

Starved, stuffed and squandered: Consequences of decades of global nutrition transition

November 18 2020



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The availability of food is unevenly distributed on a global basis. This gap is likely to worsen, while food waste will increase and pressure on

the environment will rise, according to a new study. Researchers from the Potsdam Institute for Climate Impact Research (PIK) assessed the consequences if the current nutrition transition from scarce starch-based diets toward processed foods and animal products continues. The calculations combine, for the first time, estimates for malnutrition and obesity, food composition and waste. Their findings provide a startling look ahead: By 2050, more than 4 billion people could be overweight, 1.5 billion of them obese, while 500 million people continue to be underweight.

"If the observed nutrition transition continues, we will not achieve the United Nations goal of eradicating hunger worldwide," explains Benjamin Bodirsky from PIK, lead author of the study just published in *Scientific Reports*. "At the same time, our future will be characterized by overweight and obesity of mind-blowing magnitude." By 2050, 45% of the world's population could be overweight and 16% obese, compared to about 29% and 9% in 2010. This development is due to the insufficient global distribution of food as well as to the shift from scarcely processed plant-based diets toward unbalanced, affluent diets, where animal protein, sugar and fat displace whole grains and pulses.

Bodirsky says, "The increasing waste of food and the rising consumption of [animal protein](#) mean that the environmental impact of our agricultural system will spiral out of control. Whether via greenhouse gasses, nitrogen pollution or deforestation, we are pushing the limits of our planet—and exceeding them."

Food systems as driver for greenhouse gas emissions

Crop and grazing land for food production cover about one third of the global land area; our food system is responsible for up to a third of global greenhouse gas emissions. The study projects that if current trends continue, global food demand will increase by about 50% between

2010 and 2050 and the demand for [animal products](#) like meat and milk will therefore approximately double, a development that requires more land.

"Using the same area of land, we could produce much more plant-based food for humans than animal-based food," explains co-author Alexander Popp, head of PIK's Land Use Management Research Group. "To put it in a very simplistic way: If more people eat more meat, there's less plant-based food for the others—plus we need more land for food production, which can lead to forests being cut down. And greenhouse gas emissions rise as a consequence of keeping more animals."

Global food demand: distribution and education are at the heart of the problem

The study provides the first consistent, long-term overview of a continued global nutrition transition from 1965 to 2100, using an open-source model that forecasts how much of food demand can be attributed to factors like population growth, aging, increasing height, growing body mass index, declining physical activity and increasing [food waste](#). Co-author Prajal Pradhan from PIK explains: "There is enough food in the world—the problem is that the poorest people on our planet have simply not the income to purchase it. And in [rich countries](#), people don't feel the economic and environmental consequences of wasting [food](#)." But redistribution alone would not be sufficient, as actually both the poor and the rich eat poorly: There is a lack of knowledge about a healthy way of life and nutrition.

How to trigger an appetite for change?

"Unhealthy diets are the world's largest health risks," co-author Sabine Gabrysch, head of PIK's Research Department on Climate Resilience

explains. "While many countries in Asia and Africa currently still struggle with undernutrition and associated health problems, they are increasingly also faced with overweight, and as a consequence, with a rising burden of diabetes, cardiovascular disease and cancer." The study could provide valuable orientation about the potential development pathway of different countries and regions. It could also support much-needed pro-active policies for a qualitative transition toward sustainable and healthy diets.

Sabine Gabrysch concludes: "We urgently need political measures to create an environment that promotes healthy eating habits. This could include binding regulations that limit the marketing of unhealthy snacks and promote sustainable and healthy meals in schools, hospitals and canteens. A stronger focus on nutrition education is also key, from early education in kindergarten to counseling by medical doctors and nurses. What we eat is of vital importance—both for our own health and that of our planet."

More information: The ongoing nutrition transition thwarts long-term targets for food security, public health and environmental protection, *Scientific Reports* (2020). [DOI: 10.1038/s41598-020-75213-3](https://doi.org/10.1038/s41598-020-75213-3)

Provided by Potsdam Institute for Climate Impact Research

Citation: Starved, stuffed and squandered: Consequences of decades of global nutrition transition (2020, November 18) retrieved 6 May 2024 from <https://phys.org/news/2020-11-starved-stuffed-squandered-consequences-decades.html>

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