

# Mariculture – A Namibian Perspective

By Moses Maurihungirire and Kerry Griffin

Namibia has an undeveloped coastline with a virtually pollution-free and highly productive marine environment, due to the Benguela upwelling system. The mariculture industry, based on the farming and ranching of marine organisms, is still in its infancy with potential for development.

In 1993, the Ministry of Fisheries and Marine Resources established the Mariculture Section to explore the potential of fish farming in coastal waters and to assist the development of mariculture in Namibia through research and extension services. This section works closely with private mariculturists at Lüderitz, Swakopmund and Walvis Bay.

In August 1996, a draft aquaculture policy document was published to facilitate aquaculture in the marine and fresh water sectors. Two aquaculture consultants wrote the document with input from Namibian government ministries, educators, community development organisations, private oyster farmers and fishing companies. The policy aims to promote the responsible development and sustainable management of aquaculture, to guide government support for existing and potential aquaculture ventures and to protect all aquatic ecosystems. It is aimed to form the basis for aquaculture legislation.

The draft aquaculture policy addresses economic development, consumer health and safety, cooperative research, introduction of non-indigenous species, protection of the environment, the regulatory role of government, dissemination of information marketing and ethics.

The University of Namibia introduced courses and curricula to ensure future expertise in aquaculture. With these initiatives, investment and technological knowledge, the Namibian mariculture industry will hopefully accomplish the goals outlined in the draft aquaculture policy.

Currently the Namibian mariculture industry is focused on cultivating shellfish, especially oysters, and seaweed at the few sheltered bays suited for mariculture along the coastline. The unpolluted waters and the nutrient rich

Benguela Current greatly enhance the suitability for capture fisheries.

## Historical background

Between 1990 and 1992 Seaflower Lobster Corporation at Lüderitz cultivated endemic black mussels (*Choromytilus meridionalis*) using ropes suspended from a framework of wooden planks. The mussels were sold live in Namibia and, after they had been debearded, cooked, frozen and packed in half shells, in South Africa. Seaflower ended the operation due to frequent red tides and poor market conditions.

Mussel farming is common throughout the world, especially on the westcoast of Europe in Holland, Belgium France and Spain. Ropes seeded with juvenile mussels of the desired species are usually suspended from a framework, allowing the mussels to hang in the water and filter feed. A current can help to carry nutrients to the mussels. However, if the current is too strong, it can cause problems with the ropes, the



Because of favourable conditions in Radford Bay in the Lüderitz lagoon oysters reach marketable size within only 12 months.

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support structure and the anchoring system.

This type of farming is known as “extensive” mariculture because the cultured species is left largely alone to feed from the natural environment. “Intensive” mariculture implies artificial feeding in a much more controlled environment and is usually practised in a land-based system. Walvis Bay Salt Refiners with limited success tried to culture the common sole (*Solea solea*) from brood stock obtained from the North Sea.

## Oyster farming

Namibia does not have indigenous oysters as natural reproduction does not occur due mainly to unfavourable conditions. Oysters are artificially produced in hatcheries or laboratories. Two species are cultivated: Pacific oysters (*Crassostrea gigas*) and European flat oysters (*Ostrea edulis*). Both are ostreidae or true oysters. True oysters were already cultivated in pre-Christian times. Over the centuries oysters were regarded as a culinary delicacy.



Between 1986 and 1991 Taurus Atlantic Seaweed at Lüderitz cultivated Pacific oysters (*Crassostrea gigas*) and generated sales of about 6 000 medium-sized (55 to 60 gram) oysters monthly. The restricted market at Lüderitz and the distance of Lüderitz from other market centres doomed the enterprise. Taurus used the "rack and bag" system in which plastic mesh bags of oysters lay on top of a metal framework about one metre above the substrate.

Of the three commercial oyster farms operating in Namibia today, two – one at Walvis Bay and the other at Swakopmund – operate as a sideline to salt production. The primary focus of the third, located in Lüderitz, is the cultivation of oysters. They employ between ten to 20 workers each, and market their oysters fresh and almost exclusively in South Africa and Namibia.

Many different methods are used to farm oysters, depending on the conditions of the area where cultivation takes place. The oyster producers at Walvis Bay and Swakopmund use a land-based system in which water is pumped from the sea into man-made ponds, where the oysters hang in bags from ropes or wooden structures. The oyster farm in Lüderitz uses a similar method, except that the bags hang in a natural lagoon. Some bags are suspended horizontally from ropes and floats, but most hang vertically from a wooden framework.

Both oyster species cultivated in Namibia are protandrous – they change sex. With Pacific oysters fertilisation takes place externally, whereas with the *Ostrea* genus, the female draws in sperm which has been released by the male. Spawning takes place when conditions (mainly temperature) are correct.

In a laboratory setting, spawning can be induced by manipulating the rearing conditions. The larvae can settle on substrate, or can be forced to develop into the juvenile stage unattached. The latter is the preferred method because the mature oysters will have a more uniform and pleasing appearance than when they grow while attached to something which can affect their shape.

Once the spat have grown to between 3 to 17 mm they are sorted into seven different size categories and priced accordingly. The different sized oysters are cultivated in plastic mesh bags of different mesh sizes varying between 4 and 23 mm. The marketable size for the Pacific oyster is between 55 and 130 grams, which they reach between 12 and 18 months. The European flat oyster reaches marketable size at 120 grams after about 24 months. Most of the oysters for cultivation in Namibia are purchased from hatcheries in South Africa.

Lüderitz Mariculture Limited was established in 1992 at Radford Bay, Lüderitz. The company specialises in the cultivation of the Pacific oyster for export to South Africa, and produces 50 000 medium sized (55 and 60 g) oysters per month. The oyster market in South Africa is improving and Lüderitz Mariculture hopes to double production soon. Because of favourable water conditions oysters in Radford Bay in the Lüderitz lagoon reach marketable size within only 12 months. The company currently orders 250 000 spat monthly from South Africa, and has up to 2,5 million oysters in the water at any time. The company employs 17 people.

Walvis Bay Salt Refiners and Salt Company (Pty) Ltd started oyster farming on an experimental basis in 1991.

Farming is conducted in onshore ponds that have constant water flow through them. The ponds and pumps are the same used for the company's salt production. The company employs 11 workers, and in 1992, yielded 650 000 medium sized Pacific oysters for export to South Africa.

The oyster farm run by Salt Company (Pty) Ltd was established at the Swakopmund salt works in 1987. The company cultivates Pacific oysters from spat imported mainly from Chile and South Africa. It also produces spat of European oysters, which is sold to local companies. Domestic and export sales of medium and large Pacific oysters of this company are one million organisms annually.

## Seaweed culture

Taurus Atlantic Seaweed began collecting beachcast of seaweed in 1980. The company focuses on *Gracilaria verrucosa*, which is used for agar production. Other species of seaweed are also used, such as kelps (*Laminaria pallida* and *Ecklonia maxima*). Most of Taurus's production comes from beachcast, but longline cultivation in the lagoon at Lüderitz is used to supplement production. The company employs about 50 people.

Quest International was established in 1992 at Lüderitz, and was supplied by Taurus Atlantic Seaweed with wild stock of *Gracilaria*. This stock was supplemented by cultured *Gracilaria* in close collaboration with researchers from the Ministry of Fisheries and Marine Resources. Quest International processed its seaweed to the agar stage.

*Gracilaria* from Namibian waters command a good price on world markets due to its high gel strength. Cultured weed contains 23% gel as opposed to the 16% of natural stocks. Quest International has the capacity to process 6 000 tons of wet seaweed annually.

## Future potential of mariculture

There is considerable interest in the culture of rock lobster in the private and research community. One private mariculture venture already obtained permission to collect juvenile rock lobster from oyster bags and to keep the lobster in holding tanks, to determine whether cultivation would be possible and economically viable. This is done in close cooperation with the Ministry of Fisheries and Marine Resources.

The Namibian mariculture industry is relatively young and expansion is market-dependent. To expand, other markets would have to be sought outside southern Africa. Expansion of mariculture depends on the identification of physical and socio-economic potential, by carrying out a coastal resource profile which identifies potential sites for mariculture.

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