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A Vegan Diet Affects Environmental Sustainability

By Melanie Kirk, Katherine Cotten and Bre Pollard

Sustainability: The ability to meet the current needs of our population without compromising this ability for future generations. There are three factors that go into sustainability: environment, social impact and economy.

Environmental Sustainability: The ability for the natural environment to meet the needs of the human population without compromising this ability for future generations through degradation of the environment, etc.

- The GWP of the MD is double that of the VD. This is because livestock has very a large carbon footprint due to methane emissions. As seen in Figure 1, the GWP was 20 kg CO₂eq per person per week for the MD and 13 kg CO₂eq per person per week for the VD¹
- The amount of livestock needed to supply a meat-based diet in the U.S is 5x the U.S. human population due to the decreased trophic level efficiency in animals². The livestock population consumes more than 7x as much grains as is directly consumed by the human population². The amount of grains needed to feed U.S livestock could feed over 840 million people on plant-based diets².
- As seen in Figure 2, VD reduces per capita food-borne greenhouse gas emissions by 67%, blue water use by 75%, and land occupation by 79% as compared to MUD³. It also reduces greenhouse gas emissions, blue water use, and land occupation as compared to VEG.

Vegan Diet (VD or VGN): No animal products in diet.

Vegetarian Diet (VEG): No animal meat in diet (still consumes egg and dairy products).

Mediterranean Diet (MD): No restriction on diet; however, emphasis on vegetables, nuts and fish.

U.S. Diet (MUD): No restriction on diet; however, heavy emphasis on meat and animal products.

Carbon Footprint: The amount of carbon compounds emitted by a specific activity. Correlates to GWP.

Global Warming Potential (GWP): The relative potential an activity has on the warming of the atmosphere due to greenhouse gas emissions.

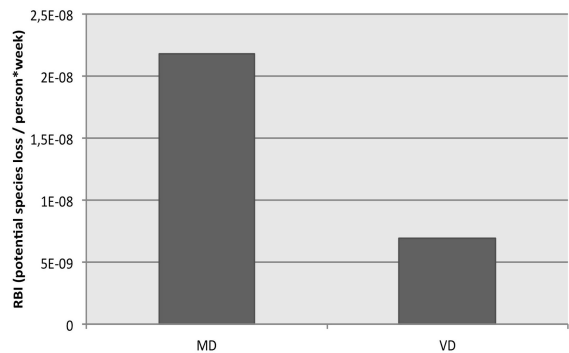


Figure 1: The vegan diet (VD) and the Mediterranean diet (MD) as it relates to the potential species loss per person per week (RBI) due to land use occupation. MD enables more species loss per person than VD, thus MD enables a greater loss in biodiversity.

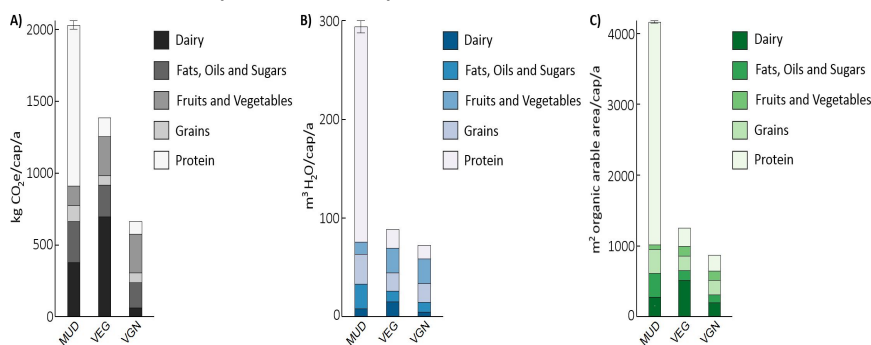


Figure 2. MUD, VEG and VGN diets and their relationship to greenhouse gas emissions, blue water use, and land occupation area.

Therefore, when looking solely at the environmental impact of various diets, the VD proved to be the most sustainable compared to the MD, VEG and MUD diets.

References:

¹Castañé S, Antón A. Assessment of the nutritional quality and environmental impact of two food diets: A Mediterranean and a vegan diet. *Journal of Cleaner Production*. 2017;167:929–937.
²Pimentel D, Pimentel M. Sustainability of meat-based and plant-based diets and the environment. *The American Journal of Clinical Nutrition*. 2003;78(3):660–663.
³Goldstein B, Moses R, Sammons N, Birkved M. Potential to curb the environmental burdens of American beef consumption using a novel plant-based beef substitute. *Plos One*. 2017;12(12).