

# An Overview of Techniques Used in Aquaculture

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# DESCRIPTION

Aquaculture is commonly known as fish farming, which can take place in the lakes, ocean, or on land. Aquaculture is the world's fastest-growing seafood industry, and it's on track to exceed all other types of seafood production in the next few years. It has been regarded as a savior and a destroyer of the oceans. The aquaculture technologies have different environmental implications, therefore it's important to know how the fishes are raised. There is some of the most frequent aquaculture methods used which have both pros and cons.

Aquaculture methods include:

- Open aquaculture systems: Sea-cage (active feeding)
- Open Aquaculture Systems: Sticks, ropes, racks and cages (passive feeding)
- Semi-closed Aquaculture Systems
- Closed Aquaculture Systems

### Open aquaculture system: Sea-cage (active feeding)

The rearing of aquatic species in enclosures in natural waterways is known as open sea-cage aquaculture. In a variety of habitats, including freshwater rivers, brackish estuaries, and coastal marine zones, open systems are being introduced. The size of the floating mesh cages varies depending on the volume of the operation and the species being grown. Juvenile stock is taken from hatcheries or natural populations and raised in enclosures until it reaches a marketable size. Finfish raised in open settings are mostly carnivorous species that eat fishmeal as a diet (pellets comprising small schooling fish species). Yellowtail kingfish, southern bluefin tuna, Atlantic salmon, trout, and barramundi are some of the fast-growing open-water species. The growth of open sea-cage aquaculture has generated plenty of issues. The demand for fishmeal to feed carnivorous creatures is one of the main issues. In certain cases, more than 5 kilograms of fishmeal is required to create just 1 kilogram of marketable fish. Other concerns include increased disease and parasite transmission owing to high fish densities, the potential of escape and interbreeding with wild species, and poor water quality due to fecal waste accumulation.

# Open aquaculture system: Sticks, ropes, racks and cages (passive feeding)

Numerous shellfish species are cultured in systems that are exposed to natural streams. Larval stages can be found in the wild or created in hatcheries. These are then lowered into the water column using various ways like attaching them to poles or ropes or enclosing them in cages. Mussels and oysters are the most common species grown using these techniques. These filterfeeding species are capable of obtaining nutritional needs from the water column without the use of fishmeal. Aquaculture of mussels, oysters, and other filter feeders can be considered environmentally friendly. If the water flow is sufficient, there is little influence on marine ecosystems or water quality. In some regions, the disposal of sticks and racks may be an issue.

#### Semi-closed aquaculture system

Semi-closed aquaculture is used when a species is grown on land and water is exchanged between the farm and a natural river. The farm is refilled with new water pumped back into the system, while wastewater is discharged into the local canal. Prawn farming is the most common type of semi-closed aquaculture in Australia, and it also makes the most extensive use of pond systems. The black tiger prawn is the most commonly farmed species, but banana, kuruma, and brown tiger prawns are also grown for the seafood sector. Vannamei prawns from Southeast Asia are becoming more widely available in markets as a low-cost alternative. Semi-closed aquaculture operations have the potential to have a substantial impact on coastal ecosystems. Ponds are frequently found near rivers when coastal wetlands and mangroves are reclaimed for construction since they require constant water exchange. The upshot might be a significant loss of habitat, which is crucial for many species' juvenile stages. If not handled properly, a constant discharge of water can degrade the water quality in the surrounding area. Fishmeal (pellets made up of tiny schooling fish species) is added to prawns at conversion ratios ranging from 1-3 kg of feed to 1 kg of prawns, putting pressure on wild fish populations.

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### Closed aquaculture system

The land-based breeding of aquatic species in raceways, tanks, and ponds is referred to as closed system aquaculture. Water is recirculated through filters and again returned to the aquaculture system using recirculation technology. This method usually keeps water quality high while minimizing contact with natural streams. The most frequent marketable species are silver perch, barramundi, yabbies, and marron, which are all grown in closed aquaculture systems. The principal marine species produced in closed systems are blacklip and greenlip abalone, which are seeing significant expansion due to demand from Asian markets. Closed system aquaculture is often regarded as one of the most environmentally friendly techniques of aquatic species rearing. Fishmeal (pellets made up of tiny schooling fish) may be used to feed carnivorous aquaculture species, which is a source of concern since it puts a strain on wild fish populations. As a consequence of the tight control over wastewater and the prevention of fish escape, there is very little interaction with rivers.

## CONCLUSION

Shellfish are grown on beaches or suspended in water on plastic trays, ropes or mesh bags by farmers. The shellfish raised in this manner are filter feeders, meaning they just need clean water to grow. Suspension systems are used to cultivate oysters, scallops, mussels, and clams. If the farmed species are natural to the area and the farm has enough water flow to minimize trash accumulation, shellfish production in suspended aquaculture is frequently low risk.