frontiers | Frontiers for Young Minds

EARTH SCIENCES
Published: 13 May 2024
doi: 10.3389/frym.2024.1333921

THE DOUBLE BENEFIT OF EATING FEWER ANIMAL PRODUCTS

***Paul Behrens*[1*], *Zhongxiao Sun*[2], *Laura Scherer*[1], *Arnold Tukker*[1], *Seth A. Spawn-Lee*[3], *Martin Bruckner*[4] and *Holly Gibbs*[3]**

[1] *Institute of Environmental Sciences, CML, Leiden University, Leiden, Netherlands*

[2] *College of Land Science and Technology, China Agricultural University, Beijing, China*

[3] *Department of Geography, College of Letters and Science, The Nelson Institute for Environmental Studies, University of Wisconsin-Madison, Madison, WI, United States*

[4] *Institute of Environmental Economics, Vienna University of Economics and Business, Vienna, Austria*

YOUNG REVIEWERS:

EDNA
AGE: 10

EVAN
AGE: 10

Scientists around the world have been studying how the food we eat impacts the planet. The demand for animal products, especially meat and milk, creates a lot of greenhouse gas emissions that heat our world. In rich countries, people often eat more animal-based foods than needed, which can be bad for people's health. So, eating more plants can reduce climate change while also making our bodies healthier. Eating more plants would also save huge areas of land, which is another benefit for the climate. This is because 75–80% of all the world's farming land is used to produce animal products. If we ate more plants, we could give this land back to nature or make new nature parks that would draw greenhouse gases out of the atmosphere. More natural land would also mean more plants and

animals could make their homes in these parks, and humans would have more places to play and explore.

REDUCING GREENHOUSE GASES BY EATING PLANT-BASED FOODS

Eating more plants and less meat is better for the planet. This is because raising animals for food releases up to 100 times more **greenhouse gases** into the air than growing plants does (Figure 1). There are three main ways that animal foods emit more greenhouse gases. First, some animals, like cows, produce the greenhouse gas methane when they digest their food, and methane is even more potent than carbon dioxide at trapping heat close to the Earth. Second, we must grow a lot of food to feed the animals, but we do not get that same amount of food back in the form of animal products. This is because when animals grow, they use a lot of energy just to stay alive, for example for breathing or digesting food. Third, animals and the foods we feed them take up a lot of space, so people must cut down forests to make more farmland. This is called **deforestation**, and the trees and the soil beneath them hold a lot of greenhouse gases that are released when the trees are cut down. By choosing more plant-based foods, we can help reduce the release of harmful greenhouse gases and save more trees from being cut down.

GREENHOUSE GASES

Any gas that increases the temperature of the planet when it is in the atmosphere.

DEFORESTATION

When large areas of forest are cleared and the trees cut down.

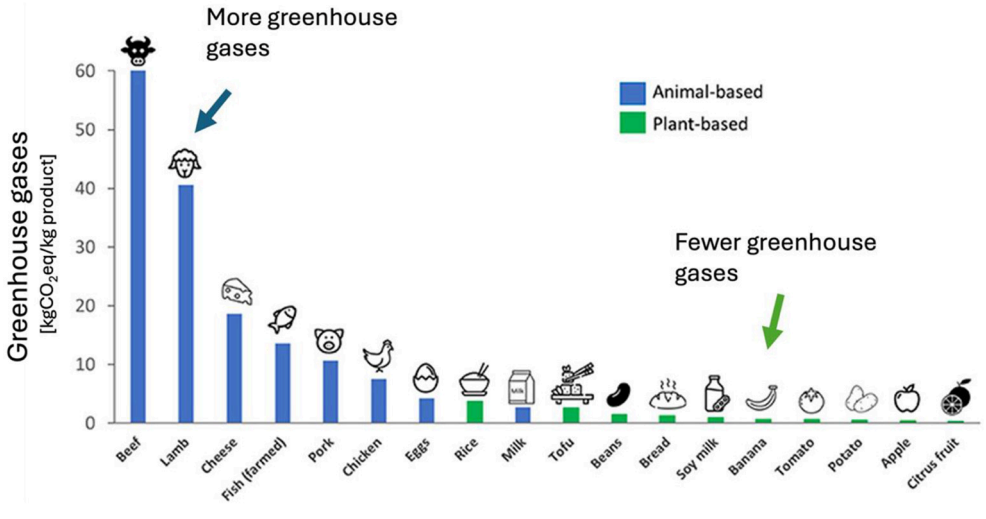

Figure 1

Greenhouse gas emission from different kinds of foods. Animal-based foods are shown in blue and plant-based foods are shown in green. The bars show a general value of greenhouse gases released per kg of food (data sourced from [1]; this figure was originally included in this Frontiers for Young Minds article).

RESTORING NATURE AND REDUCING CARBON IN THE ATMOSPHERE

Another exciting benefit of eating more plant-based foods is that we will need less land to grow all the food for the animals, as well as less land to keep them on. The extra land that is not used for

REVEGETATION

When areas that have been cleared of natural plants are replanted by humans or by nature.

PHOTOSYNTHESIS

The process that plants use to stay alive. They use energy from sunlight to turn carbon dioxide into food for themselves.

farming can be restored to its natural state, with trees and other plants (Figure 2). This process is called **revegetation**. Plants are super helpful for the environment because they soak up carbon dioxide from the air during **photosynthesis**. Photosynthesis is a process by which plants use sunlight, water, and carbon dioxide to create energy and grow. Carbon dioxide is one of the greenhouse gases that cause climate change, so when plants absorb it, they help to keep Earth's atmosphere in balance. By restoring land to its natural state, we can have more trees and other plants working together to remove carbon dioxide from the air, which is good for the planet.

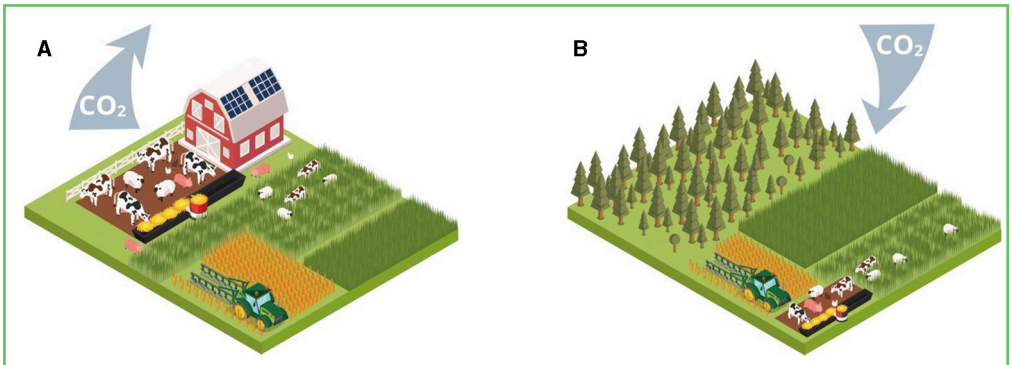

Figure 2

Here you can see two options for farming, using the same amount of land to feed the same number of people. **(A)** Current farming, with a lot of animal agriculture taking up a large amount of space. This contributes to carbon dioxide (CO_2) emissions, which contribute to climate change. **(B)** If people eat more plants and fewer animal-based foods, we can save a lot of land. Through revegetation, this land could be given back to nature so that the trees and other plants could help take up carbon dioxide from the air.

DOUBLE THE BENEFIT

Scientists came up with a special diet called the EAT-Lancet planetary health diet [2]. This diet is both healthy for us and healthy for the planet. People on this diet are advised to eat more foods like beans and lentils along with more nuts. They eat much less meat and cheese. We wondered what would happen if people in rich countries, like the U.S. and European countries, ate this diet, so we did research to find out. We discovered that, if everyone in these countries ate the EAT-Lancet planetary health diet, we could reduce greenhouse gas emissions from the foods we eat by a whopping 61% straight away [3]. This is because the diet avoids lots of animal foods, which release lots of greenhouse gases into the atmosphere. Releasing less greenhouse gases is the first important climate benefit of eating more plants.

Then we looked at the land-saving aspect of eating a plant-based diet. Because animal farming takes up so much space, shifting to eating plants would save lots of land that could be returned to its natural state. This means we could plant more trees and other plants, which help to soak up more carbon dioxide from the air. This is the second climate benefit from eating more plants rather than animal products. Revegetation can remove a huge amount of carbon dioxide from the air. If everyone in rich countries switched to the EAT-Lancet diet, we estimate that almost 100 billion tons of emissions could be extracted from the air over the long term. This is equal to around 14 years of

greenhouse gases currently produced around the world by farming. We would benefit most over the short term—around 20 years—as plants grow fast in the beginning and need lots of carbon dioxide from the atmosphere, but we would continue to benefit for over 100 years in many cases.

So, switching to a plant-based diet gives us a double climate benefit. The first part of the benefit comes from reducing greenhouse gas emissions. When we eat more plant-based foods, we produce fewer greenhouse gases from farming, which is good for the planet. The second part of the benefit comes from the carbon stored in nature through revegetation, and that is also good for the planet.

HELPING WILDLIFE THRIVE

There are many other environmental benefits to switching to a plant-based diet. When we choose to eat more plant-based foods and free up land that was used for farming, it is not only good for the climate but also fantastic for wildlife and for people, too. By restoring land to its natural state with trees, flowers, and grasses, we can create a safe and welcoming home for many kinds of animals, like birds and insects. Trees provide cozy homes for birds to build nests, and flowers attract busy bees and colorful butterflies. The more we plant, the more diverse and exciting the wildlife community becomes!

When we restore land to its natural state, we create amazing places where people can explore and have fun. This is really good for human health. Breathing in the fresh air among the trees makes us feel happy and relaxed. When we spend time outdoors, nature gives us the special gift of feeling healthy and strong.

WE CAN MAKE A BIG DIFFERENCE

Now you know that eating more plant-based foods gives us a double climate benefit—it reduces greenhouse gases produced from farming *and* it helps the planet by freeing up land for more trees and other plants to grow and soak up carbon dioxide. We can also create homes for wildlife, explore nature's playground, and stay healthy. Everyone can play a part in protecting our planet by eating fewer animal products and more plants. Remember, every little step counts, and together we can make a big difference. We can also encourage our friends, family, and communities to join in. By doing so, we can raise awareness about the importance of more eating plant-based foods and the positive impacts it can have on Earth's climate.

ORIGINAL SOURCE ARTICLE

Sun, Z., Scherer, L., Tukker, A., Spawn-Lee, S. A., Bruckner, M., Gibbs, H., et al. 2022. Dietary change in high-income nations alone can lead to substantial double climate dividend. *Nature Food*. 3:29–37 doi: 10.1038/s43016-021-00431-5

REFERENCES

1. Poore, J., and Nemecek, T. 2018. Reducing food's environmental impacts through producers and consumers. *Science* 992:987–992. doi: 10.1126/science.aaq0216
2. Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S. et al. 2019. Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems. *Lancet* 393, 447–492. doi: 10.1016/S0140-6736(18)31788-4
3. Sun, Z., Scherer, L., Tukker, A., Spawn-Lee, S. A., Bruckner, M., Gibbs, H., et al. 2022. Dietary change in high-income nations alone can lead to substantial double climate dividend. *Nature Food.* 3:29–37 doi: 10.1038/s43016-021-00431-5

SUBMITTED: 06 November 2023; **ACCEPTED:** 23 April 2024;
PUBLISHED ONLINE: 13 May 2024.

EDITOR: Idan Segev, Hebrew University of Jerusalem, Israel

SCIENCE MENTORS: Blessing Nyamasoka-Magonziwa and Mark Zwart

CITATION: Behrens P, Sun Z, Scherer L, Tukker A, Spawn-Lee SA, Bruckner M and Gibbs H (2024) The Double Benefit of Eating Fewer Animal Products. Front. Young Minds 12:1333921. doi: 10.3389/frym.2024.1333921

CONFLICT OF INTEREST: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

AI TOOL STATEMENT: Before starting the article, the author used AI-assisted technologies to help explore age-appropriate terminology. No text generated by the tool appears in the article.

YOUNG REVIEWERS

EDNA, AGE: 10

Edna is a bright and curious 10-year-old. Her curiosity drives her to explore the wonders of nature and she constantly brainstorms about ways to make the world a better place. Edna is also passionate about helping others. Her sociable nature brings joy to everyone she encounters. In addition to her passion for baking, she also plays piano and enjoys gymnastics.

EVAN, AGE: 10

Evan has a passion for science from coding and designing robots, to learning about planets, volcanoes and flags, to understanding how viruses work (thanks to corona virus) and learning about different animals and their habitats. Evan is also a talented artist and loves to draw and design robots when he is not at school. He loves playing soccer with his teammates, brothers and dad. He enjoys his mother's home baked cakes and his favorite fruit is banana.

AUTHORS

PAUL BEHRENS

Paul Behrens is an environmental scientist from the United Kingdom. He studied physics and then wind energy after school. His current work is on food, energy, and climate change. He wrote a book to explore how climate change might change the world this century. He does not fly or eat animal foods so he can lower his impact on climate change and nature. *p.a.behrens@cml.leidenuniv.nl

ZHONGXIAO SUN

Zhongxiao Sun is an environmental scientist. He comes from China and works at China Agricultural University now. His work mainly focusses on the sustainable development of food systems. He has been trying to find dietary patterns that can benefit both human and planetary health.

LAURA SCHERER

Laura Scherer is an environmental scientist. She comes from Germany and lives in the Netherlands, where she works at Leiden University. She cares a lot about nature and the wellbeing of animals. In her research, she studies how people's activities affect both and tries to identify ways to do better. She does not eat animal products because they can harm nature and animals.

ARNOLD TUKKER

Arnold Tukker is from the Netherlands. He studied chemistry after high school. After this, he learned a lot of other things by doing research on the environment at a big research institute (TNO). He now works as a professor at Leiden University. He wants to understand how all people on Earth can live well, without polluting the Earth.

SETH A. SPAWN-LEE

Seth A. Spawn-Lee is a geographer who studies how farms, forests, and grasslands influence our climate. He maps where in the world plants are storing and absorbing carbon and how these patterns are changed by people. He is currently a researcher at The Nature Conservancy.

MARTIN BRUCKNER

Martin Bruckner is an environmental scientist trying to better understand the impact of our consumption on the global climate and distant ecosystems. He is currently a senior researcher at ETH Zurich.

HOLLY GIBBS

Holly Gibbs is a land systems scientist who works to understand how and why people use land around the world and what it means for the environment. She is a professor at the University of Wisconsin-Madison and is currently focused on finding solutions to deforestation in the Amazon and learning how private landowners can better support biodiversity, especially in the United States.