

ple consumed LRFF, should also facilitate dissemination of supplementary information about LRFF to consumers.

In view of the high public support and low opposition from the industry, the HKSAR Government should consider banning the imports and sales of humphead wrasse and giant grouper. At minimum the government should legislate in line with the laws of other countries, such as the Philippines and Maldives where the export of humphead wrasse is prohibited and Indonesia and Australia where size restrictions are imposed on the export of humphead wrasse and leopard coral grouper respectively. The Government should also recommend that wild-caught LRFF species in high demand, especially leopard coral grouper from the Philippines and Indonesia, be subject to catch and export restrictions in these countries. In parallel, there is an

urgent need to conduct further biological research into stocks and population trends of certain LRFF species for refining catch and export limits.

To help deter cyanide fishing in Southeast Asia, the HKSAR Government should ban the import of LRFF which test positive for unnatural cyanide, and the import of future LRFF from the same source. This would require research into a more sensitive cyanide detection device to be used in Hong Kong.

Finally, so that Hong Kong people might continue to enjoy LRFF sourced from sustainable managed fisheries and caught with non-destructive fishing methods, international cooperation and efforts should be encouraged to further explore the feasibility of establishing an eco-labelling scheme or cyanide-free certification scheme for LRFF.



## The live reef fish trade in Vietnam: a preliminary report from the field

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### Introduction

The International Marinelife Alliance (IMA) office in Hong Kong has noted for some time that significant numbers of live reef food fish are arriving from Vietnam. Little information is available on the fishery there, although anecdotal reports from importers and others indicate that the use of cyanide is widespread.

In October 1999 IMA, World Resources Institute, and Institute of Fisheries and Economic Planning (IFEP) met in Hanoi to discuss the possibility of initiating work under the Destructive Fishing Reform Initiative in Vietnam. Government officials noted their concern over reports of cyanide use in the live reef fish trade — and widespread use of other destructive fishing methods such as explosives, electricity, and fine-mesh nets — in several areas of northern and southern Vietnam. They admitted, however, they had little further information, and would be interested in collaborating with IMA to gather field information and develop a strategy for both controlling the live reef fish trade and combating destructive fishing practices.

IMA established an office in Hanoi soon thereafter, and in June 2000 conducted a preliminary field assessment at four sites, in collaboration with staff from IFEP and the People's Aid Coordinating Committee (PACCOM). This paper provides a preliminary assessment of the live reef fish trade and related issues in these four areas.

### Cat Ba Island and environs, Hai Phong Province

Hai Phong Province has a coastline of 125 km, and large areas of coral reef, as well as one of Vietnam's largest industrial and fishing ports. Fishing has long been important for the province, but its marine resources have been severely depleted by destructive fishing methods including explosives, cyanide, and the use of "sweeper" (fine-mesh) nets. The province's mangroves have also been largely eradicated.

Prior to 1979, the province's fisheries were quite well developed by skilful ethnic-Chinese fishermen who had settled in the area. After 1979, however, nearly 30,000 of them emigrated to China, and Hai

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Phong's fisheries declined due to the loss of fishing expertise and high quality boats and gear. This exodus was one of the reasons that remaining fishermen turned to destructive fishing methods.

Since the mid-1990s, provincial authorities have begun to try to revive the fishing sector by investing in new vessels, promoting aquaculture, and replanting mangroves. A marine police force was also established to counter destructive fishing practices, but has not been very effective, due to a lack of human and financial resources. In addition, fishermen are among the poorest people in the province, and feel that they have no alternative but to catch fish for their daily needs, by whatever means necessary.

Local fishing fleets work nearshore waters, continuing to deplete already exhausted fish stocks. Landings declined continuously from 1979 to 1995 because of overfishing, and the destruction of habitat caused by the widespread use of explosives, cyanide, and "electro-rod" gear (which uses electrical charges to indiscriminately kill large numbers of fish). Meanwhile, the size of the local fleet has continually increased, adding additional pressure; currently there may be as many as 2500 fishing boats in the province's four main fishing grounds at any one time. Some vessels are reportedly not local, but rather come from China or as far away as Thailand.

Most local fishermen are very poor, and utilise small boats — often hand-built — which are either non-motorised or use very small motors to fish nearshore waters. Catches are low, and fishermen therefore must travel farther and farther out to sea, and turn to destructive methods.

One commune in Don Son village organised a fishing cooperative in order to pool their resources for the purchase and running of larger boats that could travel farther, to less depleted fishing areas. The cooperative chairman, a retired naval captain who has fished the area for 36 years, reported that habitat destruction, mostly from blast fishing (which was extremely common in the late 1980s and early 1990s), has been the main culprit behind declining catches. He also noted that higher-valued fish such as groupers have been virtually extirpated from local waters.

Today the cooperative owns three boats (one 22 horsepower and two 18 horsepower). The main fishing grounds lie around Cat Ba Island, and each trip takes 2–3 days with crew of 10 fishermen. The main gear is long drift nets that are pulled in by hand, and the target species is squid, with bycatch of groupers and snapper (usually only about

20–30 kg per trip) sold to traders on Cat Ba Island before the fishermen return to Don Son. Live fish weighing 1–1.5 kg sell for US\$ 5–6/kg on Cat Ba. The Cat Ba middlemen are reported to resell the fish to exporters for about US\$ 12/kg. By contrast, the fishermen get US\$ 2/kg for their squid in Don Son, and less than US\$ 0.50/kg for fresh fish.

The overhead cost per trip is about US\$ 135–170 per boat (depending on its size). Net profits are split 40/60 between the cooperative and the crew. Each crewmember nets anywhere from US\$ 70–340 per month, depending on the catch. Cooperative members are quite satisfied with the arrangement, but worry about the future of fishing in the area, lamenting that 10 years ago, fishing boats on such trips could catch 10–15 t per trip, while the current average is only 0.5–1.5 t.

Hai Phong's live reef food fishermen are centred in two villages on Cat Ba Island, and two on neighbouring Cat Hai Island. Most fishermen use traps and hook and line, and sometimes nets. Cyanide use is not unknown, but is much more prevalent farther north in Quang Ninh Province, as discussed below. Apart from being the main trading centre for live reef fish in the area, Cat Ba Island is also a national park, and is included in the boundaries of UNESCO's Ha Long Bay World Heritage Site.

Phu Long village is one of the two main live reef fishing villages on Cat Ba. Fishermen here use hook-and-line gear to capture live groupers. Some fishermen fish very close to shore in non-motorised vessels, while others with motors work farther out. Fishing trips are short (1–3 days), and the average catch is only 1 kg per day. April to October is the main fishing season, with highest catches usually recorded between June and September. Cyanide is not thought to be used very often by the poorer fishermen right around Cat Ba; they cannot afford it and in any case the island is located near a freshwater outfall, making the waters too murky for cyanide-based diving to be practical.

Small-scale fishermen in Phu Long reported that hookahs and cyanide are used by larger-scale operators working around Long Chau, which is farther out to sea, where the water is much clearer. These fishermen come from Coto Island, to the north, or are recruited from Mong Gai, a large trading center for live reef fish on the Chinese border. The cyanide is brought from Mon Gai, along with fishermen trained in how to use it. The catch is sold to middlemen on Coto Island. Cyanide seems to be used by some fishermen in many parts of the area, but its use is not as widespread as in some other parts of Vietnam (discussed below).

Live reef fisherman in the Cat Ba area capture and sell both grouper fingerlings for aquaculture and mature fish. Mature fish are either sold to middlemen who export them to Hong Kong or mainland China, or directly to restaurants serving the growing tourist trade at Cat Ba and Ha Long Bay, an increasingly important market. One floating fish cage and trading station operator, for example, noted that he did not export any of the fish he grows out or buys directly, since he can buy groupers at US\$ 5–7/kg from the fishermen and sell them directly on the local market at over US\$ 10/kg. This complex included some 30 pens, making it one of the larger operations in the area (only 4 or 5 others are that big). Most of the over 100 other middlemen are smaller-scale operators, with between 4 and 10 pens.

Middlemen sell to exporters, who divide their stock between cultured and wild-caught fish, and make shipments of about 5 t each to China, when prices are favourable. Cultured fish are generally sold in mainland China, while wild-caught stock ultimately goes to Hong Kong. Cell phones have become ubiquitous in the area, and exporters are in constant contact with buyers in China to determine when they can get the best prices. In general, prices in China are 15–50 percent higher than on the local market.

The middlemen are very adept at selecting only healthy and unmarked fish from the fishermen, who are well versed in using a decompression needle to avoid problems with expanding swim bladders. Middlemen reported that most fishermen use hook-and-line gear and nets. Some used longlines, but experienced high fish mortality levels with this method.

There is a parallel fishery for grouper fry. Fry fishermen set about 100 traps four times per day, collecting each set after two hours. Daily average catch is about 20 grouper fry with an average weight of 200 g, sold at US\$ 1.50 apiece during the high season from February to March. By the middle of April the catch starts to decrease, and by May is negligible. More fry become available in June and July. During the months of January, March and April and again in July and August, the fry are plagued with disease, and middlemen prefer not to buy fry during this period, and so offer lower prices.

### Ha Long Bay and environs, Quang Ninh Province

Quang Ninh Province, which adjoins Vietnam's border with China, has a 250-km-long coast and more than 2000 islands — 70% of all Vietnam's islands. Every year, 20,000–25,000 t of marine products are

harvested from the fishing grounds around these islands. However, the marine resources of Quang Ninh have become severely exhausted by overfishing and destructive fishing practices.

Fishermen commonly use fine mesh nets in the breeding season, compounding the general overfishing problem. As in neighbouring Hai Phong Province, fishermen are quite poor and their lives are very hard, especially the ones living in floating fishing villages. Explosives, chemicals, and electro-rods are widely used, especially in more distant fishing grounds around islands such as Dau Be, Bach Long Vi, Co To and Ha Mai. Only a few cases of cyanide fishing have been conclusively proven, largely because the enforcement capacity of local authorities is extremely limited. Discussions with fishermen in the area, however, indicate that in fact, the number of fishermen using cyanide to capture live reef food fish is actually quite high, although restricted to the islands and reefs farther out, since visibility in the bay is generally very poor for diving. Local officials claim that most fishermen using illegal destructive methods come from Ha Long city (the bay's main town) and Coto Island, with lesser numbers coming from distant parts of central Vietnam.

Cua Van is a floating village in Ha Long Bay where many fisherman are engaged in the live reef fish trade, using hook-and-line gear. Many houses have fish pens underneath them. Blast fishing was widespread in the area as recently as five years ago, but recently most fishermen have switched to capturing live groupers to sell to local restaurants. Fishermen generally catch only smaller-sized groupers, because they cannot afford to buy fishing line strong enough to catch larger ones, and stick to nearshore areas around the many islands in the bay. Undersize fish are sold to small middlemen, who grow them out. A variety of groupers are caught, but the main target species are *E. coioides* and *E. quoyanus*. Local knowledge of post-harvest care requirements appears relatively high, and fishermen use antibiotics and other medicines in their pens to reduce disease.

Apart from these small-scale fishermen who sell their catch to local restaurants, there are also larger-scale operators who sell the most highly-valued species to middlemen, for export to China. These species are caught as adults, and only held for a short time before being sold to buyers. The most important species for this export trade are red snapper (*Lutjanus stellatus*), leopard coral trout (*Plectropomus leopardus*), flowery cod (*Epinephelus fuscoguttatus*), camouflage grouper (*E. polyphkadion*) and the honeycomb grouper (*E. merra*). Nets have been used to catch these species in the past,

but due to high mortality rates, many of these larger-scale, export-oriented fishermen have converted to cyanide fishing, according to local fishermen. Cyanide fishing operations are usually carried out around some of the more distant islands, such as Long Chau, Bach long Vi, Dau Be and Co To islands. Co To is a main trading and supply location, and many of the cyanide fishermen operating in the area come from there, as well as from around Ha Long city. As is the case with live groupers from neighbouring Hai Phong, fish are transported by land to the border town of Mong Gai, and sold to Chinese traders.

In Quang Ninh, the network of trading is well developed. Middlemen purchase live fish and resell them to restaurants or bring them to markets in Mong Cai. The Mong Cai live reef fish trade is quite lively, although volume has dropped of over the past years, since more fish are being sold on the local market to restaurants catering to growing numbers of tourists. Fishermen generally get about US\$ 9–10/kg for adult groupers from middlemen, and about US\$ 4–5/kg for live red snapper. When fry are sold, they fetch about US\$ 1.50 apiece

## Phu Yen Province

A province along the coast of South Central Vietnam, Phu Yen has a coastline of more than 180 km, with 37 fishing villages. Phu Yen is considered one of the poorest provinces in Vietnam, and many villages lack basic health and sanitation facilities. Many of the coastal areas and marine resources have been heavily exploited and resource protection by the authorities is only concentrated in two districts, so explosives, cyanide and electrode rods are openly and widely used.

Live reef fish are caught in Phu Yen with hookah and cyanide, as well as with traps (which are also used to capture fingerlings). In Dan Phu village, juvenile fish are reared in a lake and sold to floating-cage middlemen for about US\$ 5/kg (with 3–4 fingerlings/kg). Target species for the live food fish trade are *Cephalopholis argus*, *Plectropomus leopardus* and spiny lobster, for export markets in Hong Kong. Some aquarium fish are also captured, and sold through middlemen to traders in Ho Chi Minh City who export to Europe via Singapore. Coral is also harvested for the growing tourist curio market.

Cyanide fishing is practised at many locations along the province's coast, and cyanide fishers from neighbouring Nha Trang and Binh Dinh Provinces come to exploit these fishing grounds. With the high prices offered for live groupers, the cyanide-based live reef fishery is very attractive to many poor coastal fishermen, and the government has little

capacity to crack down. Other destructive practices such as blast fishing, electrode fishing, and use of fine-mesh nets are also prevalent in the area.

In Middle and New Hamlets and My Quang village, An Chan commune, and Tuy An districts, fishermen are traditionally divers and target live marine products. With many other species depleted, these fishermen are currently targeting lobsters, which are caught as juveniles and raised to market size in submerged cages. Lobsters command an even higher price than live fish and are easier to raise, but in addition to lobsters the fishermen harvest virtually every organism that falls into their nets. The main technique is to surround the coral with a barrier net and spray cyanide into the coral head, which drives all the organisms out into the net. The adult live food fish captured in this way are sold to Chinese middlemen around Nha Trang, or to tourist restaurants. Under-sized *Cephalopholis argus* are sold to floating-cage culture operators at about US\$ 1.50/fish. Fish that die are sold fresh to traders as well. Aquarium fish are sold to middlemen in the Nha Trang area.

In Dan Phu village No 1, Xuan Phuong commune, Song Cau district, the live reef fishery focuses on lobster and groupers. The average catch for a fishing/diving trip is 100–200 small lobsters (100 g each). A few are retained by the fishermen for growout, but most are sold to local floating-cage middlemen or outsiders from Cam Ranh town, at the price of US\$ 3.50 each. Middlemen keep the lobsters about 18 months until they weigh 1–1.5 kg, and then sells them to traders for US\$ 27/kg for grade 1 (more than 1 kg), US\$ 24/kg for grade 2 (0.8–1 kg), and about US\$ 20 kg for grade 3 (0.5–0.7 kg).

## Khanh Hoa Province

Khanh Hoa Province has a coastline of 385 km (13 per cent of the country's total coastline), with hundreds of small islands. According to official records, the province has some 5,000 fishing vessels of varying sizes, and some 27,000 fishermen. Fisherman all along this coast use a variety of destructive fishing practices, and the use of cyanide and explosives is especially rampant in Nha Trang. Diving is often combined with the use of lamps, spear guns, or barrier nets with cyanide sprayed to chase the fish into the net. Electric rod fishing is frequently used in lagoon areas, and is used during particular lunar phases to target spawning fish.

The live reef fish trade is very important in Khanh Hoa, compared to other provinces, and Nha Trang is one of the major live reef fish trading centres of southern Vietnam. Cyanide fishing was only introduced about 5–7 years ago, according to local

sources. Local government officials believe that Hong Kong-based middlemen and traders supply cyanide to fishermen to guarantee the supply of certain volumes and species. The fishing grounds where cyanide fishing is most common are around Hon Cha La, Hon Gom, Hon Lon, Hon Do, Hon Dung, Hon Mieu, Hon Tre, Hon Mun, Hon Tam, Hon Noi, Hon Ngoai, Bai Tien up to Ninh-Binh Thuan. Khanh Hoa live reef fishermen and traders also travel to Phu Yen, and Ninh-Binh Thuan to fish and trade with live reef fishermen and traders from those provinces.

Vinh Tho is a typical fishing village near Nha Trang city, with 40 ships and 20 boats specialised in hookah diving to capture live food fish, lobsters, and ornamental fish. Live food fish are sold to floating-cage middlemen who mainly grow out and trade in *Plectropomus leopardus* and lobsters. The price of live *P. leopardus* paid by these middlemen is US\$ 10-17/kg, depending on size and grade. (Middlemen, in turn, sell the fish to exporters for around US\$ 22/kg, who ship them on to Hong Kong and Taiwan.) By contrast, fresh fish of the same species only fetch US\$ 5.50/kg for the fishermen. As small percentage of the live catch is sold to local tourist restaurants.

Fishermen sell live lobsters to middlemen for as much as US\$ 24-27/kg, who sell them to restaurant traders in Ho Chi Minh City. Most aquarium fish are sold by fishermen to middlemen for only US\$ 0.35 apiece for various species of butterflyfish and triggerfish. Middlemen are able to resell them in Nha Trang, however, for considerably more.

## Conclusion

These four "snapshots" of the live reef fish trade in Vietnam are initial and incomplete pictures of the situation. IMA is currently working with national and local officials to address the many problems associated with the live reef fish trade, especially the apparently widespread and indiscriminate use of cyanide. One of the first steps will be to continue to collect better information on the status of the trade with respect to collection areas, methods used, and volumes and species collected and exported. Nevertheless, it is clear from this initial survey that the live reef fish trade in Vietnam is of significant size, and is plagued with the widespread use of cyanide that has caused so much damage in other countries in Southeast Asia.



## Destructive fishing practices mini symposium

by Lida Pet-Soede<sup>1</sup>

The mini symposium, Destructive Fishing Practices - Towards a Global Understanding of Causes, Effects and Management Solutions, took place in October 2000 at the 9th International Coral Reef Symposium, Bali, Indonesia. Seventeen papers were presented, covering the wide range of impacts from different destructive fishing practices (DFP) on corals and reefs, experiences with enforcement, and suggestions for creating incentives to stop using destructive methods. The discussions, triggered by the presentations, continued in an evening session with the aim of summarising the current state of knowledge of all aspects of DFP and to point to a clear direction towards both proven and innovative new management solutions. A panel discussion was held in which both a selected panellist and the general audience discussed four provocative questions at length. The issues presented and discussed at the mini symposium and evening session are summarised here.

A number of other participants illustrated the destructive impacts of fish traps, derelict fishing gear and pa-aling (a modification of the well-known muro-ami method) to reef ecosystems. In Puerto Rico, 44% of a sample of 100 fish traps were found to cause damage to the reef — 23% to hard coral colonies and 34% to gorgonian colonies. In Hawai'i, derelict fishing gear originating from trawl, seine and other gill nets destroys coral habitat, entangles reef fauna and may accelerate introduction of alien species. In the Philippines, pa-aling may indeed be less destructive than the muro-ami from which it evolved, but appears to be a highly efficient and non-selective gear that easily clears reefs of fish.

Various papers focused on blast fishing and cyanide fishing. Evidence shows that blast fishing in Malaysia not only results in rubble fields but also in seriously reduced fish species diversity — fewer

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