Farmed seafood supply at risk if we don't act on climate change

December 13 2021

A giant clam farm in Palau, one example of mariculture. Credit: Dr. Colette Wabnitz

The supply of farmed seafood such as salmon and mussels are projected to drop 16 per cent globally by 2090 if no action is taken to mitigate climate change, according to a new UBC study.

Ocean-farmed seafood or mariculture is often seen as a panacea to the problems of depleted stocks of wild fish and growing human demand, and is expected to grow substantially in the coming years, says lead author Dr. Muhammed Oyinlola, a postdoctoral research fellow at the Institute for the Oceans and Fisheries (IOF). But the new modeling study highlights the industry is as vulnerable to the effects of climate change as any other. "If we continue to burn fossil fuels at our current rate, the amount of seafood such as fish or mussels able to be farmed sustainably will increase by only eight per cent by 2050, and decline by 16 per cent by 2090."

By comparison, in a low emissions scenario where the action is taken to mitigate climate change, mariculture is projected to grow by about 17 per cent by the mid-21st century and by about 33 per cent by the end of the century, relative to the 2000s.

The model takes into account many factors, including changing ocean temperatures, suitable mariculture areas in the future, and the supply of fishmeal and fish oil. It examined approximately 70 per cent of the world's mariculture production as of 2015, focusing on Exclusive Economic Zones, where most of the world's seafood farming occurs.

Climate change will affect mariculture production differently depending on where farms are in the world, and what they produce, says Dr. Oyinlola. The hardest-hit regions in the high-emissions scenario—Norway, Myanmar, Bangladesh, the Netherlands, and China—could see their mariculture production decline by as much as 40 to 90 per cent.

Climate effects on mariculture include changes in the area of viable ocean in which to farm fish as well as the stock of food used to feed them. Fish farms tend to use fishmeal and fish oil, which are largely composed of smaller fish such as herring and anchovy—stocks which

are also threatened by climate change.

"Some regions produce more bivalves, such as mussels, oysters and clams, and in these regions, the impact is smaller," Dr. Oyinlola said. "In regions that produce more finfish, such as salmon, the impact will be high due to reduction in the supply of fishmeal and fish oil."

Under current carbon emission rates, finfish farming, such as salmon, is projected to decrease globally by three per cent by 2050, and 14 per cent by 2090. Bivalve farming is projected to increase by 2050 and decrease by 2090 under both climate scenarios.

Countries where mariculture is prominent especially for finfish production, such as Norway, Iceland, Finland, Chile, and Bangladesh, will be hit hardest, according to Dr. Oyinlola, whereas regions that produce more bivalves will be more stable or in Canada's case, will grow.

Vegetarian fish: Feeding fish soybeans

The study also found that substituting fishmeal and fish oil for plant-based foods such as soybeans could help alleviate the effects of climate change for fish farms.

When a quarter of the fish food was substituted with alternatives, under a low emissions scenario, mariculture production was projected to increase by 25 per cent by 2050 and 31 per cent by 2090.

With no change to current emissions, when a quarter of the fish food was substituted with alternatives, mariculture production was projected to increase by 15 per cent by 2050 and four per cent by 2090. When half the food was substituted in both climate scenarios, these percentages increased.

"This study highlights the need to diversify mariculture development from the current focus on fish," said senior author Dr. William Cheung, IOF professor and director. Climate-adapted mariculture would include species that are not dependent on fishmeal and fish oil, such as shellfish or algae, or those that can utilize non-fish-based feed. "Farming these species generally helps to reduce exposure of seafood farming to climate hazards."

While there is enthusiasm about ocean mariculture helping to increase the production of seafood, the study shows if humans don't relieve climate change, such enthusiasm will be tempered, says Dr. Cheung. "Climate change affects everything, including aspects of seafood farming we've not previously considered. We need to act, and quickly, to mitigate climate change rather than rely on one solution to solve all our seafood production problems."

The research was published in *Global Change Biology*

More information: Muhammed A. Oyinlola et al, Projecting global mariculture production and adaptation pathways under climate change, *Global Change Biology* (2021). doi.org/10.1111/gcb.15991

Provided by University of British Columbia

Citation: Farmed seafood supply at risk if we don't act on climate change (2021, December 13) retrieved 25 April 2024 from https://phys.org/news/2021-12-farmed-seafood-dont-climate.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.