

Aquaculture

What is Aquaculture?

- The cultivating of populations of aquatic organisms under controlled conditions
- This can include >220 species of finfish and shellfish and the level of control varies from organism's entire life or just part of it
- Products from aquaculture fulfils a major role in feeding people today and has huge potential to do more so in the future
- Aquaculture happens at a global scale and is increasing hugely in recent years

Is Aquaculture sustainable?

Positives of Aquaculture

- Production of fish can reduce pressure on wild stocks, which may already be overexploited
- Stocking organisms from aquaculture systems may help to enhance depleted stocks with limited reproductive success e.g. Pacific Salmon
- Destructive land-use patterns, such as slash-and-burn agriculture, may be replaced by more sustainable patterns, such as aquaculture in ponds, which also may generate income, reduce poverty and improve human health
- It can improve food security

Negatives of Aquaculture

- Animals are targeted to control predation of farmed fish e.g. seals and salmon that have a significant contribution to their diet but this has caused conflict between the seals and fishers
- Escape of aquatic animals and crops and their potential hazard as invasive species
- Escaped fish e.g. salmon may breed with wild species that are adapted to their natal spawning grounds, but after breeding they alter the genetics of spawn and increase the decline in many locally endangered wild Atlantic salmon populations
- Disease, parasites, etc affect captive and surrounding wild populations
- Heavy eutrophication beneath fish farms in particular for cage/pen culture for salmon
- Conversion of sensitive land
 - ↳ Displacement of traditional users of the coastline - artisanal fishers or rice farmers
 - ↳ Shrimp Aquaculture causes clearance of mangroves, salt water is brought inland and if abandoned, altered land cannot be returned to normal productive purposes (Abdullah, 2019)

However environmental impacts could be regulated by sustainable aquaculture such as species choices (e.g. mussels and herbivorous fish), novel culture systems (e.g. waste management), alternative feed strategies and regulation and legislation.

Paper Name	Description	In-text Reference
Employment in Fisheries and Aquaculture	Aquaculture provides employment and is a huge sector in developing countries (59.6m in fisheries/aquaculture, Asia 85%, Africa 10%, Latin America and Caribbean 4%, rest of world 1%). And including both primary and secondary sector, 50% of the workforce are women	(FAO, 2018)
Pinnipeds and Salmon Farming: Threats, conflicts and challenges to co-exist after 50 years of industrial growth and expansion	Pinnipeds result in estimated losses of 10-12% of gross production costs from eating fish, damaging equipment and global losses of 6% due to infections from sea lice and other diseases / However fisheries cause huge problems for seals like intentional or unintentional killings, net entrapment, habitat change and degradation and other effects like vessel collisions and noise	(Heredia-Azuaje et al 2021)
Environmental problems and regulation in the aquaculture industry. Insights from Norway	- Issues such as sea lice, escapement, nutrition/eutrophication, chemicals/antibiotics and issues with fish welfare - Solutions include moving from open net cages to closed containment systems	(Claussen, 2018)
Making Fish Farming more sustainable	- Talks about moving farms into open ocean to huge pens	(Cho, 2016)

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