

Study finds dietary guidelines around the world have vastly different carbon footprints

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Senior study author Diego Rose, professor of nutrition and food security at Tulane University School of Public Health and Tropical Medicine. Photo by Paula Burch Celentano.

If people across the globe were to follow their country's recommendations for a healthy diet, the impact of their food choices on greenhouse gas emissions would vary greatly depending on where they live.

Someone following U.S. dietary guidelines would have the largest carbon footprint, while a resident of India would have the smallest, according to a new Tulane University study in the [*Nutrition Journal*](#).

Researchers compared dietary guidelines and food consumption patterns in seven countries —Germany, India, the Netherlands, Oman, Thailand, Uruguay and the United States — to investigate differences in greenhouse gas emissions associated with different dietary guidelines.

The variations result from differences in recommendations for and consumptions of individual foods within the six main food groups —protein foods, dairy, grains, fruits, vegetables and oils/fats.

“Many countries provide recommendations about foods that people should eat for a healthy diet and previous simulations have shown that if the public were to eat according to their government’s recommendations, their diets would be both healthier and have a lower carbon footprint,” said senior study author Diego Rose, professor of nutrition and food security at Tulane University School of Public Health and Tropical Medicine. “However, for the US the opposite has been shown; greenhouse gas emissions were simulated to go up, if people followed dietary guidelines. This anomaly prompted us to investigate how dietary guidelines vary between countries and the consequent implications for greenhouse gas emissions.”

The authors found that the carbon footprint of India’s dietary guidelines was comparatively low, with the recommended diet associated with the equivalent of 0.86 kg CO₂ per day, compared to the US’s with 3.83 kg CO₂ per day. The carbon footprint of the US dietary guidelines was found to be about 1.2 times that of the Netherlands (equivalent to 2.86 kg CO₂ per day) and about 1.5 times that of Germany (equivalent to 2.25 kg CO₂ per day). The US vegetarian dietary guideline, while much lower than the main US guideline in terms of greenhouse gas emissions (equivalent to 1.80 kg CO₂ per day), was still over twice that of India’s largely due to the high U.S. dairy recommendation.

The authors also found that the principal difference between the dietary guidelines of the various countries was the wide range of daily recommended amounts for each food group, particularly protein and dairy foods. Daily recommended amounts of dairy foods ranged from 118 ml per day for Oman to 710 ml per day for the US. The greenhouse gas emissions associated with these two recommendations were equivalent to 0.17 and 1.10 kg CO₂ per day, respectively. The greenhouse gas emissions associated with the protein food recommendations ranged 0.03 kg CO₂ per day in India to 1.84 kg CO₂ in the US, for recommended amounts of 75g per day and 156g per day, respectively.

Guidelines also varied in terms of which foods were included in each food group. Protein food recommendations in Germany and Uruguay only included animal proteins, the US and Thailand recommended a full spectrum of plant and animal protein foods, whereas India recommended just plant proteins. The US vegetarian guideline recommended plant proteins, as well as dairy and eggs.

“As there is great variation in the global warming impacts of these individual foods, which foods people consume and how much of them has an impact on the carbon footprint of dietary guidelines,” said lead author Brittany Kovacs. “For example, consumption of beef, mutton, and lamb in Uruguay accounts for 31% of protein foods, whereas in Germany it is only 16%. Thus, our calculated greenhouse gas emissions for Uruguay’s protein food recommendation is 53% higher than Germany’s, despite the fact that both countries’ quantity recommendations for protein foods as a food group are about the same.”

The U.S. vegetarian guideline is almost identical in recommendations to the main U.S. guideline, except for the protein group – which recommends legumes, soy, nuts, and seeds, as well as eggs – resulting in an overall carbon footprint that is less than half, Rose said.

The authors caution that the study only considers a single environmental impact of diets, greenhouse gas emissions. Other environmental impacts, such as land and water use, should be considered when evaluating the overall impact of a diet. The study is restricted to the daily quantitative recommendations of seven countries’ dietary guidelines, which may limit its generalizability to other countries.

“These findings hold insights for future development of dietary guidelines and highlight the importance of including sustainability considerations, such as reductions of protein food and dairy recommendations and/or the inclusion of more plant-based substitutions for animal-based products,” Kovacs said. “By including more sustainable, yet still health-based, considerations into dietary recommendations, it is possible to influence the environmental impacts of the larger food and agriculture sector in various countries and worldwide.”