

Conserving mangrove ecosystems, securing livelihoods – the seafood sector can play its part

The international community of states is stepping up its calls for the private sector to be involved in the achievement of climate and development goals. Taking pioneering projects in Costa Rica and India as examples, this article illustrates what the (organic) shrimp farming sector can do to conserve and restore mangrove ecosystems.

By Udo Censkowsky

As well as being of great ecological benefit, mangroves are highly valuable in socio-economic terms. For marginalised population groups in particular, the ecosystem services that mangroves provide are vital elements of their livelihood security. Often, though, the associated activities contribute directly to the degradation of these already endangered ecosystems. The problem cannot be solved by the public sector alone; the private sector and civil society are also called upon to help develop sustainable and inclusive value chains that enable people in or on the fringes of mangrove ecosystems to continue to make a living there. What is crucial is that income generation – whatever its basis – is linked directly or indirectly to mangrove conservation.

What shrimp production has to do with mangrove conservation

Many commercially exploited prawn and shrimp species (together with many other fish species) spend the initial stages of their lives in mangrove ecosystems. Without this nursery they would be unable to develop in the wild. In the 1990s and the first decade of the 2000s, a significant proportion of the world's mangrove stands were uprooted to make way for agriculture, fish farming and salt production – and in many cases for shrimp farming. Today, the conversion of mangrove sites for economic use is banned in most countries. Unfortunately, though, there are repeated reports of illegal activities. In addition, although conversion for agriculture or fish farming does not usually receive official approval, exemptions from the ban are often granted for purposes such as tourism and the construction of housing and infrastructure.

One of the requirements attached to the certification of organic shrimps is a ban on felling mangroves in order to establish shrimp farms. Some certification bodies, such as the German association Naturland, also consider a farm's site history in detail: if mangroves previously covered more than 50 per cent of the site, cer-

tification is refused, while if they covered less than 50 per cent, reforestation must take place on the farm. Beyond that, however, the participating retailers and their suppliers are not subject to any specific requirements – such as a duty to actively support mangrove restoration in the areas from which the shrimps originate.

On behalf of various companies in the organic shrimp industry, the German consultancy firm bluesensus has developed organically certified value chains, often linking them to pilot mangrove conservation measures. The following section describes how these measures – which are supported on a voluntary basis by three German companies (Ristic GmbH, Alnatura and Aldi Süd) – not only help conserve valuable ecosystems but also improve the living conditions of local people and enable them to earn an income. Working with a local subsidiary in Costa Rica, the fish trading company Ristic has developed the production of organic shrimps in the Central American country and now supplies the organic supermarket chain Alnatura and the discount retailer Aldi Süd; Alnatura and Aldi Süd also buy organic shrimps from India.

Restoring the hydrology of salinated areas

On the Nicoya Peninsula in northwest Costa Rica, tourism – together with arable and livestock farming – is the main source of income. Salt used to be produced there in earth ponds on the coast. Many of these earth ponds were created in the mangroves but they are no longer economically viable and lie idle. Yet because of the dams that have been created there and the high salt levels in the soil, mangroves cannot re-establish themselves or can do so only very slowly.

The Costa Rican environmental organisation Fundecodes aims to restore the hydrological condition of the areas previously used for salt extraction by removing dams and digging small channels to improve the flooding of the sties.

Fundecodes regularly holds meetings with the local community to raise awareness of mangrove conservation; it also involves local schoolchildren in litter picking. The planting tasks and the work on restoring the hydrological situation are performed by local people, who are paid for what they do. With the help of the local population about ten hectares have already been restored; this is due to be expanded to around 17 hectares in 2022. Via its local representatives, the Costa Rican environment agency Sinac is closely involved in all the activities.

The companies Ristic and Alnatura have been providing financial support for the restoration schemes since 2015 in Nicoya, where some of the farms that supply them with organic shrimps are located. Alnatura donates 15 euros for each pack of organic shrimps that it sells; on top of this, Ristic contributes a fixed amount annually. Both companies also fund measures to protect the privately owned Karen Mogensen Nature Reserve, which is nearby. The owners of the reserve, the NGO Asepaleco, are seeking both to prevent forest fires and to gradually extend the protected area. In 2021 Alnatura provided co-financing for the purchase of a former cattle farm on a 25-hectare site adjacent to the reserve. This area is now being protected and trees are being allowed to regrow naturally. This also helps to conserve the mangrove sites, because the forest cover significantly reduces erosion and silting of the mangrove stands. The forest now covers almost 400 hectares and is playing an increasingly important role in the supply of water to the coastal community.

Removing mangrove fern, supporting shellfish gatherers

Close to Costa Rica's most southerly organic shrimp farm on the Osa Peninsula is the 14,000-hectare site of the Terraba-Sierpe Wetlands, which form the largest area of mangroves in the country. Mangrove fern (*Acrostichum aureum*) grows on more than 2,000 hectares of the site. The clearance of

mangroves along the larger river arms some decades ago for timber and tannin production enabled the fern to spread widely. It currently grows to a height of two to three metres and forms a dense tangle of roots and rhizomes that has so far prevented the mangroves re-establishing themselves naturally. Although the mangrove fern is native to the region, these areas provide far fewer ecosystem services than the adjacent mangrove sites.

Over the course of some three years, cooperation with the regional NGO Osa Conservation, the fisherpeople's association Apremaa and the National University of Costa Rica resulted in the production of a restoration strategy which provides for environmentally sound removal of the mangrove fern and subsequent reforestation of mangroves. This has led to the restoration of some 50 hectares of mangrove cover between 2018 and 2021. Because the fern constantly regrows, it is necessary not only to cut the mangrove fern and plant the mangroves but also to rework the site regularly. This is particularly important in the first year after planting. This work is carried out by hand with a machete – a strenuous task that has been performed by the men and women of the fisherpeople's organisation. The costs of the trial, the supervision by the NGO Osa Conservation and the work of the fishermen's organisation have been funded as part of an Aldi Süd develoPPP project. The develoPPP programme established by the German Federal Ministry for Economic Cooperation and Development (BMZ) is aimed at companies seeking to invest sustainably in a developing or emerging country. The private-sector company must provide at least 50 per cent of the funds; the remainder is co-financed by BMZ.

Apremaa has used some of the payment to acquire a plot of land on which a small shellfish processing centre has now been established. The organisation's members earn money by collecting the piangua shellfish and selling them to middlemen. In future they will be able to process the shellfish and sell it themselves at better prices.

Protecting dykes, promoting sustainable tourism

According to the NGO Germanwatch, India is one of the 20 countries most at risk from climate change. The sea level is rising, and the cyclones that travel across the Indian Ocean have devastating consequences for coastal communities. Visitors to the Sundarbans of West Bengal (see article on page 28) will



Mangrove upgrowth after around two years in the Terraba-Sierpe Wetlands, Costa Rica.



A small channel to improve the flooding of the sties in Nicoya, Costa Rica.



Talking to the women's group in Lakshmipur, India.



Terraces and fences as a preparatory measure for integrated mangrove aquaculture in West Bengal.

Photo: Udo Censkowsky

notice that people are establishing permanent dykes or renovating old ones. The life of the dykes can be extended by replanting mangroves on the polders in front of them – not a trivial task, because at each site it is necessary to study the soil and flooding conditions in order to identify suitable species of mangrove. In organising this, the Indian NGO NEWS (Nature Environment & Wildlife Society of India) focuses on training women's groups and their mangrove stewards and on embedding the interventions in the village communities.

As with all afforestation projects, planting the mangroves is the easier part; a far more complex task is preserving the planted areas long-term. This requires the cooperation of local people. For example, fishermen need to keep to agreed channels for their boats, and livestock owners must promise to keep their cattle or goats away from the mangrove plants so that they don't eat them. Involving all the local stakeholders – especially the community's administrative authorities – and working regularly with the locally active women's group can ensure the protection of the sites.

The organic food retailer Alnatura sells organic black tiger shrimps from West Bengal. It has supported the project since 2016 by donating 15 eurocents for each pack of shrimps that it sells. In 2020 the women's group in Lakshmipur district used the proceeds to build a viewing tower on the dyke and construct a small tea shop for Indian tourists, who come mainly to see the increasingly extensive range of birds. After a two-year delay as a result of the pandemic, tourism is due to get going this year, thus generating income for the women's group. More than five hectares have been afforested at this site.

Combining extensive afforestation with agriculture

A relatively small part of the Indian Sundarbans is a protected nature reserve that people need a permit to enter; by contrast, the larger part of the Sundarbans is inhabited, and mangroves occur there at far lower density. Because almost all the available land is used, there is virtually no scope for extensive afforestation – unless new land is created by the dynamics of the Ganges river delta. Here afforestation in combination with passive conservation measures (such as fences and mangrove stewards) can speed up the process of land formation. As an incentive to run the tree nursery and engage in planting and monitoring work, the local NGO partner NEWS has developed a

participatory approach to income generation. In one case the participating families decided to start keeping hens and selling eggs. The discount supermarket Aldi Süd buys organic black tiger shrimps in West Bengal and as part of the develoPPP project mentioned above it has funded extensive afforestation that is combined with income-generating activities. Between 2017 and 2021 areas totalling some 40 hectares have been afforested at two sites, in each case with the involvement of a local women's group. The women's groups were trained and provided with necessary equipment to enable them not only to keep hens for egg production but also to run their own replacement breeding. Solar-powered incubators for the hens' eggs were purchased for this purpose. Previously the women had to buy the chicks they were going to rear.

Integrated mangrove aquaculture

As another aspect of the Aldi Süd project, three pilot farms for integrated mangrove aquaculture (IMA) were set up in West Bengal. This has involved the NGO NEWS and the organic shrimp producer Blue Sea Aquaculture, which is based in Calcutta, incorporating more than ten hectares of mangroves into existing organic shrimp ponds. This form of production, which was previously unknown in India, has great potential – especially for regions that will be particularly affected by sea-level rise over the

next 50 years. Integrating mangroves will help stabilise pond dams, increase biodiversity, alter the microclimate and bind carbon. Above all, though, the mangroves in the scheme developed by bluesensus and NEWS will also improve the living and growing conditions for shrimps, fish and crabs in the ponds. As yet this is a pilot project that still needs to be refined and scientifically monitored.

Systematic expansion of the initiatives is envisaged

In India and Costa Rica functioning structures have been established that enable the initiated projects to be implemented quickly and thus contribute to the mitigation of global warming. In India the search is under way for partners who are interested in investing in the further development of integrated mangrove aquaculture. In Costa Rica the aim is to restore the 2,000 hectares of mangrove fern as an intact mangrove ecosystem as quickly as possible. Further supporting research is also needed to help with issues such as exact measurement of carbon storage at the individual sites.

The seafood sector, which deals in products from tropical brackish water aquaculture and thus often has a direct connection with mangrove ecosystems, is an obvious candidate for such involvement. Bluesensus and the German NGO Global Nature Fund are currently de-



Women's group involved in extensive afforestation in West Bengal.

Photo: Sourabh Dubey

veloping a scheme that will give the seafood sector a very easy means of participating in the financing of restoration measures (see also following article). If all Germany's sellers of organic shrimps were to adopt the Alnatura model, this could make a significant contribution to climate change mitigation and help improve the living conditions of many people on the brink of poverty.

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A multi-stakeholder partnership for integrated mangrove aquaculture in the Sundarbans

Shrimp farming often involves the felling of valuable mangrove forests. Through the Sustainable Aquaculture in Mangrove Ecosystems (SAIME) project, the Global Nature Fund and partner organisations in India and Bangladesh aim to halt the loss of these valuable ecosystems while securing the livelihoods of small-scale aquaculture farmers.

By Ralph Dejas

More than a third of all mangrove stands in the world's tropical coastal regions have been lost since the 1980s. This means that the habitats of these salt-tolerant plants are shrinking three to five times faster than tropical rainforests or coral reefs. These valuable coastal ecosystems are being deforested for firewood and settlement, but more than half of the cleared area is being used for new aquaculture ponds. In many of the world's coastal regions, prawn and shrimp farmers are felling mangrove forests because species-rich river deltas are perfectly

suitable to aquaculture of the tasty crustaceans. The aquaculture market segment has grown dramatically in recent years. Seafood produced in various forms of pond farming, in net cages or in other closed-circuit systems now accounts for more than a third of the global seafood market. Global consumption of fish and seafood now averages 20 kilos per person per year, and the figure is rising. While sustainable aquaculture presents opportunities to use controllable production to combat the over-fishing of the world's oceans, the drawbacks of

inappropriate methods are obvious: fish meal used as feed in aquaculture systems contributes directly to overfishing. Often, too, the breeding ponds are over-fertilised and polluted with antibiotics.

The Sundarbans (the word is Bengali for "beautiful forests") are the largest contiguous mangrove area in the world, yet they are under severe threat. This unique ecosystem extends from the east coast of India to Bangladesh. The area, the home of the last wild