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Analysis of global diets highlights persistent undernutrition

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***Nature Sustainability* study reviews income growth and climate change effects on global nutrition security**



Increased and balanced consumption of seafood could help alleviate the inadequate intakes of many important nutrients in human diets reported in a recent *Nature Sustainability* report.

A new research report analyzing global diets, underscores the fact that worldwide intake of calcium, vitamin D, vitamin E and folate is likely to remain inadequate through 2050. The research did find that nearly every country in the world is achieving adequate carbohydrate and protein intake.

The study – **Income growth and climate change effects on global nutrition security to mid-century** (<https://www.nature.com/articles/s41893-018-0192-z>) – was published in *Nature Sustainability*. It was written by several specialists including the Commonwealth Scientific and Industrial Research Organization (CSIRO) and the International Food Policy Research Institute (IFPRI researchers), led by Professor Emeritus Gerald Nelson from the University of Illinois in Urbana-Champaign (Illinois, USA).

The study describes 21st century challenges for food and nutrition security, which include the worldwide spread of obesity and the persistent undernutrition in vulnerable populations, along with continued micronutrient deficiencies. It highlights that climate change, increasing incomes and evolving diets complicate the search for sustainable solutions, and – projecting to the year 2050 – it explored future macronutrient and micronutrient adequacy with combined biophysical and socioeconomic scenarios that are country-specific.

“In all scenarios for 2050, the average benefits of widely shared economic growth, if achieved, are much greater than the modelled negative effects of climate change,” the report stated. “Average macronutrient availability in 2050 at the country level appears adequate in all but the poorest countries. Many regions, however, will continue to have critical micronutrient inadequacies. Climate change alters micronutrient availability in some regions more than others.”

Nutritious diets rather than calories

The findings indicate that the greatest food security challenge in 2050 will be providing nutritious diets, rather than adequate calories. The report stressed that research priorities and policies should emphasize nutritional quality by increasing availability and affordability of nutrient-dense foods, and improving dietary diversity.

The researchers completed an analysis of the trajectory of diets across the globe from now until 2050, which enables you to connect with high-resolution data from the study on nutrient adequacy across the globe can be seen [here](https://impactnutrients.ifpri.org/nutrientModeling/) (<https://impactnutrients.ifpri.org/nutrientModeling/>). You can choose a country and scenario and get relevant information.

Micronutrient deficiencies widespread

The World Health Organisation ([WHO](http://www.who.int) (<http://www.who.int>)) currently estimates that more than 2 billion people globally suffer from micronutrient deficiency. The *Nature Sustainability* shows that, worldwide, our diets are lacking in vitamins and minerals essential for proper growth and development. The effects of severe micronutrient deficiencies include stunting of growth, a weaker immune system and impaired intellectual development. Additionally, widespread inadequacies were highlighted in the report for calcium, vitamin D, vitamin E and folate. For some of the poorest countries in the world, the study projects continued inadequacies in iron, zinc, and vitamins A and K.

“Global food security is not just about providing adequate calories; a person can consume too many calories but still be malnourished,” said Jessica Bogard, nutrition systems scientist at CSIRO and one of the study’s authors. “A change in the climate combined with a change in people’s diets, as they begin to earn more, will ultimately impact on our agricultural systems and what gets grown where. Improving farm productivity and economic growth alone is not going to be enough to achieve nutritional security now and into the future. We must refocus our efforts on dietary quality rather than quantity.”

Report researchers found that the major factor affecting food and nutrition security through to 2050 would be climate change, and strongly suggested that their research shows that serious micronutrient deficiencies will persist globally along with continued undernutrition in the poorest regions of the world unless action is taken to make nutritious foods more available and affordable.

“To achieve the provision of nutritious diets by 2050, we need to increase availability and affordability of nutrient-rich foods, including vegetables, fruits, pulses, nuts and seeds – and this must be tailored to location-specific challenges such as resource conditions, income levels, and dietary preferences,” said report co-author, Prof. Mario Herrero, chief research scientist at CSIRO.

Also mentioned was that, in many developing countries, there must also be a focus on nutritious, animal-source foods with complementary interventions throughout the food system, such as reduced waste, and efforts to promote healthy food environments.

The report, though, typically lacks “seafood language,” even though seafood products are nutritious and wholesome. It is rare to find anything more nutritious in meeting human dietary requirements for protein, vitamins, nutrients and micro-nutrients than fish and seafood, and yet this is not specifically mentioned.

Clearly then, there is an essential opportunity for fish and seafood to bolster all these elements and take the lead in playing a key role in food security in every country by 2050. Let us also face facts: If we – as an industry – do not do this, then you can be certain pharmaceutical and nutritional supplement interests will be all over this and promoting their own capsule-form versions.

Vitamin D deficiency and health risks

Importantly, there has been strong media coverage about the association between **vitamin D deficiency** (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3540805/>) and various **adverse pregnancy outcomes** (<https://www.nature.com/articles/s41598-018-21944-3>), following some studies, predominantly from Europe. Vitamin D deficiency **during pregnancy** (<https://www.ncbi.nlm.nih.gov/pubmed/29976852>) has been associated with some adverse neonatal outcomes as well as an increased risk of late pregnancy complications.

The outcomes of published studies investigating preeclampsia and gestational diabetes mellitus, vary with some large trials suggesting a potential positive effect of vitamin D supplementation during pregnancy on the decreased risk of these complications.

The research also suggests a possible connection between lower vitamin D concentrations and increased risk of preterm labor. And the studies highlighted that the pregnant woman is the only source of vitamin D for the fetus. The main sources of vitamin D for pregnant women are sunlight, fortified dairy products, dietary supplements and, naturally, oily fish.

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