

# Global warming may threaten availability of essential brain-building fatty acid

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By 2100, 96% of the global population may not have sufficient access to a naturally occurring essential brain-building omega-3 fatty acid, according to a study in the journal *Ambio*.

Global warming may reduce the availability of Docosahexaenoic acid (DHA), the most abundant fatty acid found in mammalian brains, which has a crucial role in processes such as neuroprotection, cell survival, and inflammation. Despite its requirement for neural development and health, humans are unable to produce enough of their own DHA. They rely on obtaining the nutrient through a diet of fish and seafood, and/or by taking supplements.

Stefanie Colombo at Dalhousie University, Canada; Tim Rodgers at University of Toronto and colleagues at Ryerson University and University of Toronto developed a [mathematical model](#) to investigate the potential decrease in available DHA with varying global warming scenarios. In the aquatic food chain, DHA is produced primarily by algae and the biochemical reactions involved in the process are sensitive to slight changes in temperature.

The authors found that if global warming continues unabated, declines in DHA production combined with [population growth](#) could lead to 96% of the [global population](#) not having sufficient access to DHA from domestic fish production. People living in countries with large fish production and relatively low populations, such as Greenland, Norway, Chile, and New Zealand would still be able to consume the recommended dose of 100 mg per day. By contrast, the largest countries in East and South-East Asia (such as China, Japan and Indonesia), along with most of the countries in Africa could shift from producing an excess of DHA to falling below the threshold for the recommended dose by 2100.

Dr. Colombo, Mr. Rodgers and colleagues said: "According to our model, global warming could result in a 10 to 58% loss of globally-available DHA in the next 80 years. A decrease in levels will have the greatest effect on vulnerable populations and periods of human development, such as foetuses and infants, and may also affect predatory

mammals, especially those in Polar Regions."

To predict global annual production of DHA in each of the United Nations fishing zones, the authors used data from the Sea Around Us project database, an initiative that provides reconstructed fisheries data to support impact assessments of fishing on marine ecosystems. The authors also used data from the United Nations for global inland fisheries catch and aquaculture production data. Temperature increases were predicted using the [global warming](#) scenarios outlined in the Fifth Assessment Report (AR5) of the United Nations Intergovernmental Panel on Climate Change (IPCC).

Dr. Colombo, Mr. Rodgers and colleagues said: "It is also interesting to see that freshwater fishing zones showed greater declines in DHA than marine zones, due to larger projected [temperature increases](#) in freshwater than the oceans. Changes in availability of DHA may therefore have a greater impact on populations in certain areas of the world, especially inland Africa."

**More information:** Stefanie M. Colombo et al, Projected declines in global DHA availability for human consumption as a result of global warming, *Ambio* (2019). [DOI: 10.1007/s13280-019-01234-6](https://doi.org/10.1007/s13280-019-01234-6)

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