The sea's greener pastures

Underwater meadows of seagrass play a crucial role in the marine ecosystem yet are poorly understood – something Wakatobi Resort is helping to rectify. By **Karen Stearns**

GUESTS AT WAKATOBI RESORT, ON A small island off southeastern Sulawesi, have been known to spend entire days snorkelling the house reef. The continuing profusion and diversity of life that keeps them rapt is thanks to a strategy implemented by the resort's founder, Lorenz Mäder. Even before construction of the resort began, he met with the area's fishermen and villagers to propose a no-fishing sanctuary along six kilometres of reef. In exchange for them honouring this conservation zone, the resort would make direct lease payments to area villages. So began the Collaborative Reef Conservation Program, which has since grown to encompass some 20 kilometres of reef.

The real secret to the programme's success though is that it protects not just corals but vital meadows of seagrass that grow in the shallows. Together with similar places around the world, they comprise some of the most extensive grasslands on the planet, but you don't hear much about them. They cover tens of thousands of acres around the Philippines, Malaysia and Indonesia – the latter alone having 10% of the world's total seagrass population. Some seagrass meadows are even large enough to be seen from space.

The scant attention is unfortunate, because seagrass meadows are among the planet's most vibrant and vital ecosystems. Seagrass beds are the nurseries and breadbaskets of the ocean, providing both shelter and sustenance for thousands of species of marine life. Grasses are a nursery habitat for juvenile fish, supporting some 20% of the world's most significant fisheries, and an important feeding ground for grazers such as sea turtles and dugongs, along with foragers that feed on invertebrates and other species that live among the plants. According to marine biologist Benjamin Jones of Stockholm University, who specialises in the study of seagrasses, "Without these secret gardens of life, we probably wouldn't have coral reefs as we know them, and they'd be much less beautiful."

Studies show that in the waters of southeastern Asia, more than 400 species of fish rely on seagrass for their growth and development. This tally includes many of the reef fish that divers and snorkellers love to see, as well as important food fish. It is estimated that more than half of all fish caught by humans in Indonesia are tied in some way to seagrass beds.

In addition to feeding hundreds of millions of humans, seagrass meadows help stabilise coastlines, and are able to capture and store vast quantities of carbon dioxide. Researchers calculate that seagrasses are 35 times more efficient at capturing greenhouse gases than tropical rainforest. Indonesia's seagrasses and mangroves together are thought to account for at least 17% of the world's 'blue carbon' – a term used to describe the atmospheric carbon dioxide absorbed by seawater.

Threats and opportunities

Given the tremendous ecological and economic value of seagrasses, the need to protect this resource might seem obvious. Unfortunately, this isn't always the case. Coastal development, agricultural runoff, overfishing, coral and sand mining, oil pollution and sedimentation from land-based sources all contribute to the destruction and degradation of seagrass meadows. Some studies have estimated that globally, this habitat is disappearing at a rate similar to that of the world's rainforest: an area the size of a football pitch every half hour.

The good news is that the importance of seagrass is becoming better known, and there are organisations working towards their conservation at global and local levels. SeagrassNet (www.seagrassnet.org) was established in the Western Pacific in 2001 and is now monitoring 126 sites in 33 countries. In Indonesia, the Seagrass Network is focusing its work on the region of Sulawesi home to Wakatobi National Park. Then there is Indo-Pacific Seagrass Network (https://indopacificseagrass.network) which is addressing seagrass loss in Indonesia through local educational efforts and restoration projects.

A third initiative is Project Seagrass (www.projectseagrass.org), cofounded by Benjamin Jones, Dr Richard Lilley, a biology teacher in Edinburgh, Scotland, and Dr Richard Unsworth of the Seagrass Ecosystem Research Group at Swansea University. Jones' current PhD project investigates the linkages between marine life, biodiversity and food security using seagrass meadows as a model system. His goal is to provide the evidence needed for policy change across the Indo-Pacific that acknowledges the services that seagrass meadows provide. Data is also being crowdsourced via a citizen science project, seagrassspotter.org.

"This is something both tourists and local communities can use to help Project Seagrass understand the distribution of seagrass meadows across Indonesia," says Jones.

Planting trees, changing minds

Initial studies published by Dr Unsworth showed that nearly half of the seagrasses in Wakatobi National Park were vulnerable to some degree of degradation. While some grasses were lost to encroaching development, it was ultimately determined that a far greater threat was an increase in coastal runoff. These findings were drawn from the work of University of California marine biologist Angela Quiros, based on her studies of the seagrass beds of the Philippines. According to Quiros's research, what happens on land is also quite important to the health of seagrasses. As forests are converted to croplands, there is an increase in runoff into rivers. Couple this with a loss of coastal mangroves, which serve as natural filters, and the result is a level of sedimentation that can smother seagrass.

To combat sedimentation, the Seagrass Network adopted a holistic approach to conservation and restoration that enlisted the help of the local people. In Wakatobi, Project Seagrass and a local Indonesian NGO began a series of outreach programmes that alerted local communities to the issues and ultimately led to the planting of more than 4,500 trees along riverbanks and shorelines.

Cooperative collaboration

There remains much to be done to ensure the protection of the seagrass beds of Indonesia – even in the comparatively well-resourced area of Wakatobi. In part it will depend on the continuing success of the Collaborative Reef Conservation Program and other marine protected areas.

At the time of its creation, the Collaborative Reef Conservation Program was groundbreaking for not being dependent on government or charitable funding, instead channelling a portion of resort revenue into the sanctuary. This model makes resort guests and area residents partners in protecting the environment. Wakatobi Resort has earned recognition and awards for this innovative approach to marine conservation, which has since been adopted by other entities around the world.

"Wakatobi has chosen to take personal responsibility for the care of our reefs and seagrasses by networking and supporting the initiatives of groups such as Project Seagrass," says Mäder, "as well as hosting individuals involved in studies and research programmes that will provide the answers needed to address current and future ecological challenges." **AA**