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PUTTING IT ALL ON THE LINE

> THE FISHERMEN OF KUNG WIMAN VILLAGE – PERCHED ON THE NORTHEASTERN ARC OF THE GULF OF THAILAND – ARE BREAKING THE RULES, MAKING ENEMIES AND RISKING DEATH. FOR YEARS NOW, COMMERCIAL AND UNSUSTAINABLE FISHING OPERATIONS HAVE MONOPOLISED AND THREATENED LOCAL FISH STOCKS. IN ORDER TO GET TO THE FISH FIRST, THIS FISHING COMMUNITY HAS TURNED FISHING TRADITIONS UPSIDE DOWN AND TAKEN TO DIVING IN ORDER TO STAY AFLOAT.



Main: For Ell and his fellow fishermen, it is their prayers and temples which protect them at and under the sea.
Left to right: Wanlop stitches closed a trap by hand; Son enters the water, trap line on one side, life line on the other; With the ecology of the reef in mind, Son selectively spears only the large fish.



But this isn't a story of old world industry with a modern twist; there are no shiny scuba tanks on the brightly painted wooden boats. The fishermen's bare boned approach to diving eschews expensive technology and incomprehensible science for simple but hazardous homegrown methods. The underwater world has been democratised with a long plastic hose, a medium pressure compressor, fins mended with bamboo, a mask, and the pragmatism of fishermen unburdened by the physiological 'details' of diving.

Son and Thanagorn are cousins and both self-taught divers. They appear unconcerned by the risks of their highly dangerous occupation: "We fish from seven o'clock in the morning until sunset... about 12 hours a day. When there are fish we stay underwater for 20 to 30 minutes per dive, if there are more fish we stay longer. Excluding rest time, I think we are underwater for possibly six hours." That's six hours a day diving, up to 30 dives a day, on average 15-20m deep and averaging 10-15 minutes per dive with about 10-15 minute surface intervals each time! And from November, which marks the annual break in Thailand's rainy season, they will dive this way for the next five to six months... seven days a week!

As the first light of early morning colours the Gulf and the shoreline moves out of focus, the crew of the *Nam Pla Chok Di* prepare for the day's fishing. Guillaume Tougeron, a local dive instructor, heard about these diving fishermen and invited Alex to come aboard the 10m long rueeyon motorboat to see and document their ways. Today the crew is four; Mr Shon is the boat's captain and owner, and Mr Wanlop and his teenage son Ell are on hand to pull in and clean the fishing traps that Son will seek out at 15-20m.

Alex prepares to follow Son's underwater work with his camera and sets up his dive

gear next to the iceboxes ready for the day's catch. The apprentice Ell is responsible for keeping the air hoses untangled once Son is underwater, while the Captain keeps a close eye on the greasy compressor that sucks air out of the atmosphere to a riotous accompaniment of mechanical noises. Ell eyes our complicated rig of regulators, tanks and inflatable BCDs with vague amusement.

Mr Shon signals, the boat is in position, Son takes the end of a rope, clamps the opening of the plastic air tube between his teeth and jumps into the murky water, a shadow beneath the surface. 10 minutes later the rope is tugged sharply; Son is returning to the surface with the first of 30 fishing traps.

What goes down must come up

Once on board, a hole is cut in the trap's wire. Wanlop uses a landing net to ladle the fish out of the trap into the iceboxes, throws unwanted or undersized fish back in the sea and closes the hole by sewing it up with another cord. While the captain uses GPS to manoeuvre the boat into the next position, Wanlop cleans the net cage with a wire brush and finally rinses the trap and the deck, sending a dirty brown sludge back into the sea. "The fish won't enter dirty traps, so they must all be cleaned before returning them to the sea" explains Wanlop. All this takes no more than 10 minutes, a typical dive interval for Son.

Once the trap lands on the sandy bottom, Son follows its line, locates the clean trap, wrestles it into a good spot for the fish and unties the line. He then sets off to find and tie the same line to the next trap, hopefully full of fish and for another round.

Occasionally Son's 'fish-eye' view reveals a spearfishing paradise only hinted at on a GPS screen above. Then, he'll surface to get the speargun from the boat and spend another 10-20 minutes ducking between the concrete blocks that make up the artificial

reef 20m down. He has the advantage of selection, spearing only the larger more valuable fish, and then threading the silver bodies onto his own breathing hose for their final trip to the surface.

Thanagorn, 35, has been diving for 10 years. He knows his daring approach to fishing is making him enemies amongst the trawler captains. "Since we started diving and spearfishing we have had problems with the big fishing boats. We have received complaints from the big boats (about us fishing) and they also accused us of using cyanide to poison the fish, but it wasn't true. The water police, fishery office and lawyers board our boats but they never find anything because we have never used cyanide. Cubed hollow concrete blocks were put down by the marine authorities to encourage and provide fish habitat and growth but everything happened because the big fishing boats were not catching any large fish and complained when they saw how successful we (had been). Plus, they cannot use their fishing nets with the concrete blocks where the fish hide."

Fishing for keeps

Like many of their Southeast Asian counterparts, Thai fishermen are often maligned for their destructive approach to securing a catch. Trawling. Cyanide. Dynamite. Officially banned in many countries including Thailand, these practices persist due to a combination of poor enforcement, poverty induced necessity, few non-fishing livelihood alternatives and high demand for live fish trade from neighbouring countries.

Since the 1960s fishermen have sprayed over a million kilograms of toxic sodium cyanide onto coral reefs in the Philippines using divers to net the stunned fish. These 'cyanide fishermen' use the same long hookah breathing tubes as Son and Thanagorn, and descend to the reefs where they can selectively squirt poison directly



DIVING FISHERMEN MIGHT BE DOING FISH STOCKS A BIG FAVOUR IN THAILAND, BUT WHEN DO THE PERSONAL RISKS OF CONSERVATION BECOME TOO HIGH?



Top: A 50 metre plastic hose and the most basic of equipment... patched together with rubber bands and black electrical tape!
Bottom: Son uses a knotted loop in the hose to secure his only air source underwater.

into coral heads and rock crevices. Then it is just a matter of taking your pick from what floats out – not much different to harvesting fruit.

Rich foodies in Asia and ornamental pet owners fuel the live fish trade, elevating personal enjoyment of beauty or 'status-dining' over ecosystem integrity and sustainability. More than 75% of live fish die within 48 hours of capture or prematurely en-route from the reefs to the restaurants; thus the expectation of heavy losses means enormous numbers of fish are taken to meet demand. Meanwhile sodium cyanide is a silent and indiscriminate killer of reefs, razing the homes and food sources of all the fish 'fortunate' enough to be left behind.

The situation is even worse in Myanmar. In places along this country's coastline, dynamite fishing has visibly devastated reefs, carpeting the seabed in an eerie montage of numbed fish and coral rubble. Sustainability has been shelved in favour of survival. There is little hope that the majority of local people here will reap benefits from Myanmar's nascent diving industry, so the reefs have no economic value to coastal communities apart from what can be brought to the surface and sold today. Meanwhile, the economic value of the neighbouring Similan Islands from scuba diving alone was estimated to have generated up to US\$55 million for the Thai economy.

The reefs surrounding the cousins' village in Kung Wiman do not show signs of either cyanide or dynamite fishing. The Department of Fisheries and local Rayong officials have been using these concrete blocks to encourage artificial reef growth to provide dedicated environments that 'produce' a catch for the local fishermen. It is working, slowly. Thanagorn says whilst some species like sea bass are declining in the area, he has noticed larger numbers of smaller fish. Nevertheless, this is still a race between conservation and unsustainable fishing practices.

The combination of modern GPS equipment, mechanised net retrieval systems and illegal 2cm-wide mesh nets may undo all the good work of the fisheries department, with trawlers trapping everything that gets in the way and tearing up seagrass and breaking corals. The high overheads of bigger fishing operations also means that there is less discrimination about taking and selling

undersized fish, a fact acknowledged by Thanagorn who says, "If they (the big boats) weren't doing this, I think there would be more fish for everyone."

In comparison, the key to the sustainability and economic success of diving fishermen is found in the advantage of selection. The location of traps is chosen carefully and they're placed instead of dropped on the reefs to minimise damage. Son and Thanagorn can identify and spear the larger more valuable fish, leaving the smaller ones to mature and replenish the reefs.

The crew's main competition comes from the large fishing boats rented by Thai captains and operated by underpaid labour from neighbouring countries, although the small-scale operations of Kung Wiman's diving fishermen are proving more successful and profitable. The community has organised what would be like a fishermen's cooperative, with four teams working on different reefs and selling their catch at local markets. Bigger or more valuable fish like grouper are sold to Bangkok's affluent urban crowd less than 150km away. The income is then split between the four teams ensuring equity and an assured income. Together, the fishermen can make US\$300 in just two days – an unthinkable high sum compared to their overworked foreign counterparts on the big boats, whose salary is closer to US\$60-90 per month.

The fishermen value the freedom and benefits of working for themselves and the quality of life in their tight-knit community. Thanagorn sits with his wife as she sorts the day's catch with the other women, directing baskets of fish into different trucks whilst keeping an eye on her young son. "No Thais want to work for the big boats because the Thai trawling captains pay a very low salary. Most of the time the crew work, live, eat and sleep on the boats because they can't afford to live on the mainland."

Fortune favours the brave

But what about the risks? 25m under the boat's shadow, the frantic beeping of our dive-computers are a clear reminder of what's at stake. Dive computers have largely replaced the mental arithmetic associated with calculating safe dive profiles and ascent rates, and are the modern diver's speed camera – reducing

fatalities associated with unsafe diving through an alert system. If the logic of science is anything to go by, these men should be dead.

The dangers of decompression illness (DCI), commonly known as 'the bends', can lead to serious barotrauma and death. The probability of DCI is exacerbated by long bottom times, short intervals between repetitive dives, rapid ascents and change in altitude. Son ascended from his last dive of the day at more than half a metre per second, leaving Alex to watch his disappearing fins from the relative safety of the sandy bottom.

Son is ambivalent to his safety, "Sometimes the tube breaks or I lose it and I will have to swim to the surface without air... once I had this problem three times in one day. I was 19m deep when the tube broke and I ran out of air. I just went up as normal and nothing happened to me." So we pondered if Son's apparent imperviousness to scuba lore was evidence of courage, ignorance, natural instincts or some kind of physiological adaptation? Accidents do happen. Dive physiology aside, mishaps are inevitable given the physical nature of hauling heavy traps along the bottom and keeping ropes, air hoses and divers from tangling or being caught in the propeller of the manoeuvring boat. Regardless, it is the divers' risky dive profiles that arguably pose the greatest threats.

Of course, there was no pure oxygen on the boat, another simple procedure that could save their lives if something went wrong. Thanagorn recalls that his cousin died after a rapid ascent and a senior fisherman who'd been diving for 20 years also died suddenly. "We don't know the cause. We only know that he finished his dive, then took a shower and rested for a while on the boat. Then he just died."

Others argue that generations of diving have equipped the young men with finely tuned instincts for diving and even physical adaptations. They claim the fatalities associated with traditional diving in the village are not unusually high given the number of divers, or compared to the rate of fatalities in other high-risk occupations.

The Moken are a nomadic sea-faring people (colloquially known as sea gypsies) who live in and around the islands of the Andaman Sea and Southern Thai provinces.



Top to bottom: The air supply; The bare end of a plastic hose is gripped with the teeth; A 10-15 minute surface interval; The hose doubles as a fish line for speared catch; Sorting the catch.

Scientists from Lund University have discovered that their underwater vision is twice as sharp as normal people and they are able to alter the shape of their eyes' lenses, the same way as an underwater camera. So is it possible that Son and Thanagorn are also diving with a physiological advantage? A romantic theory perhaps, but unlikely because the tradition of diving is broken and unlike the Moken, the Thai fishermen have not been doing this their entire lives.

Changing Tides

Thanagorn has incorporated modern techniques into his diving – such as safety stops and using pure synthetic oil instead of engine oil for the dive compressor – but he says most people from his village, including Son, prefer to stick to the tradition of instincts and superstition. "I've been studying diving with Guillaume who teaches in Chanthaburi. I know about safety stops and limiting how many dives I do, but the others don't know because they did not learn as I did." The costs of a professional scuba course, equipment and a licence to fish with scuba gear are another disincentive to update skills – costing around US\$3,500.

And yet, diving is set to increase in the area, thanks to increased local environmental awareness and strong economic incentives for less fuel-intensive fishing. In mid 2008 the price of crude oil inched its way higher than ever before and the world was facing a fuel crisis. The high price of oil was also felt in the Gulf of Thailand, eroding the already tiny margins of fishermen and seeing a resurgence of traditional fishing methods. Thanks to a global resource crunch, fishing turned to less fuel intensive trips on local reefs, relying on divers rather than trawling.

The Marine Authorities are also working with communities such as Kung Wiman to promote a return to traditional fishing methods such as line fishing and diving. The GPS locations of the new artificial reefs are shared with villagers and kept secret from the larger fishing outfits, who risk losing nets and damaging their hulls if they go into previously sandy areas.

In the face of declining fish stocks, is it acceptable that fishermen risk their lives just to beat their competition? For Mr Shon and his men, unless they want to join the underpaid crews of the unsustainable big

trawlers they must continue to use diving to seek out the biggest fish. But Son and Thanagorn say they are not so keen for their children to follow in their fin-steps. The risks are simply too high.

But what if instincts and superstitions were backed up by modern diving instruction and equipment? Perhaps then more young men would be inclined to choose the freedom of self-supporting fishing collectives over joining crews on large boats. Therefore, if tradition is the key to sustainable fishing, then perhaps affordable diver education for villagers could keep the whole fishing industry, and its divers, above water.



Coral Sea Uncovered



Pink anemonefish takes refuge ©Lucy Trippett, Plankton Productions



White tipped reef shark ©Undersea Explorer



Osprey Reef in the Coral Sea, a world renowned shark diving destination ©AMCS

A new report explores why Australia's Coral Sea is worthy of world class protection. Home to 18 oceanic coral reef systems and large populations of majestic pelagic fish and sharks, the Coral Sea is of true global conservation significance.

The report, Australia's Coral Sea: A biophysical profile, found that the Coral Sea, east of the Great Barrier Reef marine park, is likely the world's only remaining tropical pelagic environment where the marine life is not markedly impacted by fishing. It is also one of the few places where a viable marine reserve of very large size can be established and maintained.

The report's author, tropical marine ecologist Dr Ceccarelli, found that while our knowledge of the deeper Coral Sea ecosystems is still in its infancy, early studies have revealed a great diversity of habitats in the deeper waters. These include massive canyons at least three kilometres deep containing unique ecological communities. As divers most of us can only imagine what is lurking in the depths of these vacuous canyons.

The report reveals further wonders of the Coral Sea. It boasts the world's only known spawning aggregation of black marlin. Also, astonishingly, all species of eels that live in the freshwater streams of eastern Australia and New Zealand spawn in the northern Coral Sea and then embark on migrations of up to 3,000 kilometres.

Australia's Coral Sea: A biophysical profile is the first comprehensive biological and physical profile of the Coral Sea. It adds further weight to our efforts to protect this iconic marine environment in the world's largest, highly protected marine park which will leave a lasting legacy for future generations.

The Australian Marine Conservation Society is a member of the Protect our Coral Sea alliance which is calling on the federal government to establish a very large, highly protected, world-class marine park in Australia's Coral Sea. A highly protected marine park would provide refuge to large populations of pelagic fish and sharks, and leave a lasting legacy for future generations.

Join us and help support this important work. Visit www.marineconservation.org.au to join over 50,000 people who have signed a petition in support of protecting the iconic Coral Sea.

"BECAUSE DIVERS MAKE THE WORLD OF DIFFERENCE!"

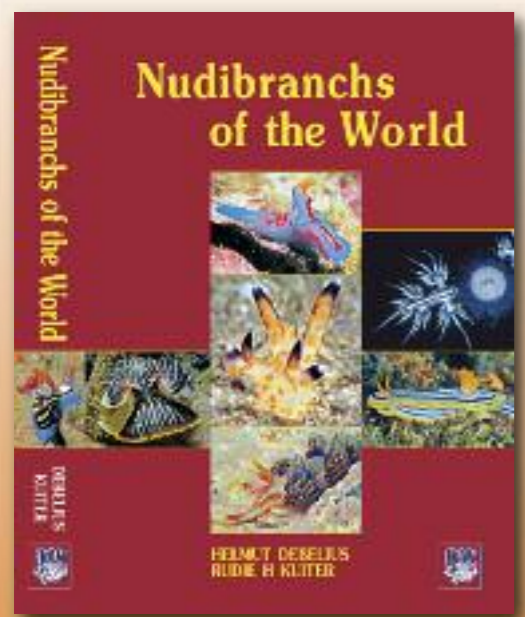
CORAL SEA TREASURES

The Coral Sea serves as a system of 'stepping-stones' for the dispersal of species from the western Pacific to the Great Barrier Reef.

- It is an important migratory route for many species, such as sea turtles and oceanic sharks, riding the great ocean currents from the northwest.
- The East Australian Current forms in the Coral Sea and carries warm water and tropical species southward.
- The Coral Sea is ecologically fragile. The reefs are small, isolated from each other and exposed to severe weather.

Australia's Coral Sea: A biophysical profile, was commissioned by the Pew Environment Group-Australia and written by Dr Dani Ceccarelli, an independent tropical marine ecology consultant.

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