

Is Reducing your Calorie Intake an Environmentally Sustainable Diet?

By Sarah Welhous, Christian Duemmel, Sarah Melo, and Emily de Jong

Reducing your daily calorie intake can help in the effort to create a sustainable environment. A high calorie diet not only leads to a number of health problems but also can have negative impact on the environment. A lower calorie diet can help fight food shortages, minimize waste, conserve natural resources, reduce the emission of greenhouse gases, and fight deforestation. These factors are all related to how food webs, trophic structure, and ecosystem energies are sustained and managed.

Food Webs

Reducing daily caloric intake, in general, would lead to lower amounts of human damages for every trophic level involved in a food web. This includes the decreases of consumption in primary producers all the way to predators. With this reduced amount of human interaction in environmental food webs, environmental stability would increase. Each part of the food web would have more available energy to pass on to each other which would result in an environment that is more stable. Not only would there be more available energy but there would also be less greenhouse gasses being produced from the production of food (Meyer and Reguant-Closa, 2017). These greenhouse gasses that are currently affecting the environment create instability in climates of the affected environments. This causes the organisms in food webs to struggle to survive in their natural environment. Organisms die and there is less energy available for organisms higher up the food web. The implementation of a reduced caloric intake would help to prevent these problems.

Trophic Structure & Ecosystem Energetics

Trophic structure describes the system or organization of organisms into different trophic levels based on the amount of energy the organism consumes (Adey and Loveland, 2007). Ecosystem energetics is the study of the flow of energy within an ecological system from the time the energy enters the living system until it is lost from the system. Reducing calorie intake can improve environmental sustainability, however, restricting calorie intake in certain food groups is more sustainable. Trophic structure demonstrates the feeding relationships between different organisms of both producers and consumers within a set area and time; therefore, we can analyze how reducing calorie intake of specific foods influences the status of related organisms. Across studies, consistent evidence indicated that a dietary pattern higher in plant-based foods (e.g., vegetables, fruits, legumes, seeds, nuts, whole grains) and lower in animal-based foods (especially red meat), is both healthier and associated with a lesser impact on the environment, as seen from the figure right (Nelson et al., 2010). Beef production requires 20 times more land and emits 20 times more greenhouse gas emissions per unit of edible protein than common plant-based protein sources such as beans, peas and lentils. Chicken and pork are more resource efficient than beef, but still require three times more land and emit three times more greenhouse gas emissions than beans. It can be concluded that eating less calories while maintaining a balanced diet is more sustainable (Ranganathan J.,2016).

Conclusion

Food webs, trophic structure and ecosystem energetics are important tools to measuring the impact of a diet focused on the consumption of fewer calories. This diet would help reduce our carbon footprints and our interaction with the natural flow of energy the environment. Less calories means less demand for products that involve a long chain of energy to create, therefore leaving much needed energy for other organisms. Not only is reducing calorie intake important but also reducing our consumption of animal-based foods, as the production of such is much more damaging to the environment than the consumption of plant-based foods. A lower calorie diet would allow for a more stable and productive environment.

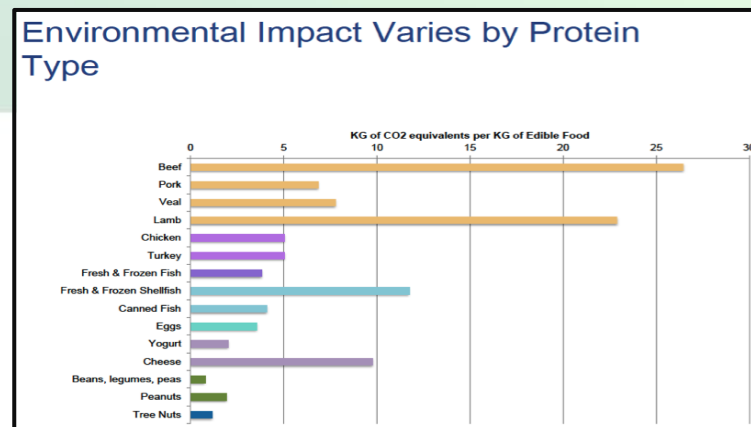


Figure 1: The graph compares different foods to their CO2 emissions.

References:

- Adey WH, Loveland K. Trophic Structure. *Dynamic Aquaria*. 2007:191–202. doi:10.1016/b978-0-12-370641-6.50022-4
- Meyer N, Reguant-Closa A. “Eat as If You Could Save the Planet and Win!” Sustainability Integration into Nutrition for Exercise and Sport. *Nutrients*. 2017;9(4):412. doi:10.3390/nu9040412
- Nelson ME, Hamm MW, Hu FB, Abrams SA, Griffin TS. Alignment of Healthy Dietary Patterns and Environmental Sustainability: A Systematic Review. *Advances in Nutrition: An International Review Journal*. 2016;7(6):1005–1025. doi:10.3945/an.116.012567
- Ranganathan J. What You Need...And What You Need To Know. *Chemical & Engineering News*. 2016;78(12):8. doi:10.1021/cen-v078n012.p008
- 9comeback. Green earth vector image. <https://www.vectorstock.com/royalty-free-vector/green-earth-vector-9915540>