure 2. **Monthly variation in Hong Kong retail prices for: (a) *Cromileptes altivelis* and (b) *Plectropomus leopardus* during 1999–2003 (Source: Chan 2003).**

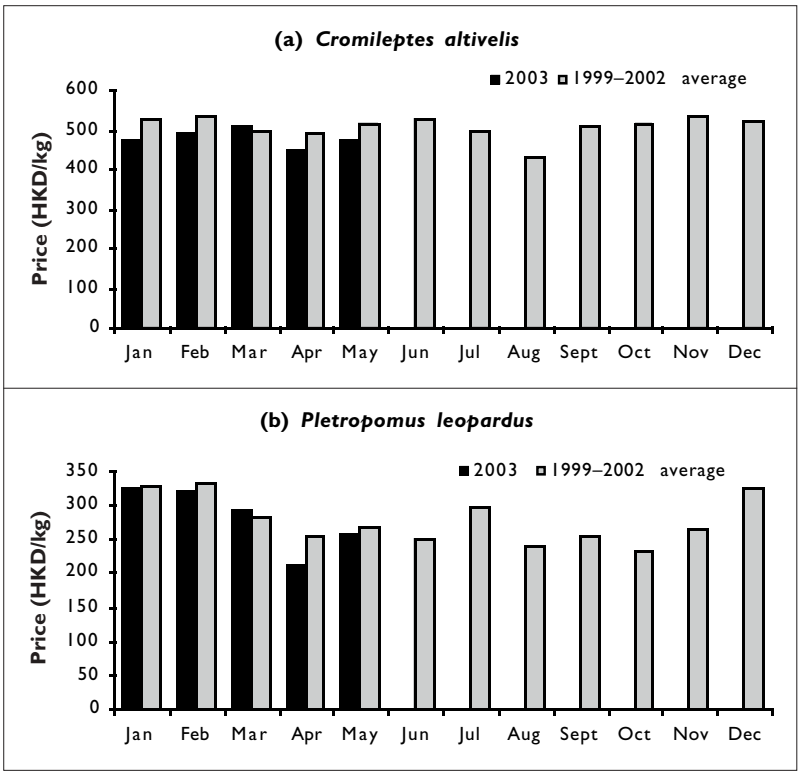

Figure 3. **Monthly variation in Hong Kong wholesale prices for: (a) *Cromileptes altivelis* and (b) *Plectropomus leopardus* during 1999–2003 (Source: Chan 2003).**

and Karimunjawa in central Indonesia. To check the validity of these reports, we also reviewed export data from Bali Ngurah Rai airport, one of the major points of export for live reef food fish in Indonesia. Where there was agreement among these data sources, the impacts on fishers' fishing practices were further examined.

Trends in Hong Kong wholesale and retail prices and import volumes

Graphic presentation of the monthly variance in retail prices for two species, *Cromileptes altivelis* and *Plectropomus leopardus*, does not indicate significantly lower prices during the months of the SARS outbreak (Figs. 2a and 2b) compared to the same months in previous years. The same is true with wholesale prices (Figs. 3a and 3b).

It was not possible to determine whether the volume of live reef food fish imports to Hong Kong declined during the peak of the SARS outbreak in early 2003, as data were not available. Records of import volumes through 2002, however, are available. In November and December 2002, imports into Hong Kong of live fish from all sources did not decline, while Indonesia's share of imports decreased (Figs. 4a and 4b). The pattern was the same with respect to just *Cromileptes altivelis* and *Plectropomus leopardus* — imports of these two species from all sources combined did not decline during November and December 2002. It is probable that at that time, news of the seriousness of the SARS outbreak had not spread very far.

Export of live grouper from Bali airport during the SARS outbreak

Bali Ngurah Rai Airport is known as the main gate for exporting live grouper from eastern Indonesia. Data on exports of live reef food

fish from Bali for the early months of 2003 show a clear drop in both shipment frequency and numbers of live fish exported (Figs. 5a and 5b). This occurred at the height of the SARS outbreak in Hong Kong. Unfortunately, due to lack of Hong Kong import data for 2003, these trends could not be confirmed.

Impacts of SARS on the trade from South Sulawesi

South Sulawesi continues to be one of the most important areas for the live reef food fish trade. Catching live grouper began in Indonesian waters in the 1970s, conducted by foreign fishing boats from Taiwan and China, which transported the fish directly to Hong Kong. To Indonesian fishers, the live food fish trade became known in the early 1990s when people from Hong Kong linked up with family members that lived in Makassar, who then became middlemen. Indonesian fishers were trained how to catch and care for their fish, and in return they sold their fish to Chinese middlemen in Makassar. Once every one to two months, transport vessels would come from Hong Kong and export the fish. The live food fish trade kept growing, and Chinese businessmen hired local businessmen to become suppliers and to deal with the local side of the business.

In South Sulawesi, the main collection and trade areas are located around Makassar and Pangkep (Spermonde Archipelago), Bulukumba, Sinjai District (Sembilan Islands), the Selayar District (Selayar island and Taka Bonerate National Park) and Buton District (Wakatobi National Park). In 2001, the total amount of grouper exported from South Sulawesi Province was 1662 t, with an estimated local value of nearly USD 3.1 million[7] (Table 1).

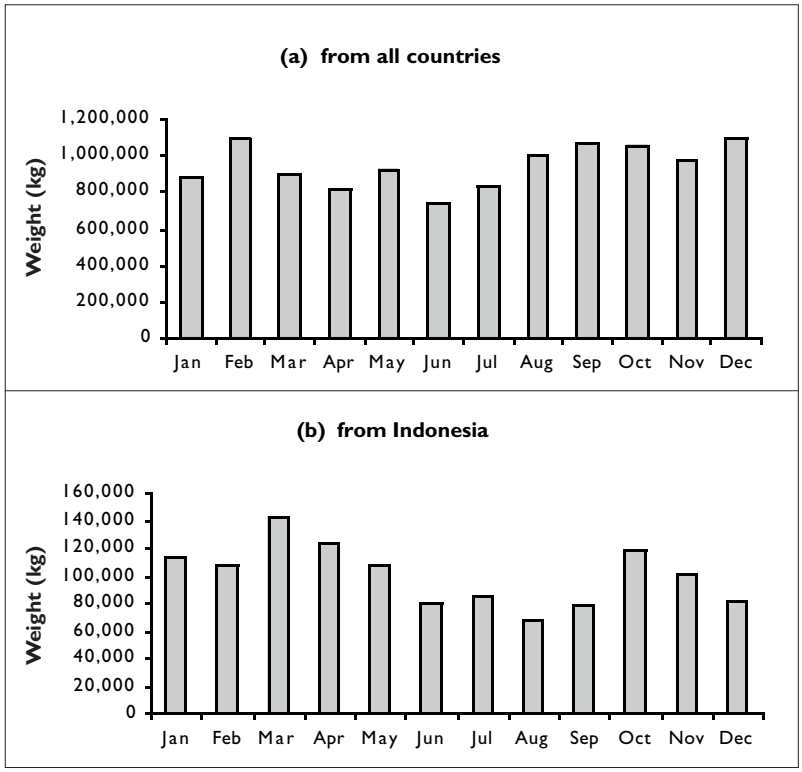

Figure 4. **Monthly variation in Hong Kong imports of live fish from: (a) all countries and (b) Indonesia for 2002 (Source: Chan 2003).**

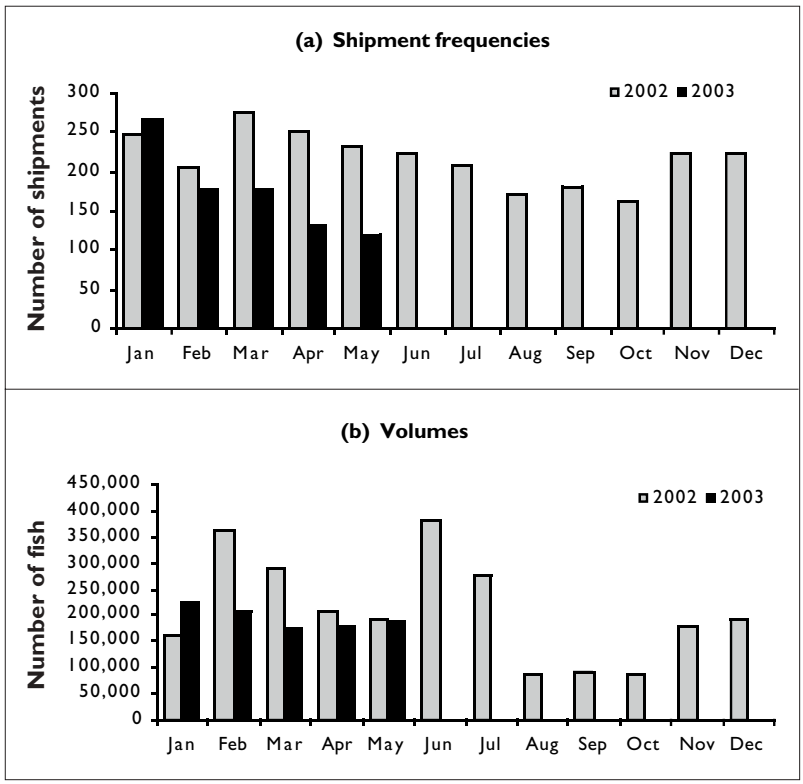

Figure 5. **Monthly live grouper exports from Bali airport, 2002–2003: (a) shipment frequencies and (b) volumes.**

7. Please note that this value from the government statistics works out to approximately USD 2 per kg for all product types combined, and these prices are much lower than what fishers reported receiving for live grouper. The low value is probably a result of both provincial government offices and exporters under-reporting the actual value, for tax-related reasons.

Table 1. **Exports of grouper from South Sulawesi in 2001.**

Commodity	Volume (kg)	Value (USD)	Destination
Fresh grouper	1,547,693	2,653,540	Singapore, Hong Kong, Taiwan, Korea, Malaysia, Australia
Live grouper	25,971	99,594	Hong Kong
Frozen grouper	14,290	16,044	Vietnam
Frozen fillet grouper	74,331	290,819	USA, Australia, Japan

Source: DKP (2001).

Table 2. **Reported prices (in rupiah) paid to fishers for live grouper (mainly *Plectropomus* species), by size class.**

Size class	Before SARS (March 2003)	Spreading of SARS (March–May 2003)	Currently (June 2003)
Sunu Ekoran (1.3–2 kg)[8]	150,000 per fish	60,000 per fish	100,000 per fish
Sunu Super (0.6–1.2 kg)	120,000 per kg	80,000 per kg	120,000 per kg
Sunu Baby (0.3–0.5 kg)	60,000 per kg	30,000 per kg	60,000 per kg

Source: Interviews by the authors (H. Horuodono) with five key people in South Sulawesi (fishers and main traders).

In South Sulawesi, fishers use *jolloro* (traditional boats) that are modified for grouper fishing and short-distance transport. The boats contain small holds for daily catches. Previously, South Sulawesi fishers did not make distant trips, but currently, fishers from Barrang Lompo Island, for example, travel as far as Wakatobi National Park, the waters close to Kalimantan, the reefs of Masalima Islands and sometimes even Halmahera's waters. These remote sites are distant enough that fishing there involves a mothership. In the early days of the trade from South Sulawesi most grouper fishers used cyanide. In the mid-1990s some started to use hook-and-line gear, which is somewhat cheaper to use and does not require payment of "penalties," or bribes, to the marine surveillance apparatus. In these types of operations, smaller boats, called *lepa-lepa*, with only one fisher per boat, are used. During longer trips, catches are held in the hold of the mothership.

Starting in March 2003, many people in the South Sulawesi trade thought that the live food fish trade was collapsing. Prices started to drop (Table 2), and as a result, fishers that had no source of income other than from live grouper saw their incomes decrease.

Table 2 indicates a large reduction in prices during the SARS outbreak. Before the SARS outbreak, classifications included *Sunu Ekoran* (1.3–2 kg), *Sunu Super* (0.6–1.2 kg), and *Sunu Baby* (0.3–0.5 kg). During the SARS outbreak the weight ranges in the top two classes shifted downward to *Sunu Ekoran* (1.1–2 kg) and *Sunu Super* (0.5–1 kg). This meant that the value of a fish slightly larger than 1 kg had become really low, as it was now being traded on a per-individual basis for the price of *ekoran* instead of on a per kilogram basis for the price of *super*. The *Sunu Baby* class did not change. Another effect during the SARS outbreak was that fish larger than 2 kg were no longer wanted at all.

Interviewed traders explained that due to increased holding times stemming from fewer orders, some fish lost weight before being exported, and this was part of the reason that the prices paid to fishers decreased.

Most traders have since shifted back to using the pre-SARS size classes, and as indicated in Table 2, prices rebounded substantially by June 2003.

Most of the fishers in South Sulawesi, especially those that live on the islands near Makassar (Barrang Lompo Island, Barrang Caddi Island, Lae Lae island, and Karanrang Island), do not target only grouper. They also collect sea cucumber, lobster and corals. So, when the price of live grouper

8. Note that prices paid for fish in the Sunu Ekoran size class are per fish, regardless of weight, rather than per kilogram.

dropped, most fishers shifted their attention to these other products. Now that the price for live grouper has rebounded, they have shifted back to capturing grouper as much as they can.

Impacts of SARS on the trade from Karimunjawa

The trade of grouper and lobster in Karimunjawa was also impacted as a result of the SARS outbreak, as indicated by a drop in prices (Table 3). Grouper prices here were at their lowest during April 2003. As many of the grouper fishers in Karimunjawa depend solely on live-grouper fishing for their income, these reductions in prices were felt hard.

The drop in price was not the only thing happening in early 2003. Costs for fuel had increased in late 2002, so total operational expenses increased. Many fishers tried to limit their expenses by fishing closer to home, but grouper stocks in those areas had already been nearly depleted so their catches were smaller than previously, when they would travel farther. Reduced catches and lower prices created significant declines in the incomes of Karimunjawa grouper fishers. Their buyers or bosses tried to find other activities for them to complement their incomes. They provided nets to the divers, who started using their now-idle dive gear (hookah compressors) to fish for schooling fusiliers (*Caesio* spp.) in a way derived from the *muro ami* fishing method. The catch was sold in domestic fish markets. This fishing method is now frequently used in the Philippines, since the traditional *muro ami* method was banned (Pet-Soede 2001).

The adjusted *muro ami* method was being used in Indonesia by fishers operating in Pulau Seribu, off Jakarta, who showed it to Karimunjawa fishers when they fished Karimunjawa waters some two years ago. At that time, Karimunjawa fishers were not interested and actually recognised that this method was potentially very damaging to fish stocks due to its effectiveness. But now that their economic situation has deteriorated and their middlemen are providing them with nets, they have started fishing with this new technique, claiming that they have little other choice. The method involves placing a very fine-meshed barrier net on the reef and divers releasing bubbles from their compressor hoses to create a "bubble-screen" that scares the fish into the net. The method has been reported to be highly effective, catching a large proportion of the fish in the vicinity. The bycatch includes many undersized fish and unmarketable species that get entangled or otherwise damaged in the barrier net.

Currently there are some 27 operations that deploy this form of *muro ami*, with about 20 from the main island of Karimunjawa, four from Kemujan Island and three owned by people from Parang. Each operation typically involves between 15 and 21 people operating from three boats. In one day, an operation can catch between 500 and 1000 kg of fish. Using preliminary data from visual censuses at four fixed monitoring sites, fusilier abundance has declined approximately 40 per cent (Taka 2003). The same trend was observed and reported by dive operators in the Karimunjawa area.

Discussion

It appears that the SARS outbreak significantly affected the incomes of Indonesian fishers during the early months of 2003 as a result of substantial price reductions. Wholesale and retail prices in Hong Kong, however, did not reflect these declines, remaining fairly steady through the early months of 2003. Indonesian traders claimed that

Table 3. Prices paid for grouper (rupiah per kg)[9] to fishers and middlemen in Karimunjawa before and during the SARS outbreak.

Species	Price to fishers		Price to middlemen	
	Before SARS	During SARS	Before SARS	During SARS
Plectropomus areolatus	30–35,000	20–25,000	Ex-fisher price	Ex-fisher price
Plectropomus laevis	40–50,000	30–40,000	plus 50%	plus 50%
Plectropomus leopardus	70,000	50,000	or more	or more
Epinephelus fuscoguttatus	40–50,000	30–40,000		
Epinephelus spp.	30–35,000	20–25,000		

Source: Interviews conducted by the authors (Sudarsono and team) with fishers and traders in Karimunjawa.

9. Note that the preferred size range is 0.9–1.8 kg. These are called super. Smaller fish are usually fattened until they reach the super class. Fish larger than 1.8 kg are not accepted for export.

they needed to pay lower prices so they could afford to export fewer fish in response to the decline in demand, which required that they bear the greater costs of holding the fish longer. Unfortunately, the trends in export volumes of live grouper from Indonesia to Hong Kong could not be examined due to a lack of data for that period. However, the data from one of the most important export airports, Bali, showed a slight reduction in shipments from early 2003 until May 2003. This supports the claims made by the Indonesian traders as to their rates of export.

Things are now mostly back to pre-SARS conditions and the search for live grouper and Napoleon wrasse continues as before. One exception is the shift to the use of the modified *muro ami* fishing method, which continues. Although the method is not used to produce live reef food fish, its adoption was caused by the effect of the SARS outbreak on live grouper prices. This has resulted in yet another threat to Indonesia's already heavily exploited coastal fisheries resources.

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