**Name of species/group**
Giant clams Tridacna gigas, Tridacna derasa, Tridacna tevoroa, Tridacna squamosa, Tridacna maxima, Tridacna crocea, Hippopus hippopus, Hippopus porcellanus.

**Primary potential**
Aquaculture for sale of various products.
Aquaculture for stock enhancement.

**Attributes for aquaculture/stock enhancement**
- Methods for all phases of aquaculture have been developed and are readily accessible in manuals and through experienced personnel.
- Broodstock of many species is available in most of the Pacific region.
- Techniques for rearing larvae, often the most technically difficult phase of aquaculture, are relatively simple. Survival may be low but the very high numbers of eggs available from broodstock spawnings compensate for this.
- Relatively simple and inexpensive facilities, compared to many other shellfish and finfish, are required.
- Feed input is only needed at the land nursery stage. Afterwards no feed inputs are required.
- Commercial size for the aquarium trade can be reached in about two years.
- Giant clams are not prone to diseases.
- Giant clams are sold for very high retail prices in the USA (e.g. Harbor Aquatics advertises prices from USD20 to USD300) and probably in Europe and Japan, where tropical aquaria are popular. (Constraints may be access to suitable international air transport for rapid transport of live clams and the extent to which current markets are satisfied.)

**Culture methods**
- Juveniles are not available from the wild so hatchery production is needed.
- Low environmental impact at all stages of production.

**Juvenile production**
- Gonad ripeness is easily visible.
- Spawning is induced by heat shocks or serotonin injection.
- Large numbers of eggs are produced (millions to hundreds of millions).
- Larval phase is short at less than 10 days. Hatchery production is technical and requires trained personnel and specialised equipment.
Microalgal food for larvae involves standard, but technical, production methods. For simplicity, microencapsulated diets may be used.

The land nursery phase for juvenile growth is relatively long (6-8 months) but only requires clean seawater and some additional soluble nutrients.

**Ocean nursery production**
- Juveniles are transferred to simple mesh cages in the sea at 15+ mm shell length.
- With some reduction of stocking densities the ocean nursery phase can be carried through to market size, thereby reducing mortality from large predators.
- To reduce mortality from predatory snails and flatworms, regular simple husbandry in relatively shallow water is required.
- Wide variability in growth rates both within and between species ensures a steady flow of market size animals.
- The ocean nursery phase utilises simple, inexpensive technology.
- Husbandry can involve all members of a family group.
- Where larger clams are required, involving longer periods of growth, when the clams reach a size where they will be free from predation they may be spread out on the substrate. They require virtually no husbandry at this stage: it is equivalent to forestry.

**Restocking**
- Individuals large enough to be essentially free from predation can easily be placed in suitable positions on the reef.
- Lack of mobility makes it easy to monitor mortality, growth and reproduction.
- Age to sexual maturity in larger species can be 10+ years, so long-term vigilance is required to prevent poaching before reproductive capacity is achieved.
- Restocking is expensive for the number of clams involved. Regulation is far cheaper where there are significant existing stocks.
- Restocking has been successfully achieved in the Philippines and probably in some Pacific Islands countries where clam species were reintroduced as quarantined juveniles, reared and subsequently introduced into the environment. In the Philippines, some restocked clams have been used as broodstock to produce at least one further generation of clams.

**Current production status**
- Generally very limited, pilot-scale hatchery, nursery production and grow-out culture in the Philippines, Solomon Islands, Vanuatu, Tonga, Fiji Islands, Cook Islands.
- Commercial companies in Hawaii and Micronesia selling to at least the USA tropical marine trade (probable sources of clams for trade). There are no readily available values for the commercial value of these operations.
Marketing

Aquarium and shell trade

- Established aquarium market for wild giant clams makes marketing aquarium size cultured giant clams easy.
- The smaller clams needed for the aquarium trade have a high value-to-weight ratio and a short growing period to commercial size (2 years and less).
- Due to CITES listing there are some transport difficulties for F1 generations in or through some countries. Using F2 generations overcomes this problem.
- Cultured clams are perfect for eco-labelling due to lack of reef degradation and employment of coastal communities.

Clam meat production

- Lucrative market for adductor muscle from large wild clams, but no large established market for meat from smaller individuals.
- Best price is for sashimi-grade meat, which means clams need to be shipped live.
- Transport difficulties due to limited air transport networks in the Pacific, the heavy weight of larger animals and limited shelf life (30 hours maximum) due to the need to keep the animals alive.
- High value product can be shipped as shucked meat but needs specialist handling and swift transport to markets.
- Domestic markets are very low volume due to the high production costs, thus limited mainly to specialist restaurants and the tourist trade.
- Transport and holding problems restrict the shelf life for low-volume domestic consumption.

Shell trade

- Giant clam shells are valuable and don’t need rapid transport. There is much worldwide trade in illegal clam shells, some of which command high prices at the retail level.

Comparative advantages/disadvantages (risks) of producing the species in the Pacific

Advantages

- Broodstock widely available throughout their geographical distribution.
- Relatively simple hatchery technology.
- Very fecund animals producing millions of eggs.
- Low cost growing methods.
- Ocean nursery grow-out in shallow coastal areas makes tending easy.
No adverse environmental effects, so good for eco-labelling.

All members of the community can become involved in the grow-out phase.

At the rural level, a small number of clams can produce a reasonable livelihood.

Aquarium clams are high value and easy to transport. More brightly coloured species/individuals can be selected for the aquarium trade.

More robust and quicker growing species (T. derasa and T. gigas) are more suitable to meat production due to higher survival and faster weight gains.

Shells are valuable for legitimate shell trade.

Stock enhancement is easily monitored.

Disadvantages

Some species are extinct/becoming extinct in some regions.

Need hatchery production of juveniles. Hatchery survival can be very variable.

Very susceptible to predation at ocean nursery phase in some regions, so need constant husbandry.

Great variability of growth rates between and within some species. Highest value species are the slowest growers.

Work needed in developing the markets for food, aquarium trade and shells (although all are potentially lucrative).

Very perishable, need to be shipped live or very fresh.

Some meat market clams are heavy. If they need to be airfreighted live and whole, transport costs are high.

Relatively poor and expensive air links to the Pacific region make transportation difficult.

Improper handling by airline ground-staff often leads to mass mortalities.

Stock-enhanced areas are easy targets for poachers.