

# Science for Environment Policy

## The future of fish farming and marine fisheries for a growing population

**Fish farms, and other forms of aquaculture**, are seen as a potential solution to meeting increasing global demand for seafood. However, according to recent research, they must reduce their reliance on wild fish for animal feed if current production levels from both aquaculture and wild fisheries are to be maintained.

**As the world's population** heads towards the 9.3 billion mark, predicted for 2050, the demand for fish products is also expected to grow. However, there are questions about the ability of marine fisheries and aquaculture to match increasing consumption rates. Aquaculture is currently growing at a faster rate than population growth, with total fish production (from aquaculture and wild marine fisheries) calculated at 142 megatonnes (Mt) in 2008, two thirds of which was used for direct human consumption.

However, aquaculture relies heavily on fishmeal and fish oil produced industrially from small fish caught in wild catches. In this recent study, researchers analysed the factors that affect the supply of wild fish, including climate change, and the impact of aquaculture development on natural fish stocks.

The researchers modelled the numbers of wild large fish (for direct consumption) and small low trophic level fish (for use as fishmeal and fish oil in aquaculture) for the year 2050 in 69 marine Exclusive Economic Zones (EEZs), areas which countries have exclusive fishing rights over. The EEZs studied cover over 60% of the world's marine fisheries catch.

The results suggest that the effects of climate change will result in a global small to moderate (6%) increase in the potential catches of large, wild fish by 2050, which is less than the predicted growth of the human population. It will also lead to a growth of around 3.6% of wild fishmeal catches. However, these results differ regionally, with high latitude countries, such as Denmark, Iceland and Norway, expected to benefit from increases in production, and low latitude countries, such as Peru and Chile, likely to be affected by production decreases.

Aquaculture's reliance on fishmeal from wild catches was found to affect the sustainability of commercial fishing. The researchers warn of a possible 'Ecological Collapse' scenario, whereby global fish production could decline by more than half until 2020, due to high fishmeal prices incentivising yearly fishing quotas to be exceeded. Management systems and market stabilisation measures are therefore recommended by the study to ensure prices levels are kept level and that fishing is well-regulated, specifically, that the small pelagic fisheries are effectively managed to support a stable and high supply of fishmeal and oil.

The results demonstrate that marine ecosystems may be able to sustain current and increased per capita consumption rates through to 2050, provided that effective fisheries management measures are implemented and that significant technological adaptations to increase aquaculture efficiency and sustainability are developed. These include the use of alternative protein sources, such as soya; the use of cultured species that require less than a unit of wild fish to yield a unit of cultured product; as well as reduced spatial occupation, pollution and other environmental impacts per unit of cultured fish. Government policies encouraging improved environmental standards in aquaculture production are therefore considered essential by the researchers.



**20 December 2012**  
**Issue 2012**

**Subscribe to free**  
**weekly News Alert**

**Source:** Merino, G., Barange, M., Blanchard, J.L., *et al.* (2012) Can marine fisheries and aquaculture meet fish demand from a growing human population in a changing climate? *Global Environmental Change*. 22: 795-806. Doi: 10.1016/j.gloenvcha.2012.03.003.

**Contact:**  
[gmerin@pml.ac.uk](mailto:gmerin@pml.ac.uk)

**Theme(s):** Marine ecosystems, Sustainable consumption and production

The contents and views included in Science for Environment Policy are based on independent, peer-reviewed research and do not necessarily reflect the position of the European Commission.

To cite this article/service: "Science for Environment Policy": European Commission DG Environment News Alert Service, edited by SCU, The University of the West of England, Bristol.