Pearls from Africa

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Introduction

More often than not, aquaculture is on the wrong side of commentary relating to the environment and conservation. However, collaborative research in Tanzania by the Worldwide Fund for Nature (WWF) and Australia's James Cook University (JCU), in association with Mafia Island Marine Park (MIMP), has shown that not only are some forms of aquaculture compatible with conservation efforts, but aquaculture may provide an important component of the management plan for marine protected areas. Small-scale production of the first cultured pearls from East Africa offers opportunities for income generation for coastal communities in Tanzania and may provide an important part of the management process for sustainable use of coastal ecosystems.

Working in partnership with the Tanzanian Government, WWF has supported the development of MIMP in central Tanzania since the park's establishment in 1995. The park supports a local population of 18,000 people, who are poor and rely heavily on limited natural resources. Fishing and coconut production are the traditional sources of income on the island. WWF and MIMP are exploring, with local communities, sustainable livelihoods that will facilitate conservation measures and address the high levels of poverty on the island. Given the physical geography of the island, aquaculture is probably the most promising area to develop new income-generating activities. Over the past four years, MIMP and WWF have jointly undertaken preliminary research to investigate the feasibility of cage culture of rabbit fish (*Siganus* spp.) and pearl culture.

As demonstrated in the Pacific, cultured pearl production can provide considerable opportunity for income generation for coastal communities. Pearl production may occur on small family-based pearl farms and individuals may enter the industry at a number of levels to produce oyster shells (mother-of-pearl), half-pearls or round pearls, or they may simply collect spat from the wild for sale to pearl farms. Furthermore, the pearl industry provides opportunity for the involvement of women and provides the raw materials for local handicraft manufacture, which may include lower grade pearls or pearl shell.

Preliminary research at Mafia Island showed that the blacklip pearl oyster was abundant within MIMP. Furthermore, Mafia Island oysters reached a large size, indicating good growth rates and the potential to produce pearls of a large size. The mother-of-pearl of Mafia Island oysters was also of high quality showing very good colouration. These findings provided the basis for subsequent research to determine the quality and market acceptance of half pearls produced at Mafia Island. A trial batch of 50 *Pinctada margaritifera* was "seeded" for half pearl production (Fig. 1). Each oyster was seeded with 4–5 hemi-spherical nuclei following anaesthesia with benzocaine, which allows accurate positioning of pearl nuclei on the inner surface of the shell while minimising stress to the oyster. Seeded oysters were then placed into clean seawater to recover before being placed into panel (pocket) nets. Nets containing seeded oysters were suspended from a bamboo raft within the MIMP for a further six months. Local fishermen and MIMP/WWF staff were also trained in basic husbandry methods for *P. margaritifera* as

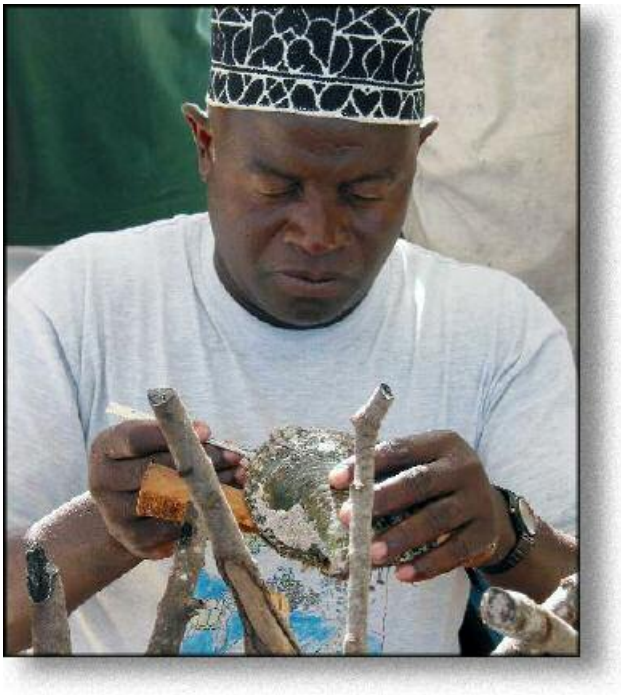

Figure 1. "Seeding" anaesthetised pearl oysters for half pearl production

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well as half-pearl production techniques that are not technically demanding.

Trial seeding for half pearls at MIMP proved extremely successful with negligible oyster mortality and production of high quality half pearls (Fig. 2). Some of the pearls have been made up into sterling silver jewellery settings (Fig. 3) and have been used to assess market acceptance of pearl jewellery at resorts on Mafia Island and retail outlets in Dar-es-Salaam and Zanzibar.

In many countries, pearls must be exported to be sold, and must compete with pearl products from other countries in the international market place. Tanzania, however, is fortunate as it is visited by large numbers of tourists who travel to both coastal resorts and inland game reserves. It is anticipated that tourism will provide the main market for pearl products from Tanzania over the short term. Over a longer term, expansion of pearl production in Tanzania may benefit from the experience and existing distribution networks of Tanzania's well-established gemstone industry.

Future development of pearl culture in Tanzania

The long-term sustainability of this project will depend on reliable sources of culture stock. Expansion of current spat collection activities and development of local hatchery production are immediate goals for the project. Ongoing research will also investigate the potential for round pearl production within the MIMP and development of local jewellery making skills.

Preliminary research has shown very clearly that high quality half pearls can be produced within the MIMP. Assuming appropriate demand, pearl jewellery provides a promising opportunity for income generation for communities within the MIMP and may play a key role in the management plan for the park. This project provides a model for similar developments in other parts of Tanzania and the East African coast.

Figure 2.
Half pearls produced within the Mafia Island Marine Park

Figure 3.
Finished products: half pearl jewellery