

# Aquaculture

## What is aquaculture?

Aquaculture is the farming of aquatic organisms, including fish, molluscs, crustaceans and aquatic plants. It is, basically, farming in water.

The main types of growing operations include:

- freshwater net pen and land-based systems,
- bottom culture shellfish operations in intertidal zones,
- long-lines, net pens and restocking operations in open water, and;
- bottom culture shellfish grow-out areas in sub-tidal zones.

In Canada there are approximately 45 different species of finfish, shellfish and marine algae that are commercially cultivated. These are primarily Atlantic salmon, Pacific oysters, white sturgeon and crayfish.

Potential applications of genomics to aquaculture include:

- Improving fish and aquatic health
- Supporting environmental integrity
- Producing high quality, sustainable food
- Enhancing social license for the fisheries and aquaculture sector
- Informed approaches to breeding

## How is aquaculture implemented?

Fish or plants in an early life stage are stocked in water bodies including net pens, cages, confined areas in rivers, ponds and tanks, and reared until harvest. Rearing is time and resource intensive: maintenance of cages/tanks, monitoring of water quality, growth rate, feed consumption, health and welfare and the mitigation or treatment of potential diseases are all considerations.

## What are the benefits of aquaculture?

There are many benefits to aquaculture including:

- Stable supply of fresh seafood all year round to meet global market demand
- Quality of seafood can be managed and improved in a targeted manner
- Pressure on, at-risk, wild stocks may be reduced
- Growing consumer demand for fish/shellfish can be met
- Employment opportunities in rural and coastal areas

Aquaculture has significant economic impact. The industry represents about a third of Canada's total fisheries value and about 20% of total seafood production. The value of aquaculture production has increased by 85% over the last ten years, to \$1,392 million in 2017 from \$753 million in 2007.

Aquaculture is also a significant source of employment in Canada. According to a 2009 study, aquaculture employs about 14,000 people primarily located in smaller coastal and rural communities. Canada's farmed-salmon industry provides more than 10,000 jobs alone.

The aquaculture industry also generates a little more than half a billion dollars in labour income.

## What are the challenges of aquaculture?

There are many challenges associated with aquaculture:

- Escapees from net pens results in economic loss
- Algal blooms, which occur in tanks, irritate gills and may cause death in fish
- As with all living organisms, the consistent use of antibiotics in aquaculture could potentially lead to the development of antibiotic resistance which brings a host of complications
- Aquaculture relies on traditional fisheries to supply feed, eggs and 'seeds' (the industry term for young invertebrates); these supplies are not always readily available

There are significant issues around the social acceptance of aquaculture:

- There is a perception that aquaculture fish from net pens have transmitted bacterial and viral diseases to wild fish, which has led to a broad rejection of aquaculture farms. To date there is limited scientific evidence to support this
- The location of net pens is also highly controversial with many groups petitioning to have them phased out completely
- Conflicts with First Nations communities, about the use of traditional lands for aquaculture without consultation with the traditional land owners exist, but there are also First Nations who strongly support the industry

## Resources

<http://www.dfo-mpo.gc.ca/aquaculture/sector-secteur/species-especes/index-eng.htm>

<http://www.fao.org/docrep/003/x6941e/x6941e04.htm>

<https://www.theglobeandmail.com/canada/british-columbia/article-fish-farms-opposed-by-first-nations-will-be-phased-out/>

<https://news.gov.bc.ca/releases/2019AGRI0015-000243>

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