

# an OCTOPUS'S GARDEN

In a remote corner of Madagascar, an unusual experiment has been taking place. In 2004, after a 90-per-cent drop in octopus catch sizes, community leaders, supported by several NGOs, introduced a voluntary six-month closure of the fishery that was sustaining them. The following year, **Lee Middleton** attended the historic reopening of the world's first community-run, protected zone for octopus. ▶



TEXT & PHOTOGRAPHS BY LEE MIDDLETON



ABOVE Almost three-quarters of the Vezo community relies on fishing as its primary source of income. Here, one of the village leaders, Robiste Alera, fishes for sardines.

PREVIOUS PAGE After an experimental six-month closure of the fishery, Vezo fisherwomen again searched for octopus at low tide.

Nearly 100 single-sail outrigger pirogues pressed silently across the Mozambique Channel's cobalt blue waters towards a hillock of sand the size of a football pitch. A pale sun rose over the approach of this armada of the Vezo, the semi-nomadic fisher people who inhabit Madagascar's south-western coast. A few minutes before nine, the crowd of men, women and children – scuba masks hugging foreheads, faces painted in yellow and orange, and spears in hand – turned east and fell silent as the *nahudas* or male elders called on the ancestors. Hunched over a few small bottles of rum and an open pack of cigarettes, the greyest of the grey hairs requested a blessing for the day.

Explaining the unprecedented gathering of people and warning that things might get hectic, the *nahuda* splashed a shot of rum into the crystal sea before throwing one back himself. Laughter rippled through the crowd, as some of its members followed their leader, who had jumped in a pirogue and was paddling away with surprising speed.

Five minutes later, 800 people had dispersed and were wading barefoot through the waters lapping the reefs surrounding the tiny white-sand island of Nosy Fasy. By the time I hitched a ride in the last pirogue to depart, more than a few people were toting octopi that, plucked from their watery dens, shimmered in the sunlight like alien iridescent flowers. A palpable yet contained excitement pulsed through the air as the glistening blue of these low-tide waters became streaked with purple-black ink.

In June 2005, I had the opportunity to attend the reopening of the world's first community-run, no-take zone for octopus. This obscure, yet historic event occurred offshore from Andavadoaka village on Madagascar's south-western coast. The people who inhabit this area and fish its waters call themselves the Vezo, or 'people who struggle with the sea'. And struggle they do.

Fishing communities the world over have been suffering from what many conservationists term a crisis in our seas. The effects of global warming and silt on coral reefs (which act as nurseries and feeding grounds for much marine life), combined with the depletion of species through over-fishing, destructive practices and pollution have led to the wide-ranging collapse of coral-reef fisheries and depletion of stocks. The trend is not restricted to tropical fisheries: various studies estimate that 60 to 70 per cent of the world's fisheries are depleted or nearly depleted. A relative latecomer to the global seafood market, Madagascar has recently assumed a place as a major exporter of shrimp, lobster and octopus.

Plentiful along the western coast's numerous reefs (which extend more than 400 kilometres and include the Grand Récif, one of the world's largest barrier reef systems), octopus was traditionally left to women and children to 'hunt' during the low tide when dens become accessible to anyone with a spear and two feet. This convention was evident in Andavadoaka, where more



than half of the fishers were women, many minding children and babies who fussed when their mother's spearing became too vigorous. The day's impressive showing of young men, often sporting scuba masks for the deeper diving required to catch larger specimens, and even more conspicuous smattering of *vazaha* or foreigners, though unusual, was certainly no accident. This event had long been anticipated, and not just by the Vezo.

One of the relatively larger but characteristically remote fishing villages dotting this coastline, Andavadoaka (population 1 200) played host to two newcomers in 2003. The first was Blue Ventures, a British NGO that aimed to help to conserve Andavadoaka's stunning coastal environment by organising paying volunteers to conduct in-situ research on marine habitats. The second was Copefrito, a French-owned seafood exporter looking to expand its market, particularly for octopus. They arrived simultaneously – a coincidence – and their impact has been significant. Suddenly, this fishing village, cut off for months every year by impassable roads, became a destination for international tourists, researchers, conservationists and businesspeople.

As you might have guessed, the people of Andavadoaka eagerly supplied octopus

to Copefrito. Zipping in twice a month on speedboats, Copefrito's collectors brought market access and the village's first regular motorised communications with the outside world. Perhaps less predictable was that Copefrito not only monitored the village's take, but that the company voluntarily shared this information with community leaders and Blue Ventures.

According to the UN's Food and Agricultural Organisation (FAO), the global market for octopus has increased in recent years, with Japan and Italy topping the list of importers in 2004. The study also showed exports from all major producers levelling off or declining in that same year. According to Copefrito's data, 18 months after beginning operations in Andavadoaka, octopus constituted both the largest portion of the company's purchases and the bulk of Andavadoaka's artisanal fishery. Their 2004 figures also charted a nosedive in octopus catch sizes, with almost 90 per cent of the individuals that year being juveniles weighing in at less than 500 grams.

Concerned over this decrease, which they had noted without the benefit of datasheets, Andavadoaka's leaders initiated a series of meetings with representatives from Copefrito, Blue Ventures and their collaborators, the Wildlife Conservation Society (WCS) ▶

*Octopus cyanea*, the primary species caught in the Andavadoaka region, is a fast-growing predator that feeds on molluscs and crustaceans. During the daytime, it occupies holes and crevices found in coral reefs, seagrass beds and across rocky, sandy or muddy seabeds.





**ABOVE** The first closure period was shown to have increased the number of octopus caught by a factor of 13. Although there was a significant drop in numbers during the months after the reopening, catch levels remained double the pre-closure figures.

**OPPOSITE, TOP and BOTTOM** Vezo children grow up amid boats and fishing gear, and learn their parents' trade from an early age. In an effort to add to the villagers' skills and knowledge, Blue Ventures has instituted an environmental education programme that includes a children's environmental club.

and the national marine research institute (Institut Halieutique et des Sciences Marines or IHSM). The scientists took the opportunity to explain certain aspects of octopus biology.

Like all octopi, the species common to Andavadoaka, the reef octopus *Octopus cyanea*, is bound by a lifecycle that is both rapid and brief. During their 12 to 18-month lives, individuals reach weights well over five kilograms. Maturity comes with weight (between 500 and 1000 grams), and the length of time it takes an octopus to get there depends on environmental factors such as water temperature, light and diet. Once it reaches maturity, however, its growth rate increases exponentially. An individual that has taken six months to reach 500 grams can gain between six and eight kilograms in the same time.

Though biology deems the octopus a kind of poster creature for the potential benefits of fisheries management, this cryptic cephalopod had never before been the sole object of a marine protected area. Faced with evidence of the species' sudden decline, combined with information about its unique growth pattern, Andavadoaka's major players decided to attempt an 'experimental' six-month closure of the octopus fishery on the reefs around the tiny offshore island of Nosy Fasy.

**W**e were all there, even the small girls,' said Nestaline, a 37-year-old fisherwoman and mother of six. It had been a few days since the reopening and I had stopped to chat to a group of women on the beach. Sitting amidst nylon nets, drying sardines and children of various ages, the women braided and knotted each other's hair while alternately nursing and scolding their energetic brood.

'The reserve was a good thing, but results always depend on luck. I only caught two kilos, but some caught 10 or even 18. If the reserve had only been for Andavadoaka, it would have been good, but too many others came.'

Nestaline's comment was echoed by nearly everyone in Andavadoaka, including Blue Ventures and WCS scientists. They were worried that many outsiders who had crashed the reopening might sour the enthusiasm of Andavadoaka residents towards management 'experiments'. Fortunately, those fears proved to be unfounded.

In the following months, leaders from three of the 14 villages represented at the Nosy Fasy reopening approached the NGOs to request help in establishing their own no-take zones. Affirming as this was, the creation of new, discrete temporary protected areas was not required. Once the data had been analysed, Andavadoaka's experimental no-take-zone was shown to have increased the number of octopus caught by 13 times the pre-closure figures, with the average weight of individual octopi rising an astounding 25 times.

Thanks in large part to these results, Madagascar's Ministry of Fisheries and Environment has adopted a national law that closes the entire octopus fishery on the south-western coast between 15 December and 31 January every year. The government also instituted additional regulations regarding minimum length (four centimetres) and weight (350 grams) for individuals caught outside this period.

'What this represents is the first community-managed marine research and conservation programme of its kind in the Indian Ocean,' said Alasdair Harris, scientific director and co-founder of Blue Ventures, speaking of the Andavadoaka project and its achievements. 'The project has been self-replicating and perpetuating for three years, and it's a huge accolade for Madagascar that this got off the ground and that the community made it happen. It's been an honour for us to work with such open minds.'

'Young people here don't have enough to do,' said Zizianne Samba, a particularly open-minded and outspoken 19-year-old collector for Copefrito. Hailing from Andavadoaka, Zizianne attended school in the provincial capital of Tulear until the age of 17. 'The biggest problem here is joblessness, especially for girls,' she continued. 'We need to improve job opportunities, and we need leaders who can provide technical advice.'

Although Zizianne's level of education was unusual in Andavadoaka, the sentiment she expressed was not. For generations, the Vezo have relied on the sea and its resources for the entirety of their material and cultural life. But, as their struggle with the sea becomes increasingly difficult and its returns ever-diminishing, the Vezo are seeking alternatives. 'The problem is that we lack the money and materials to start new things,' explained 47-year-old ▶



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fisherman and community leader, Robiste Alera.

With their shared goal of conserving the area's ecosystems, Blue Ventures and its collaborators have every interest in assisting Andavadoakans in their efforts to realise a sustainable future. Among other undertakings, the NGO has established education projects in the local schools, trained and hired locals as monitors for the socio-economic and fisheries studies, held 'eco-guide' courses and is acting as an advisor and financier of a community-owned eco-lodge. It takes pains, however, to ensure that the motivation behind all projects originates with the community, as was the case with the octopus closure.

And, lest it seem incongruous that a conservation organisation be dedicated to sustaining a fishery that requires people to tread on reef surfaces, bear the alternative in mind: the fast-growing octopus is a manageable resource whose sustainable extraction provides a buffer against over-fishing of

other slow-generating species, such as the herbivorous reef fish that keep corals healthy by eating damaging algae. Without a viable octopus fishery, people would almost certainly harvest more fish species that play a vital role in maintaining the resilience of the area's fragile coral reef systems. The willingness of many in Andavadoaka to 'start new things' notwithstanding, the goal of conservation here is not to ban all fishing, but rather to ensure its continuance.

To that end, in 2006, leaders in Andavadoaka and 21 neighbouring villages took the bold decision to create a marine protected area (MPA) that would mix temporary no-take-zones with permanently protected areas along a 50-kilometre stretch of coast. Encompassing over 800 square kilometres and including coral reefs, sea-grass beds, mangrove forests, lagoonal habitats and baobab forests, the new MPA is called Velondriake, which means 'to live with the sea'. Throughout 2006, villagers met

together, and with Blue Ventures and WCS staff, discussing and mapping the areas they thought most important to conserve. In December, they called on the Ministry of Fisheries and Environment and other partners to grant the MPA official recognition and assist them in its development.

'Across 22 villages, people are hoping that the Velondriake MPA will improve their livelihood status and resolve socioeconomic problems,' explained Roger Samba, a native of Andavadoaka and president of the association (also called Velondriake), that is leading the effort. 'People are generally happy with Velondriake. It is creating more communication and collaboration between villages, and also is giving villagers responsibility for the management of their own resources.'

And this is precisely what environmental conservation and natural resource management require: people who are willing and able to make changes and take responsibility for

their own sustainable futures. In recognition of its efforts, the village of Andavadoaka was awarded the UN's 2007 Equator Prize, for extraordinary work to diminish poverty through conservation and sustainable use of biodiversity.

'I want my four children to become teachers,' said Velonirina, a 28-year-old fisherwoman, who attended school to grade five. 'Years ago there were many, many fish, just by the seaside. But now you have to go so far. I would prefer that my kids not be fishermen. As teachers, they can do different things ... they would speak a foreign language.' She paused, her steady gaze fixed on the uninterrupted sea-sky horizon that the Vezo have seen for generations.

If Velondriake proves successful, future generations might live rather than struggle with this view. Asked if she would not regret her children leading lives so different from her own, Velonirina said simply, 'Even a teacher can still go to the sea.' ■

**ABOVE** Nearly 800 sailing pirogues were counted at the reopening of the octopus fishery on Nosy Fasy. A good number of these came from neighbouring villages, which subsequently requested help in establishing their own marine protected areas.

**OPPOSITE, TOP** A Vezo *nahuda* or elder watches the sun rise.

**OPPOSITE, BELOW** With spears and goggles at the ready, the people of Andavadoaka congregated on the beach on the morning of the reopening.

