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## Aquaculture: Issues and Concerns

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*Aquaculture is the cultivation of aquatic organisms in both coastal and inland areas and involves intervention in the breeding process to increase production. Probably, the fastest-growing food sector currently accounts for 50 percent of the fish used in food worldwide. Aquaculture is the cultivation of aquatic organisms such as fish, crustaceans, and even plants. The term refers to the cultivation of marine and freshwater species and can range from terrestrial to deep-sea production. Aquaculture, which has existed for thousands of years, has improved over time. Today, the pond is in a pond, an enclosure. In protected coastal areas, fish swim freely in large net structures. This means they always have access to clean water and exercise to keep the fish healthy, lean, and strong. People recognize its importance as a resource because 70% of the earth's surface is covered with water. For this reason, aquaculture is most often used in terms of water use as a resource. This is especially true for food production, as opposed to land use. It serves a variety of purposes, including Food Production, Recovery of endangered vulnerable people, increased population of wild strains, Construction of aquariums, Fish farming, and Rehabilitation at home.*

**Keywords:** *intervention, endangered, vulnerable, rehabilitation.*

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## INTRODUCTION

Aquaculture (also known as Aquafarming) is the breeding, raising, and harvesting of fish, crustaceans, and aquatic plants. Basically, it's water farming. Aquaculture involves the cultivation of freshwater, brackish, and saltwater populations under controlled or semi-natural

conditions, in contrast to commercial fishing, which is the harvest of wild fish. Marine aquaculture, commonly known as marine aquaculture, refers to aquaculture, especially in seawater habitats and lagoons, as opposed to freshwater aquaculture. Pisciculture is a type of aquaculture that consists of fish farming or culturing of fish; also, fish and fish products are obtained as food. Aquaculture in the United States is a source of environmentally friendly food and commodities, helping to create healthier habitats and being used to reconstruct the resources of endangered or endangered species. As the demand for seafood has increased, technology-enabled food production in coastal waters and open oceans. Aquatic agriculture is a way to produce food and other commodities, restore habitats, replenish wild populations, and restore vulnerable populations. Aquaculture is a completely man-made facility built on land (onshore aquaculture), as in the case of aquariums, ponds, Aquaponics, and sidewalks where living conditions such as water quality (oxygen), feed, and temperature depend on human control. It can be practiced in aquaculture). Alternatively, it can be carried out in well-protected shallow water near the coast of waters where the farmed species are relatively exposed to the natural environment (coastal farming). Alternatively, the species are housed in cages, racks, or bags and are fenced off the coast, exposed to more diverse natural conditions such as water currents (such as ocean currents) and diel vertical migration. Closed open water area (offshore aquaculture) nutrient circulation. There are two main forms of Aquaculture: - Ocean and freshwater. NOAA's (National Oceanic and Atmospheric Administration) efforts are primarily focused on marine aquaculture. This refers to the breeding of species that inhabit the sea and estuaries. In the United States, marine aquaculture produces many species, including fish such as oysters, clams, mussels, shrimp, seaweed, salmon, smallmouth bass, sablefish, yellowtail, and gulf pompano. There are many ways to cultivate shells, such as "sowing" small shells on the ocean floor or cultivating them on the floor or in floating cages. Marine fish farming is usually done in an underwater net pen or an aquarium on land. Freshwater aquaculture in the United States produces species such as catfish and trout. Freshwater aquaculture is mainly done in ponds and other man-made systems. NOAA is committed to supporting the economically, environmentally, and socially sustainable aquaculture industry. NOAA experts and partners strive to understand the environmental

impact of aquaculture in a variety of environments and to provide the best management practices to mitigate the risk of adverse effects.

## **AQUACULTURE AND FAO**

According to the Food and Agriculture Organization (FAO), aquaculture means cultivation, nutrition, and protection from predators of aquatic organisms such as fish, soft animals, shellfish and aquatic plants means ownership of resources by individuals or companies. As reported in 2019, global aquaculture production exceeds 120 million tons, equivalent to US \$ 274 billion. However, the reliability of the reported figures is a problem. In addition, the current aquaculture industry uses a few pounds of wild fish products to eat one pound of piscivorous fish such as Salmon. Plant and insect-based feeds have also been developed to reduce the use of wild fish as aquaculture feeds. Certain types of aquaculture include fish farming, shrimp farming, oyster farming, marine farming, fish farming, aquaculture (such as seaweed farming), and ornamental fish farming. Specific methods include poly-nutrient aquaculture integrated with aquaponics, both of which integrate fish farming and aquatic plant farming. FAO describes aquaculture as one of the most directly affected industries by climate change and its impacts. Some forms of aquaculture have a negative impact on the environment, including nutrient pollution and transmission of the disease to wild populations.

## **ISSUES AND CONCERN**

Without considering the potential environmental impacts of the region, freshwater aquaculture can cause more environmental damage than wild fishing, despite the low waste per kilogram worldwide. Local concerns related to inland aquaculture include waste disposal, antibiotic side effects, livestock, and wildlife competition, especially more marketable carnivorous fish feed using raw fish or sashimi. Includes the potential introduction of invasive animal and plant species or foreign pathogens when producing. When non-local live feed is used, aquaculture can introduce catastrophic exotic plants and animals. Advances in research and improvements in methods due to the availability of over-the-counter feeds have alleviated some of these concerns since their prevalence in the 1990s and 2000s. Fish waste is natural and

composed of vitamins important in all additives of aquatic meals webs. In ocean aquaculture frequently produces lots better than regular fish waste concentrations. The waste collects on the sea bottom, destructive or removing bottom residing life. Waste also can lower dissolved oxygen degrees withinside the water column, setting in addition stress on wild animals. An opportunity version to meals being introduced to the ecosystem is the setup of synthetic reef systems to grow the habitat niches available, without the want to feature any extra than ambient feed and nutrients. It was used in "ranching" of abalone farming in Western Australia.

- **Impact of Aquaculture on Wild Fish**

Some carnivorous and omnivorous farmed fish species are bred with wild forage fish. In 2000, farmed carnivorous fish accounted for only 13% of farmed production, while farmed fish accounted for 34% of farmed production. In the cultivation of carnivorous fish such as salmon and shrimp, there is a high demand for feed fish that match the diet received in the wild. Fish do not actually produce omega 3 fatty acids, but instead produce these fatty acids, as in feed fish such as herring and sardines, or in fatty predatory fish such as salmon. Accumulate them by consuming microalgae, by eating prey fish fortified with omega-3 fatty acids from microalgae. To meet this need, more than 50% of the world's fish oil production is supplied to farmed salmon. Farmed salmon are more efficient, but consume more wild fish than they produce in the final product. Products made from a few pounds of wild fish are supplied to produce one pound of farmed salmon. This is called the "**fish in fish out**" (**FIFO**) ratio. The salmon FIFO ratio in 1995 was 7.5 (that is, 7.5 pounds of wild fish feed was needed to produce 1 pound of salmon). By 2006, this ratio had dropped to 4.9. In addition, the increased proportion of fish oil and fishmeal comes from residues (a by-product of fish processing) rather than dedicated whole fish.

In 2012, 34% of fish oil and 28% of fishmeal came from residues. However, fishmeal and oil made from residues have different compositions with higher ash and less protein than whole fish, which may limit their potential use in aquafarming. Another potential impact of aquaculture production on wild fish is the risk that the fish will escape from the coastal

enclosure, where they will mate with wild fish, thereby diluting wild genetic resources. Escaped fish can become invasive and swarm native species.

- **Impact on Coastal Zones**

In the *S Jagannath v Union of India*<sup>1</sup>, the petitioner, head of a voluntary organization dedicated to empowering vulnerable parts of society, called for enforcement of the CRZ (Coastal Regulation Zone) notice. He prayed for extensive, extensive, and extensive and extensive aquaculture. He also called for the establishment of the National Coastal Development Authority.

*The Apex Court decision was filed using the following reference:*

The shrimp farming industry is rooted in India. For a long time, Indian fishermen have followed the traditional rotary rice/shrimp farming system. Rice is cultivated for part of the year, and shrimp and other fish species are cultivated for the rest of the year. However, in the last decade, traditional systems that produce 140 kg of shrimp per hectare in addition to rice production have replaced more intensive shrimp farming methods that can produce thousands of kilograms per hectare has begun to be. Many private and multinational companies have begun investing in shrimp farms. In recent years, more than 80,000 hectares of land have been converted to shrimp farming. India's ocean exports weighed 70,000 tonnes in 1993, these exports are expected to reach 200,000 tonnes by 2000 in the expanding market. This expectation is achieved by replacing traditional eco-friendly cultivation methods with semi-intensive and intensive methods. More and more areas are undergoing semi-intensive and intensive methods of shrimp farming. The environmental impact of shrimp farming is highly dependent on the cultural style adopted in shrimp farming. Poor control of feed, seeds, and other inputs, and water management practices pose a serious threat to the environment and ecosystems.<sup>2</sup>

*In the same vein the court continued:*

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<sup>1</sup> *S. Jagannath v Union of India* (1997)2 SCC 87

<sup>2</sup> *Ibid*, 91,92

“Coastal pollution is generally a new issue. It has already become a serious environmental problem for India. In addition to direct dumping of waste into the ocean, discharge from ocean spills, and large amounts of untreated or partially treated waste from various terrestrial sources/activities are ultimately discharged into the ocean. .. Coastal waters maintain inland waters directly through surface runoffs and land drains loaded with countless wastes, excrements, or civilized wastes. Apart from inflows from rivers and sewage, coastal areas are affected by intensive fishing, shipping, recreational activities, harbours, industrial drainage, and harbours. These are factors of varying degrees of water quality degradation. In contrast to the open ocean, changes in coastal water quality due to runoff are much greater under tidal conditions.<sup>3</sup> With the significant increase in marine pollution and the consequent decline in marine resources, the United Nations Conference on the Human Environment (1972) in Stockholm raises serious concerns about the urgent need to clean up areas of serious pollution in the marine environment.<sup>4</sup> It attracted the attention of the world towards the urgent need of identification of critically polluted areas.”

- **Animal Welfare**

Similar to the breeding of terrestrial animals, social attitudes influence the need for humanitarian practices and regulations on domestic marine animals. According to the guidelines recommended by the Livestock Conservation Council, good animal welfare means both health and well-being in the physical and mental condition of the animals. This can be defined by 5 freedoms:

- freedoms from hunger and thirst
- Free from discomfort
- Free from pain, illness, and injury
- Freedom to express normal behaviour
- Freedom from fear and need

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<sup>3</sup> *Ibid*, 94

<sup>4</sup> P Leelakrishnan, *Environmental Law Case Book* (2<sup>nd</sup> Edition, Lexis Nexis 2006)

However, the controversial question in aquaculture is whether fish and farmed marine invertebrates are actually perceptual or have the perception and perception that they will experience suffering. No evidence has been found in marine invertebrates, but recent studies have shown that fish have the necessary receptors (nociceptors) to detect harmful stimuli, resulting in pain and uneasiness. Concluding that they are more likely to experience stress. As a result, welfare in aquaculture is directed towards vertebrates, especially fish.

- **Pollution from Sea Cage Aquaculture**

Salmon farms are usually found in pristine coastal ecosystems and are polluted. A farm with 200,000 salmon produces more faeces than a city with 60,000. This waste is discharged untreated directly into the surrounding aquatic environment and often contains antibiotics and pesticides. Heavy metals, especially copper and zinc, also accumulate in benthic organisms (seabed) near salmon farms. In 2016, fish kills affected Salmon farmers and the entire ecosystem along the Chilean coast. Increased aquaculture production and the associated release have been identified as potential factors contributing to fish and molluscs mortality. Sea cage aquaculture is responsible for the accumulation of nutrients in the waters where it is established. This is due to fish droppings and inedible feed. The most worrisome factors are nitrogen and phosphorus, which can promote the growth of algae, including the harmful blue-green algae that can be toxic to fish. Rinse time, current speed, distance from the coast, and water depth are important considerations when deploying the Sea Cage to minimize the impact of nutrient accumulation on coastal ecosystems.

## **DISADVANTAGES OF AQUACULTURE**

- *Environmental impact of aquaculture*

They can have a negative impact on the local environment. For example, antibiotics and chemicals used in the treatment of fish. Fish farms can also produce large amounts of

wastewater, which can affect nearby locations. Affected fish can escape from the facility and pass on their condition to wild resources.<sup>5</sup>

- *Problems in aquaculture*

Farmed fish such as salmon, sea bass, and cod are carnivores. They need to consume large amounts of protein to ensure that they increase energy demand rapidly. This protein is often extracted from small baitfish and ground into pellets. This means that wild stocks are targeted by baitfish such as sardines, mackerel, anchovy, and other small fish, affecting wild stocks.

- *Disease*

If aquaculture is beneficial, the shortcomings associated with its practice should not be ignored. In fact, raising fish increases the risk of illness. When a fish is infected with the infectious virus, it can spread to other fish on the farm. Fish are also vulnerable to invading parasites.

## CONCLUSION

In the early days of aquaculture, a factor prevented aquaculture from producing sustainable fish. The intention of aquaculture was not to pollute the environment but to enhance food security. However, an environmental problem has occurred. There is no shortage of negative coverage, and these stories have attracted public attention. Common criticisms were the accumulation and spill of nutrients, the impact of fish farms on local wild fisheries in terms of disease and outbreaks, and the deterioration of the environment due to the location of the site. There are subtle differences in the negative impact of aquaculture on the environment. Nutrient accumulation occurs when there is dense fish in an area. Fish produce waste, which can accumulate in the environment. This can deprive the water of oxygen and create blue-green algae and dead zones. The use of antibiotics by farmers to prevent illness has raised concerns about the effects of drugs on the ecosystem around cages, including wild fish. Many

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<sup>5</sup> 'What are the advantages and disadvantages of aquaculture?' (1H2O3)  
<<https://www.1h2o3.com/en/learn/aquaculture/what-are-the-advantages-and-disadvantages-of-aquaculture/>> accessed 30 April 2022

were also afraid that the flight of non-native fish would result in wild fish competing for food and perhaps crowding native fish. These were all legitimate criticisms, given that the industry was just beginning to learn how to deal with new problems like any other new industry.