

Diversity and Quality of Aquatic Foods to Support Human Nutrition

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The Aquatic Food Composition Database (AFCD)

Food composition tables and peer reviewed literature

- > 373,000 samples with empirical laboratory analyzed data
- > 200 nutrients included
- > 2,800 unique species
- > 20 food parts (e.g., filet, liver, skin, whole fish, etc.)



nature

Article

Aquatic foods to nourish nations

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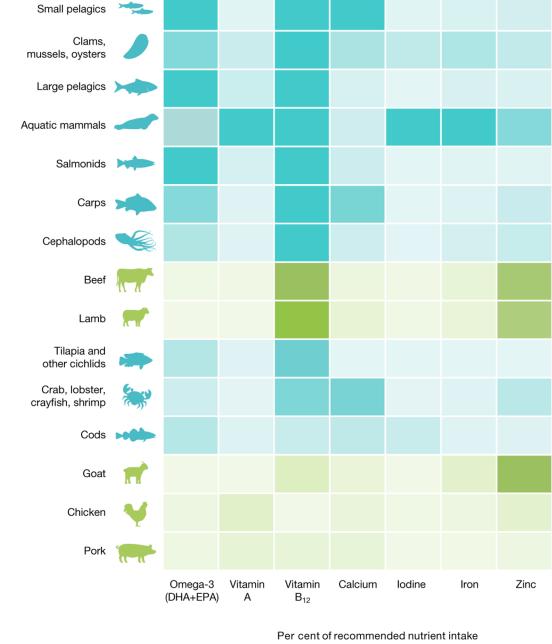
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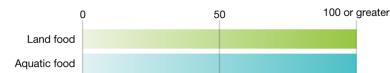
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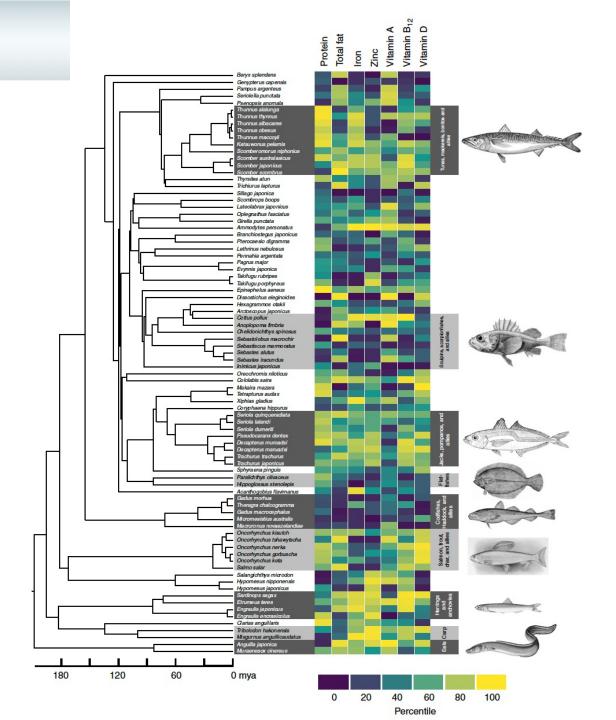
ARTICLE

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OPEN

Predicting nutrient content of ray-finned fishes using phylogenetic information

Bapu Vaitla¹, David Collar ², Matthew R. Smith ³, Samuel S. Myers^{3,4}, Benjamin L. Rice ⁵ & Christopher D. Golden ^{1,3}



LETTER

Harnessing global fisheries to tackle micronutrient deficiencies

Christina C. Hicks^{1,2*}, Philippa J. Cohen^{2,3}, Nicholas A. J. Graham^{1,2}, Kirsty L. Nash^{4,5}, Edward H. Allison^{3,6}, Coralie D'Lima³, David J. Mills^{2,3}, Matthew Roscher³, Shakuntala H. Thilsted³, Andrew L. Thorne-Lyman⁷ & M. Aaron MacNeil⁸

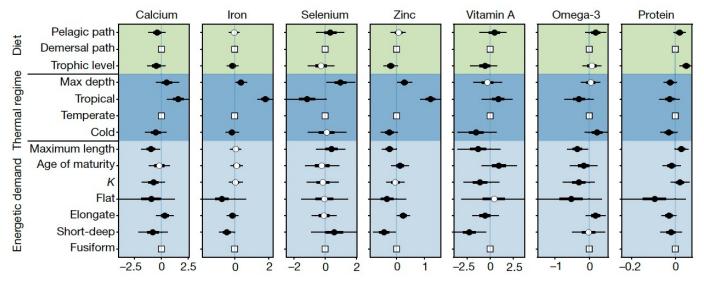
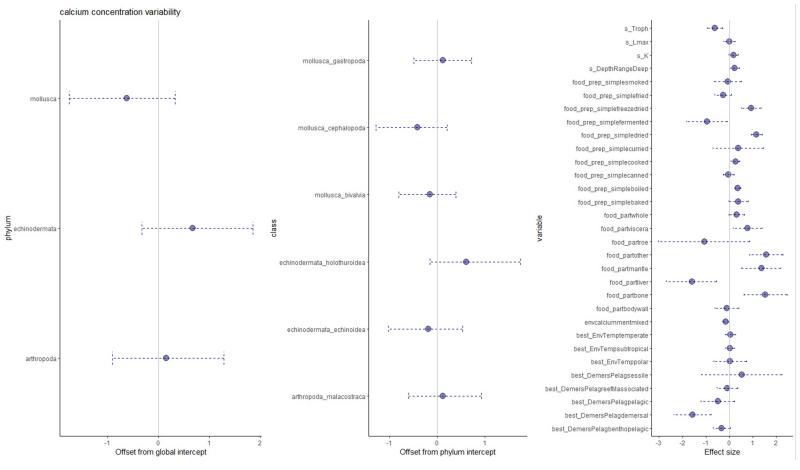


Fig. 1 | **Bayesian hierarchical predictive model of nutrient concentrations in fish.** Standardized effect sizes for environmental and ecological drivers of nutrient concentrations for diet, thermal regime and energetic demand. Parameter estimates are Bayesian posterior median values, 95% highest posterior density uncertainty intervals (thin lines) and 50% uncertainty intervals (thick lines). Black dots indicate that the 50% uncertainty intervals do not overlap zero, indicating that more than 75% of the posterior density was either positive or negative, whereas open circles

indicate that the 50% uncertainty intervals overlap zero. Open squares indicate the baseline category in the statistical model. K denotes parameter K of the von Bertalanffy growth equation. Underlying sample sizes are as follows: calcium, n = 170 biologically independent samples; iron, n = 173; selenium, n = 134; zinc n = 196; vitamin A, n = 69; omega-3 fatty acids, n = 176; protein, n = 627. Effect sizes are not on a common x-axis scale for clarity of presentation.

Nutrient predictive models for invertebrates







Fish Catch Declines and Human Nutrition

Environmental Change

Fisheries declines

Changes in Food Supply

Reduced access to aquatic foods

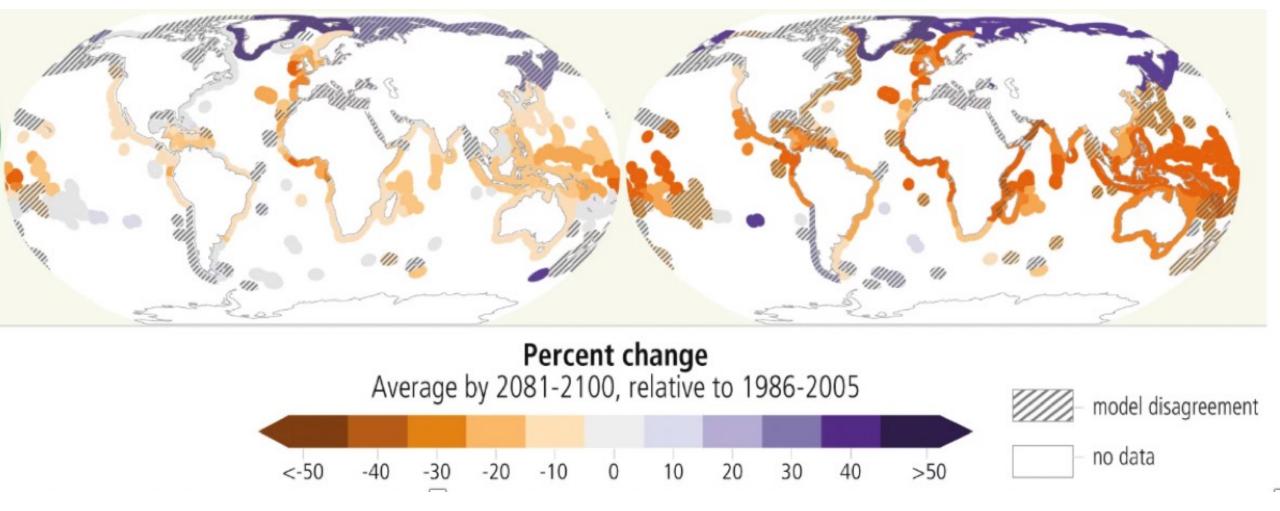
Changes in Nutrient Intake

Micronutrient and vitamin intake decreases

Health Impacts

 Increased incidence of micronutrient deficiencies and NCDs

Projected changes in maximum fisheries catch potential



IPCC, 2019: IPCC Special Report on the Ocean and Cryosphere in a Changing Climate. Pörtner, Roberts, Masson-Delmotte, Zhai, Tignor, Poloczanska, Mintenbeck, Nicolai, Okem, Petzold, Rama, and Weyer (eds.).

Nutrition: Fall in fish catch threatens human health

Christopher D. Golden, Edward H. Allison, William W. L. Cheung, Madan M. Dey, Benjamin S. Halpern, Douglas J. McCauley, Matthew Smith, Bapu Vaitla, Dirk Zeller & Samuel S. Myers

In the low-latitude developing nations, human nutrition is most dependent on wild fish, and fisheries are most at risk from illegal fishing, weak governance, poor knowledge of stock status, population pressures and climate change. These countries urgently need effective strategies for marine conservation and fisheries management to rebuild stocks for nutritional security. Most reliant on fish and most vulnerable Reliant on fish and vulnerable to //// No data Less reliant and less to micronutrient malnutrition micronutrient malnutrition vulnerable Sub-Saharan African In Bangladesh, much farmed regions still largely high-value fish is exported depend on domestic, to wealthier nations. subsistence and Smallholder systems, including artisanal fishing. Bahamas fish farmed in flooded rice Bangladesh Gambia fields, have improved local food security. Guinea Guyana Sri Lanka Benir Suriname Nigeria French Cameroon Polynesia Coast Ghana Indonesia Angola In developing small island states of the Pacific, wild fisheries will move poleward because of a rise in sea temperature, and aquaculture in deltas and floodplains will be affected by rising sea levels.

Projected percentage change in maximum marine catch potential by 2050 relative to 2000 levels

<-20% -20% to 0% 0% to 20% >20%

Impact on Nations from Fishery Declines



Less affected wealthy nations



Increasing undernutrition

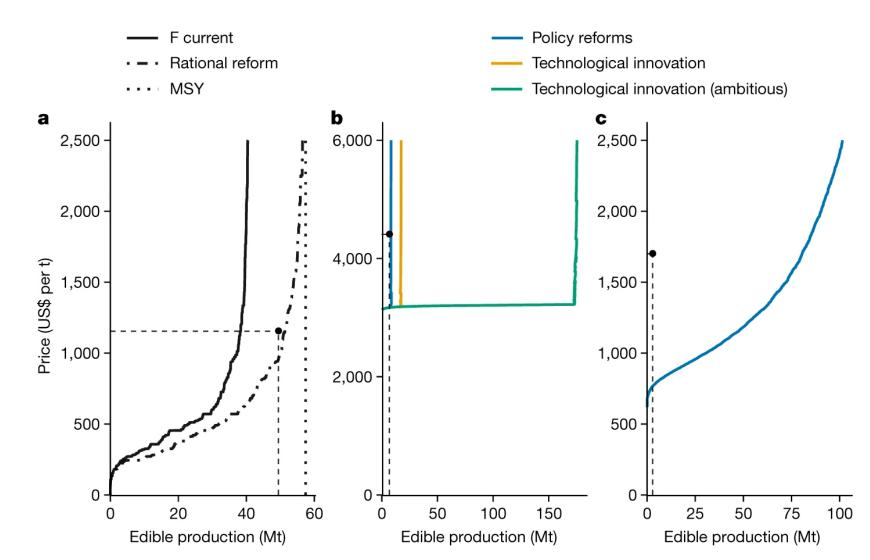


Acceleration of nutrition transition

The future of food from the sea

Christopher Costello ☑, Ling Cao ☑, Stefan Gelcich ☑, Miguel Á. Cisneros-Mata, Christopher M. Free,
Halley E. Froehlich, Christopher D. Golden, Gakushi Ishimura, Jason Maier, Ilan Macadam-Somer, Tracey
Mangin, Michael C. Melnychuk, Masanori Miyahara, Carryn L. de Moor, Rosamond Naylor, Linda
Nøstbakken, Elena Ojea, Erin O'Reilly, Ana M. Parma, Andrew J. Plantinga, Shakuntala H. Thilsted &
Jane Lubchenco

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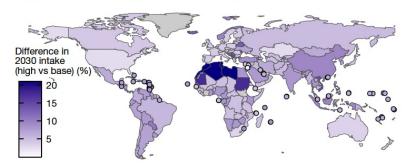
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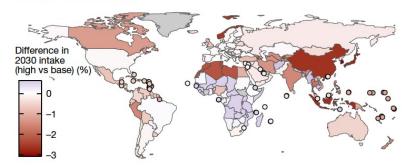
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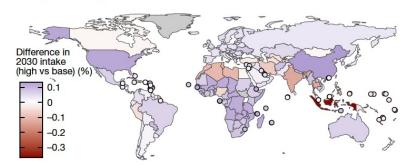
a Aquatic animal-source food consumption



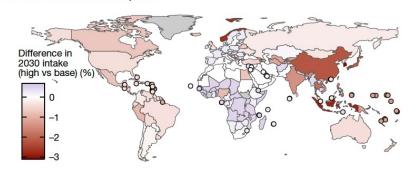
c Poultry consumption



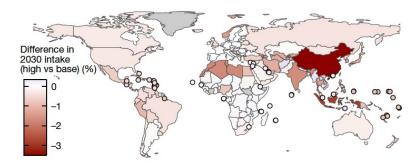
e Dairy consumption



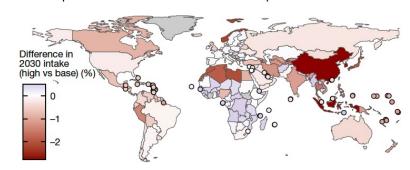
b Red meat consumption



d Egg consumption



f Non-aquatic animal-source food consumption



Fish Intake, Contaminants, and Human Health

Evaluating the Risks and the Benefits

Dariush Mozaffarian, MD, DrPH; Eric B. Rimm, ScD

Known or likely benefit:

An analysis of 20 studies involving hundreds of thousands of participants indicates that eating approximately one to two 3-ounce servings of fatty fish a week salmon, herring, mackerel, anchovies, or sardines—reduces the risk of dying from heart disease by 36 percent

Regular fish consumption and age-related brain gray matter loss

Cyrus A Raji ¹, Kirk I Erickson ², Oscar L Lopez ³, Lewis H Kuller ⁴, H Michael Gach ², Paul M Thompson ⁵, Mario Riverol ⁶, James T Becker ⁷

Possible benefit:

Eating fish once or twice a week may also reduce the risk of stroke, depression, Alzheimer's disease, and other chronic conditions

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