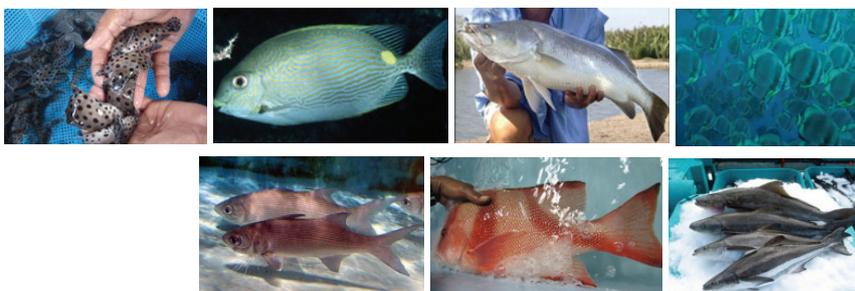


Species and uses

Some of the marine food fish that are of major commercial importance in the Pacific include: groupers (*Cromileptes altivelis*), rabbitfish (*Siganus lineatus*), barramundi (*Lates calcarifer*), batfish (*Platax orbicularis*), threadfin salmon (*Polydactylus* spp.), snappers (*Lutjanus* sp.), amberjack (*Seriola* sp.) and cobia (*Rachycentron canadum*). These and some other finfish are currently being, or have been, trialled for commercial farming in the Pacific Islands region.

In most cases, marine food fish are farmed for local markets although high-value export markets could also be a feasible alternative.

Marine food fish (hatchery based)



Figures 1 to 7: *Cromileptes altivelis*, *Siganus lineatus*, *Lates calcarifer*, *Platax orbicularis*, *Polydactylus* sp., *Lutjanus sebae* and *Rachycentron canadum*.

Most tropical food fish have higher growth rates than temperate fish species, reaching commercial size much faster. There is a growing demand for marine food fish in all Pacific Island countries, and the supply usually does not meet this demand. There are a number of suitable sites for marine finfish culture in the Pacific, and broodstock is locally available in most countries. Some species of food fish have considerable traditional customary values associated with them. Marine finfish is a highly prized commodity in most domestic markets in the Pacific.

Production cycle

Producing plate-sized marine fish is not an easy task and requires significant financial investment to pay for an appropriate set up as well as skilled labour and high operating costs. The main steps required to produce this commodity are described below.

Broodstock: In the Pacific Islands, most projects have been 'one of a kind' and had to source their own broodstock. Depending on the species, this can be a lengthy process. Broodstock can be purchased from local fishers who collect them by seining in shallow water, hand lining or diving. Adapting broodstock to captivity and conditioning them to spawn can take up to 12 months.

Hatchery: Once broodstock have spawned and eggs have been fertilised, larvae begin to hatch and require feeding, which involves producing 'live' feed that is used throughout the larval stages. Hatcheries may be set up to culture microalgae and live zooplankton (rotifers, artemia and occasionally copepods). Feeding strategies vary depending on species' nutritional requirements. Fish are weaned — within 20–40 days, depending on the species — to artificial diets as they develop into post-larvae. The nursery stage starts after this period.

Nursery: The nursery stage usually takes place in land-based facilities. Fish are grown to 5–20 grams on average before they are sold or transferred to grow-out farms. Variability in growth during the nursery phase greatly affects the survival of juvenile fish. Fingerlings can be graded as often as once a week (depending on the species and the quantity) in order to increase the homogeneity of the batches and reduce cannibalism.

Grow-out: Most marine food fish are grown-out in floating net cages, although some can be grown-out in earthen ponds. Appropriate site selection is a key factor for a successful grow-out farm. There are usually many suitable sites, but environmental hazards such as cyclones and tropical storms can cause serious damage to floating cage farms.

Sea cages can be low or high technology according to production targets, both for small-scale farming or large commercial operations. Most marine food fish, including groupers, are reared using artificial diets that consist of a compound of dry or moist pellets.



Figure 8: Humpback grouper or mouse grouper (*Cromileptes altivelis*) broodstock kept in captivity.



Figure 9: *Lutjanus sebae* fry produced in New Caledonia.



Figure 10: Humpback grouper fingerlings.



Figure 11: Floating cages for growing out *Platax orbicularis* in French Polynesia.

Markets and marketing

Markets for marine finfish for human consumption within the Pacific can be domestic or export based. Examples of domestic market-oriented products include rabbitfish farmed in New Caledonia (locally known as 'picot') and batfish cultured in French Polynesia. Both are sold locally in markets, hotels and restaurants. Recently there have been export-oriented projects for live reef food fish (e.g. groupers and red snappers) or fish fillets (cobia), but none of these are currently operational.

Some effort has been put into looking at high-value export fish species within the region, although the current domestic market, in most cases, is large enough to support fish farming activities in Pacific Island countries.

Marine finfish can be sold live, fresh, frozen, whole or fileted. In the Pacific, the demand is primarily for whole, plate-sized fish (300–500 grams). If export markets were to be developed again, whole fresh fish would be the best option, but airfreight costs and export requirements will have to be assessed in detail.



Figure 13: *Platax orbicularis* is a high-value finfish species in French Polynesia.

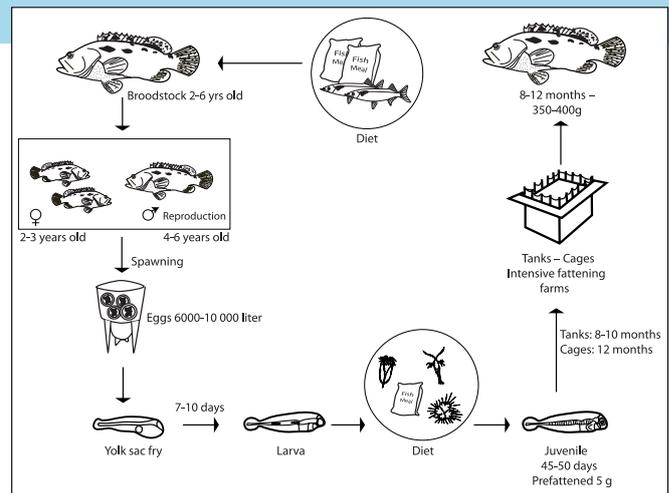


Figure 12: An example of a grouper (*Epinephelus* sp.) production cycle. Source: FAO cultured aquatic species factsheets

Current production status

As of today, only a handful of marine finfish projects have emerged in the Pacific. This means that no long-term commercial data are available, and all projects are either in start-up phases or research and development stages in the case of government-led projects.

Most private sector projects aim at developing medium-scale farms with a production capacity of 30–40 tonnes per year.

Comparative advantages and disadvantages to the region and future prospects

Below are the main limitations that the Pacific region will have to address if marine finfish farming is to be developed:

- » Marketing infrastructure is extremely important, whether for air or sea freight. Freight rates and the duration of transport must be carefully studied. Freight costs are one of the main limitations when considering export markets.
- » Live fish transport vessels require a substantial quantity of product (i.e. 15 tonnes or more) to be economically feasible. These data need to be taken into consideration when developing a live fish aquaculture project.
- » A reliable source of high-quality feed should be present in the country. Highly digestible compound feeds (e.g. pellets) are preferable because they are more cost-effective and environmentally friendly than trash fish or fresh products.
- » Neighbouring producers (e.g. Asia and Australia) are major competitors for exporting fish commodities such as grouper and snapper, and it should be remembered that their production costs are usually lower.
- » A hatchery for marine finfish is labour intensive, requires skilled staff, and is expensive to set up and operate.
- » The market must be secured prior to setting up a hatchery facility and grow-out systems because it could be a risky investment if market conditions are relatively unstable. However, it appears that domestic markets in the Pacific are becoming a good opportunity for farmed finfish.

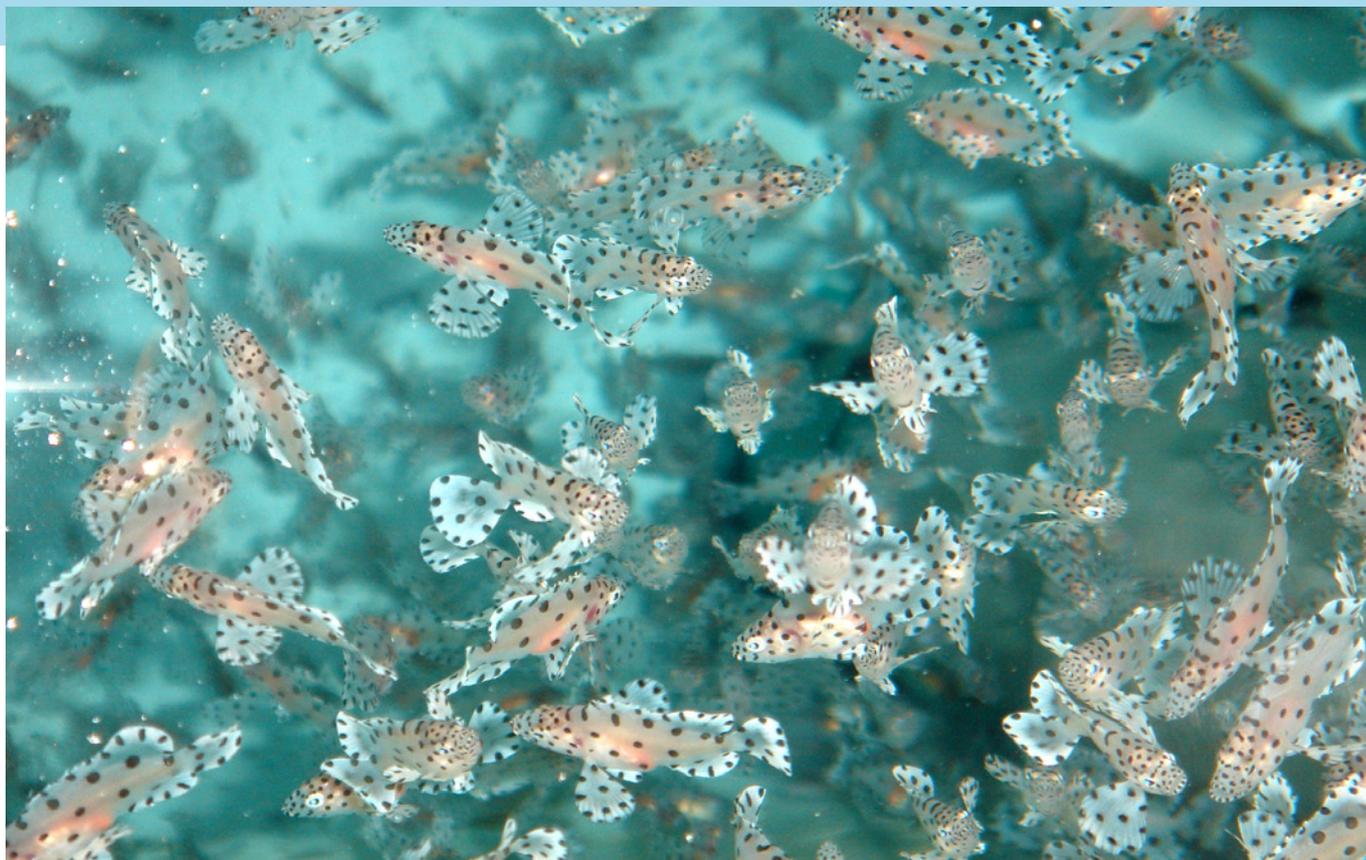


Figure 14: Cultured humpback grouper fingerlings.

Below is a range of comparative advantages that make the Pacific Islands region a suitable choice for marine finfish farming:

- » A number of fish stocks are depleted in many urban and suburban areas in the Pacific, and farmed fish may eventually replace wild-caught food fish in these locations, as has happened in other parts of the world.
- » Some local marine finfish species have a strong cultural value, such as rabbitfish in New Caledonia or batfish in French Polynesia. Some of these local species are currently being farmed with promising results.
- » There are many suitable locations for marine finfish hatcheries and floating cage deployment within the Pacific Islands region (e.g. these sites have appropriate water quality parameters, and are protected from currents and strong winds).
- » The aquatic animal health status of the region is extremely high. Most of the countries and territories are free of World Organisation for Animal Health (OIE)-listed diseases and other aquatic animal diseases that affect finfish.

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