

## Diving for holothurians in Vietnam: A human and environmental disaster

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### Abstract

On Ly Son Island in Vietnam, 400 to 500 fishers earn their living from diving. Holothurians are by far the most popular target species for these divers. The diving accident rate is 5% mortality and morbidity. The Francophone Association for Life Science Cooperation and Promotion (AFEPS) is offering to train “rescue divers” who could help prevent and respond to diving-related accidents and also to mitigate the disabling consequences of such accidents. It is clear that an ideal alternative would be to establish holothurian farms around the island and maintain a rational harvest. Unfortunately, AFEPS does not have the financial resources to make such an offer and should avoid doing so because the result would be to push the very people it seeks to help into unemployment.

### Introduction

In Vietnam, as in many tropical countries, tens of thousands of fishers dive for a living. These people often belong to the poorest groups in their societies. They offer their services to a “boatmaster” for fishing trips that often take them far away from home. Since 1998, AFEPS has been working with such fisherfolk, in conjunction with Vietnamese doctors who, like us, are inspired by the work of Alexandre Yersin on behalf of the fishers of Central Vietnam. Our Organisation de Solidarité Internationale (OSI – International Solidarity Organisation) is basically medical in nature and its responsibilities are limited to trying to prevent, manage and treat various diving accidents suffered by divers while fishing. AFEPS has already staged training workshops for medical officers responsible for fishers’ health, developed divers’ logsheets suitable for recording their activities, and has spoken out against the human and environmental disaster that this fishing method represents. The Vietnamese government and media have continued to turn a deaf ear to this issue, until recent months. Early in 2007, a major national television channel and some national newspapers heightened community awareness around this shocking state of affairs. In June 2007, an article referred to the sad fate of divers from Ly Son Island. It portrayed diving accidents (mostly decompression incidents) as part of the job, but highlighted their tragic consequences: many dead and paralysed divers. We therefore offered our help to local authorities, who asked us to meet them and suggest some options.

The Union des Blessés de la Face et de la Tête (UBFT – Union of Face and Head Wound Sufferers), which

works on the prevention of neurological and cerebral disorders, has given us its support and has opened a credit line to fund the purchase of emergency and treatment equipment. In February and March 2008, an AFEPS working group travelled to Ly Son to investigate this issue and make some recommendations.

### Social organisation and holothurian fishing on Ly Son Island

The Island of Ly Son lies offshore from the town of Quang Nai (the administrative centre for the province of the same name). The island can be reached from the port of Quang Nai, which is 25 km from the town on the estuary of the Tra Khuc River. The island is 20 nautical miles from this port. There are in fact two islands: the “big island” and the “small island”, which are joined together by a strip of coral reef. The big island, also known by its inhabitants as Culoa Re, measures approximately 5.5 km from west to east and 2.7 km from north to south, and about 1 km<sup>2</sup> in area. The northern coast is more exposed to winds and storms, and so moorings and ports are mostly along the southern coast. The small island lies about 2.5 miles to the north northwest of the big island. The two islands, each having a chief, form a single district, which is administered by a “People’s Committee”. There are approximately 20,000 inhabitants in the district.

The big island has a hospital that mostly does preventative work (e.g. vaccinations, consultations, screening, etc.) and handles medical and surgical emergencies (e.g. caesarean section) and minor sur-

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gery (appendicitis). Schools range from primary to upper secondary. Students who successfully complete secondary education can continue their education on the continent. Young people who want to live on the island and who have no university qualification can work only in agriculture, mostly garlic and onion growing. Some, for prestigious reasons, or because they cannot find jobs on the continent, opt to work as divers. There are between 400 and 500 divers on the island. Diving for sea cucumbers is done from boats 14–15 m in length, on which live a dozen crewmen, including three or four divers. The boat is fitted with a small compressor that is driven by a belt running off the boat's engine. Compressed air is pumped through a small "buffer" tank, which has three or four hoses (60–70 m long) branching off of it. Each branch hose is attached to a weight belt on the diver's waist (Fig. 1). The diver places the end of the hose straight into his mouth, with his mouth serving as a pressure regulator because the air must be delivered at a pressure of seven to eight bars. Divers are given a net to place their harvest in. The island has about 90 such boats, most of which are equipped for holothurian fishing around the Paracel Islands, a two-day trip from Ly Son Island. A few boats stay close to the island and collect shellfish and finfish for local consumption. Young divers get their experience around the island and then, when they feel ready, offer their services to a "boatmaster". A boatmaster prepares the boat for holothurian fishing trips, which usually last about four weeks. Divers remain in the water for 30-minute stretches, three times a day, every day, at depths of 50–55 m. All divers complain of symptoms relating to type 1 decompression accidents (osteoarthritic and muscular), but say that one night of rest is enough and that they

can resume diving the next day. Accidents recorded are not always easy to diagnose: in general, they are type 2 decompression accidents (medullary or cerebral accidents), which rapidly disable them and frequently make them paraplegic (Fig. 2). Excessive intra-lung pressure accidents have also been recorded when hoses break. Divers must return to the surface with no air. Because they have no fins, the 50 m ascent is exhausting and they stop breathing to give themselves a fair chance, but this entails a major risk of excessive pressure in the lungs. Some divers also die on the bottom, probably because of



**Figure 1.**  
An holothurian fisherman ready to dive with the air hose attached to his weight belt.



**Figure 2.**  
Tran Din Loc, ex holothurian fisherman from Ly Son village, tells about the diving accident that left him hemiplegic.  
(image: P. Cavenel)

## Earning a living at the bottom of the ocean

Tuoi Tre (youth) newspaper, 22/05/2008 (translation from the Vietnamese by Thi Phong Mai)

We were born, live and breathe on land, whereas they, the divers of Ly Son Island, Quang Ngai, have to spend their lives in the sea water. Their food and their life are at the bottom of the sea.

One very dark night, a small boat was “driving” on the sea near the Truong Sa Islands. Le Sen was wearing his diving gear and carrying his torch, then he put the air hose into his mouth and one of his hands was holding his pointed and barbed spear, while the other held a dip net. He took a deep breath and jumped into the sea. Le Sen was a fisherman from the An Hai district and had been diving for 15 years. To begin with, he used the motorised launch or “coffa” to go and harvest shellfish in the areas around the small islands close to the land. But, over these last 10 years, life has become harder and harder and so the fishermen have had to go further and further offshore. Le Sen cannot remember how many times he has been to sea. During the fine weather season, the sea is calm and he goes diving around the Hoang Sa or Truong Sa islands. In the bad season, he fishes around his island.

Le Sen and his friends gather everything that could be classified as seafood. On the boat, the divers are divided into several teams, with each team comprising two to three people. Le San’s team works at night. The reason for this is simple: you find more seafood at night than by day.

Under the sea, there is no light and everything seems immense. The light from the divers’ head-lamps attracts fish and squid. The divers’ job is to spear them quickly and accurately and put them in a scoop net. The length of time they spend under water depends on the depth of the sea at each location. The teams work in turn. Each team dives for four hours. On the boat, while they wait their turn, the others rest, and keep an eye on the air hose supplying their friends under the water.

Employment from diving has made it possible to improve living conditions for some of this island’s fishers, especially since the prices for holothurians, the seafood item that the fishers target the most for export, have been very high. After 15 years of diving, Le Sen has managed to build a house for his family and contribute with his brothers to the construction of a 350 hp fishing boat. Another example: Mr Doung Quang Thang of An Vinh district, after some 10 years of diving for holothurians from a powerful boat, has also been able to build a two-storey house. It is courtesy of the sea that the divers have better living conditions on land. But to be a diver is also a very tough profession. Some become disabled because they have to earn a living!

Truong Tuan Nhuan is also a diver, but the life of this 45-year-old fisherman is still extremely hard. He was lucky enough to survive a major storm in 2003, when he was fishing at Trung Sa. The boat’s crew was thrown overboard. Many of his friends on that boat were not as lucky as he and did not come home. Almost every year, the village inhabitants dig new graves for those who have died at sea. Some survive the danger but at the bottom of the sea you cannot predict what will happen. This was the case with Mr Tran Dinh Loc from Con village, in An Vinh district, a 41-year-old diver who now resembles a two-year-old child because he has got to learn to walk again after his diving accident and can no longer look after himself, not even to take a bath. He sighs as he says: “Two years ago when I was diving, I used to see heaps of fish, I was so happy, instead of catching them over two dives with a long break between the two I only took a short break. When I came out of the water, I had the feeling that my bones had been ‘stretched’, I had tingling in my arms and blood was coming out of my ears!” Seeing him in this state, his friends immediately realised that he had had a diving accident and put him back under the water so that he would not experience sudden air pressure variation but this did not improve his state and he was taken home and submerged in a large tank of water and then hospitalised as an emergency case, but in vain. Since then, he has had to give up his job. At present, to feed a family of four children, his wife goes down to the seaside to sell seafood and she also has to cover the costs of daily health care for her husband. Her second, 15-year-old, son has given up school and goes out fishing with his friends. Mr Loc said: “Around here, there were some 10 people in the same state as me: Mr Vui, Mr Quw, Mr Miet, etc.” These are serious diving accidents and, in addition, there are many cases of impaired hearing.

excessive toxic gas content in the air they breathe. Divers from Ly Son seem more aware of the danger than divers from other provinces, and have themselves reduced the number of dives per day from 5 (lasting 30 minutes) a few years ago to 3 (lasting 30 minutes) at present. Clearly this is still too much because they do not make any decompression stops, and the precautionary approach would be to make only two dives per day of 20 minutes duration, each with a decompression stop. It would also be preferable that divers only work six days out of seven in order to decompress. Unfortunately, divers' income would be proportionately reduced and they cannot afford this. It is difficult to know what they earn from four weeks of holothurian diving but it cannot be more than USD 65–80. The mortality and morbidity rate is lower than in the other provinces, but is still approximately 5%. What this means is that half of the divers must be replaced every 10 years. We noted that the island's divers had a higher level of education than the average recorded elsewhere. Eight out of 10 apparently know how to read and write, and many have a secondary level education and some have successfully completed the full secondary school curriculum. They no doubt had to drop out of university subsequently.

### **What is the future for these young men in the medium and long term?**

We are restricted to offering them a rescue diver training course. We will initially be suggesting that some 20 volunteers be trained, if possible with enough schooling to enable them to absorb the contents of the course and especially to subsequently become trainers themselves. We will give them the rudiments of prevention, teach them basic rescue techniques and management of decompression accidents by TRI (therapeutic recompression by immersion) using pure oxygen. In fact, tanks and oxygen are very cheap in Vietnam. We will provide them with the required equipment for handling decompression accidents when they happen far away from a health centre equipped with a recompression chamber. But, in the longer term, holothurians will disappear from the 50 m depth zone, so in the end,

either the divers will need to go deeper to find them and there will be even more accidents, or they will need to give up collecting holothurians to retrain for another kind of diving activity (aquarium fish, groupers stunned by cyanide, lobster, etc.).

We thought about offering them a change of profession for less dangerous jobs, still connected to the sea. Environmentally friendly and community tourism is being introduced in many countries in this region. University teachers are orienting their students towards research of this kind and the first rural guesthouses and home stays are beginning to open. It would be possible for divers to run this kind of accommodation and look after recreational divers to whom they could offer underwater treks or diving on protected sites. We also know that these divers are capable of raising crayfish. We have learned that it is possible to construct holothurian hatcheries and reseed areas around the island and then take a reasonable harvest.

We have suggested these solutions to our Vietnamese colleagues who warned us and raised an essential issue: "To do something for other people without them is to do it against them" (Touareg proverb).

It is true that we have not yet spoken about this with the divers of Ly Son Island and we need to have their opinion. But especially, if unfortunately one or more boatmasters took up the idea of a holothurian hatchery, we would be putting several hundred divers out of work.

We cannot, therefore, suggest anything without talking to the divers themselves, and we especially cannot suggest a change of job even into lobster or holothurian hatcheries without having the financial resources to create a cooperative in which the poorest would also have a share of profits and benefits. We have, therefore, decided to do what we know how to do: provide a rescue diver training school and provide the equipment required for them to perform related tasks. In order to do so, we have funding equivalent to our ambitions thanks to the credit line opened by UBVT.