

SOUTH PACIFIC COMMISSION

TWENTY-FOURTH REGIONAL TECHNICAL MEETING ON FISHERIES  
(Noumea, New Caledonia, 3-7 August 1992)

COLLABORATION IN PACIFIC ISLAND PEARL OYSTER RESOURCE DEVELOPMENT  
(Paper prepared by the Secretariat)

**Background**

1 The development of aquaculture activities based on the black-lip (*Pinctada margaritifera*) and gold-lip (*P. maxima*) pearl oysters has been identified as a potential income earning activity for outer islands and rural areas in Pacific Island countries. In some locations, initial economic analysis suggests that culture for the shell alone could be feasible, but in all cases the ultimate goal would be the production of gem-quality pearls.

2 Interest in this area by Pacific Island countries follows the successful development of a low-technology, outer-islands based pearl culture industry in French Polynesia and, more recently, the establishment of a fledgling industry in the Cook Islands. The South Pacific Commission has for some years been assisting its member countries explore the potential for pearl oyster culture in their own lagoons, and promoting the concept of a regional approach to the development of this industry.

3 Following an exposé of the black pearl culture industry at the 23rd RTMF by the representative of French Polynesia, the meeting made the following recommendation:

*"that the South Pacific Commission follow up French Polynesia's offer to contribute to developing a policy and a regional programme for cooperation in the field of pearl shell resource enhancement".*

4 This paper provides a summary of present considerations related to pearl oyster and pearl farming in the region, and details the action taken by the Secretariat in promoting the collaborative development of pearl oyster farming on a regional basis, both through cooperation with French Polynesia, and with other interested parties.

## NATIONAL AND INTERNATIONAL BODIES INVOLVED IN PEARL OYSTER RESOURCE DEVELOPMENT

### South Pacific Commission

5 During the development of the Cook Islands pearl culture industry, SPC provided support under its "Inter-Country Study Visit" and "Expert Assistance" heads. Staff of the Ministry of Marine Resources were sponsored to visit pearl culture establishments in Takapoto, French Polynesia. The visit of the first seeding technician to carry out pearl nucleus implantations on Manihiki was partly sponsored by the Commission. In addition, support was given to Federated States of Micronesia when one of the Marine Resource Department staff undertook a training attachment on Manihiki at SPC expense.

6 Since the establishment of the British Government-sponsored Inshore Fisheries Research Project, the Commission has also carried out surveys of natural black-lip pearl oyster resources in selected lagoons in Kiribati, Tuvalu and the Marshall Islands. Further survey work of this type is planned for these countries, plus the Federated States of Micronesia and possibly elsewhere.

7 In most of the locations (all of which are atolls) where SPC surveys have taken place, local pearl oyster stocks are reduced, sometimes seriously so. Anecdotal information suggests that this is the case in most atolls in the region, as well as in many coastal lagoons around high-island countries. Sometimes the low shell populations can be attributed to intensive over-harvesting (usually for mother-of-pearl export) in the past. In other cases the reasons are unclear, and could be due either to fishing activity, or non-ideal environmental conditions, or a combination of factors.

8 Irrespective of the causes, pearl oyster population sizes in many locations appear to have been reduced below the minimum level required for successful mass spawning to occur. Recruitment is therefore thought to be low, and inadequate to allow the population to build up to high levels. Low populations are also maintained by incidental or subsistence harvesting, which continues uncontrolled in most cases. In some locations, harvesting is increasing and there is a danger that local pearl oyster populations could be eliminated altogether.

9 In these cases the establishment of pearl oyster farming activities is not feasible, and will not become so until the depauperate wild stocks recover. A more appropriate approach to pearl oyster resource development in such situations would be to take steps to protect the resource and, if possible, to artificially enhance its recovery. Such enhancement could take advantage of methods that are traditionally used in pearl farming e.g. the collection of juveniles using spat collectors, and the aggregation of sexually mature animals into spawning colonies. It would also benefit from research and dissemination of information on hatcheries or other systems to increase reproductive success and the level of juvenile production from reduced numbers of adult pearl oysters.

10 Only one of the locations surveyed has so far (Namdrik atoll in the Marshall Islands) been found to have pearl oyster stocks adequate to support a farming venture. Further assistance has been provided to the Marshall Islands government in establishing a pilot farming project. Juvenile pearl oyster shell have been taken from artificial spat collectors, placed in nursery baskets, or drilled and hung directly on subsurface long-lines and will ultimately be seeded with pearl nuclei. Practical training on a working pearl farm in the Cook Islands is also being organised for the local manager of this project.

### Forum Fisheries Agency

11 The work on Namdrik has benefitted from financial support from US treaty funds administered through FFA, which organisation has also been active in promoting pearl oyster resource development. Surveys of wild pearl oyster stocks have been sponsored in Solomon Islands (gold-lip) and Fiji (black-lip), as has the attachment of a Solomon Islands fisheries officer to a Cook Islands pearl farm.

### French Polynesia

12 The French Polynesian pearl culture industry has been successful in establishing a prestige, high-quality, high-price and relatively low-volume market for its pearls, a process which has taken many years to achieve. For obvious reasons, the industry is keen to ensure its own protection from competition, and there is serious concern by industry members over the dangers of encouraging other countries to commence pearl production. The industry view is that there is a limit to the number of pearls the world market can absorb, and that if other countries begin farming pearls overproduction will occur, driving pearl prices down and making French Polynesian production uneconomic.

13 The French Polynesian government goes to considerable lengths to ensure that only the best quality pearls are sold, and that inferior pearls remain un-marketed, or are even destroyed. It is feared that production in countries where pearl quality is not subject to strict regulation will result in inferior quality pearls being sold, leading to a decline in market acceptability of black pearls, and a consequent reduction both in average product value and in the size of the world market. Inferior quality pearls include those which are misshapen, poorly coloured or textured, or on which the nacreous layer is patchy or spotty. They also include those which have too thin a nacreous layer because they have been harvested too soon after seeding. This problem has occurred in both French Polynesia and the Cook Islands, and is particularly common to newly established farms where it is necessary to realise a cash return on initial investment as early as possible.

14 For these reasons, as well as a simple reluctance to encourage competition, pearl culture interests in French Polynesia have assumed a conservative position regarding the provision of assistance to other countries of the region. Being economically important in the territory, the industry has a great deal of influence in French Polynesia and it will be difficult for the government to enter into any form of agreement that promotes pearl culture in other countries of the region without industry support. This support is not likely to be forthcoming unless industry members can be convinced that they will benefit from such an arrangement.

15 French Polynesian authorities continue to express their willingness in principle to collaborate with other Pacific Island countries in developing a regional approach to pearl oyster culture, but the terms and conditions under which this could take place have yet to be elaborated. It is therefore necessary to identify specific, concrete actions that can be taken by the various interested parties to encourage greater collaboration.

## Australia

16 The production of pearls from gold-lip pearl oysters in Western Australia and the Northern Territory is Australia's most valuable aquaculture industry. Although golden pearls ("South Sea Pearls" or "Broome Pearls") occupy a different niche market than black pearls, and do not compete directly with them, the industry view on marketing is similar to that in French Polynesia. There is a widespread apprehension concerning over-production, and existing industry interests are keen to prevent increases in production either within Australia or overseas.

17 As in French Polynesia, the industry is influential in Western Australia, and has been instrumental in convincing the state government to introduce regulations essentially preventing the use of hatchery-produced *P. maxima* spat for pearl farming, despite the fact that the necessary hatchery technology has been developed in the state. The result has been that the hatchery developers have now moved offshore, and Australian-run *P. maxima* hatcheries are now operational in Indonesia, and perhaps elsewhere, but still forbidden in Australia. The logical outcome of such a situation will be that overseas production, with its implicitly poorer quality control standards, will increase, while Australian production remains static. Such a situation would appear detrimental to Australian interests and could perhaps have been avoided if a more cooperative stance had been adopted by industry.

18 There is a growing interest in Queensland and the Northern Territory in farming *P. margaritifera*, but at present there are no commercial black-lip pearl producers in operation. Stocks of black-lip appear less robust than those of gold-lip in Western Australia, and there is considerable interest in research into hatchery and resource enhancement techniques and technology, an area that is of mutual interest to Australia and Pacific Island countries.

19 As a result, a joint programme of research is being developed through the Australian Centre for International Research (ACIAR), in partnership with Kiribati, the Cook Islands, and perhaps other Pacific Island countries, as well as SPC. The principal foci of the project, which concerns only *P. margaritifera*, are: simple methods to improve reproductive success by spawning small numbers of shell in floating enclosures; land-based low-technology hatchery techniques, especially through the use of micro-encapsulated feeds as a substitute for algal diets; identification of potential parasites and pathogens, and the identification of key environmental factors influencing their presence and distribution; and description of genetic variation among regional populations, and within populations (especially those subject to enhancement programmes) over time.

## AREAS FOR COOPERATION

20 The view of the SPC Secretariat is that a regional approach to developing pearl culture, if governed by a properly structured and legally binding agreement, would benefit established industries in the region as well as other countries wishing to gain an entry into the business. An important feature of such an agreement is that it would reduce the likelihood of a competitive and confrontational situation arising between pearl-producing countries. The agreement, while providing for technical cooperation between signatory countries, should also focus on marketing arrangements, with a clear understanding that all countries would adhere to agreed criteria and controls regarding the marketing of inferior quality pearls.

21 Within the scope of such an agreement, there are four principal areas in which cooperation could take place: resource enhancement of depleted or naturally depauperate stocks; promotion of environmentally sound pearl oyster and pearl culture techniques; a collaborative approach to pearl marketing which would maintain product quality and maximise returns to industry; and applied research to improve the productivity of, and economic returns from, pearl farming.

### Resource enhancement

22 Where wild stocks are reduced, the aim would be to rebuild them by protecting adults from fishing, taking steps to improve the reproductive success (i.e. increased fertilisation rates) of spawning adults, and husbanding juveniles to reduce early-life mortality rates.

23 These aims might be partly achieved by concentrating adults and through spat collection programmes. There are also more technically advanced approaches to resource enhancement that could be investigated. These might include the spawning of shell within floating enclosures, or the development of simple land-based hatcheries, if an alternative to live algal diets for larval pearl oysters could be developed. Hatchery techniques for *Pinctada* species have already been developed in Japan, Australia and French Polynesia, but information on these techniques is commercially secret and is not in the public domain. Juvenile production, and especially hatchery technology, for resource enhancement purposes is clearly an area that would benefit from improved collaborative between commercial and non-commercial institutions if a mechanism can be found through which information could be shared without damaging the interests of one or other party.

### Pearl farming

24 Experience both in French Polynesia and the Cook Islands has demonstrated that the following of basic rules regarding stocking densities, material construction and deployment methods, and animal husbandry techniques makes the difference between a successful pearl farm and a failure. Poor farming practice can lead to serious environmental problems such as disease and reduced spatfall within a lagoon, thus affecting all farmers, not just those whose practices are poor.

25 There is thus a need for cooperation in all fields of pearl farming development, from stock surveys, through the establishment of pilot ventures, to the training of individual farmers in correct farming methods. Those countries with established industries can play a major role in ensuring that other countries do not repeat the same errors and face the same problems that they have in establishing pearl oyster farming enterprises.

## Marketing

26 It is the Secretariat's view that the black pearl market has not been studied well enough for a realistic assessment to be made of the likely impact of increased production from the Pacific Islands. Black pearls occupy a specialised niche market and, rather than cause saturation, it has been speculated by some economists that increased production beyond a certain critical level would lead to increased demand for the product. Given the value of the existing and potential industries in the region, this issue merits a much more detailed examination, and would be an appropriate study to be undertaken by a regional agency.

## Applied research

27 A number of institutions are involved in, or planning, applied research into various aspects of pearl oyster farming that has the direct aim of conferring benefits to the industry by improving some aspect of farming productivity. A major programme involving several metropolitan and territorial agencies is under way in French Polynesia, spurred on by problems with disease outbreaks in some lagoons during the late 1980's. Some Australian institutes are also involved in production-oriented research, in fields which variously include the study of parasites and pathogenic agents, improvements in hatchery technology, the environmental implications of pearl oyster farming development, and research into improved methods of pearl seeding that will yield higher numbers of higher quality pearls. Aspects of all these topics could be carried out more efficiently and cost-effectively as collaborative research activities.

## CONCLUSION

28 There is considerable scope for the development of pearl oyster and pearl culture as an economic activity in countries of the South Pacific region. There is also considerable scope for technical and economic collaboration among countries of the region to ensure that development occurs in a harmonious and mutually beneficial manner.

29 If those countries that already have established industries withhold their cooperation, from those countries wishing to develop new industries, then the latter will seek technical assistance from outside the region. This will lead to a situation of competition and confrontation among countries of the region, and will also make it easier for disreputable operators to establish themselves. An agreement which not only provided for technical cooperation but also promoted collaborative business ventures and regionally accepted marketing controls would have the potential to overcome many of these problems.

30 The Secretariat's view is that, irrespective of where the initial technical assistance comes from, new pearl culture industries will ultimately develop in several countries of the region. To avoid conflict which would be damaging to both new and established industries, it is preferable that this should happen in an atmosphere of solidarity, cooperation and mutual support rather than of competition, conflict and mistrust. For these reasons the Secretariat is eager to support any steps that can be taken towards the establishment of a regional agreement under which technical and economic cooperation can take place.

31 The meeting is invited to consider these issues and, if appropriate, make recommendations for Secretariat action.

---