

The Impact of a Vegetarian Diet on the Human Body and the Environment

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I Introduction

I grew up in an environment centered on eating meat with most meals. The question of where the meat came from was never asked. To my prior knowledge, vegetarianism was considered to be a diet for losing weight. After delving deeper into this topic in junior year, the idea of being a vegetarian suddenly became interesting. People online asked questions like, What environmental impact does the production of meat have on the environment? Does being a vegetarian change my CO2 footprint? My newfound curiosity for nutrition and fitness led me to pursue the idea of being a vegetarian. This research paper will look at a typical vegetarian diet and compare it to a diet based on meat. While the health side of vegetarianism is important, taking a look at how it relates to the environment, economy, and different cultures around the world is just as important. Understanding the industrial world of agriculture is important because it proves that the impact the current production of meat has on the environment is unsustainable.

II Health

There have been countless arguments defending and attacking the consumption of meat. Humans have been eating meat since they have walked this Earth and has satisfied their nutritional needs and taste buds. In recent years, organizations like NPR and World Health have told U.S. citizens to cut down on meat consumption without talking about the nutritional benefits of meat products.¹

¹ Barclay, Eliza, and Allison Aubrey. "Eat Less Meat, We're Told. But Americans' Habits Are Slow To Change." NPR, NPR, 26 Feb. 2016, www.npr.org/sections/thesalt/2016/02/26/465431695/eat-less-meat-were-told-but-americans-habits-are-slow-to-change.

In 2019, controversial articles came out saying people do not need to reduce their red meat consumption. Researchers at McMaster University said people can continue eating red meat, because their studies showed there are no major impacts on people's health. The team of researchers did 12 trials with 54,000 people in total. When trials ended, there was no evidence that the consumption of red meat was linked to heart disease or cancer.² However, new research in 2020 is proving these stances to be incorrect.³ Animals like chickens, pigs, fish, and cows are all full of nutrients and vitamins, but some sources of protein are healthier than others. Chicken has less protein per 100 grams than pork, beef, or tuna, but it has less fat and mercury than any of these meats. Chicken is great for a healthy lean diet, and many nutritional websites advise people to have chicken in their diet.⁴ Beef and pork are similar in nutritional facts. They both have an abundance of proteins, nutrients, and vitamins. The only difference is that pork has less saturated fat than beef does. In recent studies, beef has been proven to have the ability to increase the likelihood of someone contracting heart disease by 3% to 7%.⁵ That being said, there have not been any signs of pork causing the same effects.⁶ Chicken, pork, beef, and other meats have all proven to cause cancer if over-cooked. Tuna is the most popular type of fish across the globe. It has 42 grams of protein per 165 grams. It also has the least amount of fat out of the three meat

² McMaster University. "No need to cut down red and processed meat for health reasons, controversial findings suggest." ScienceDaily. ScienceDaily, 30 September 2019. <www.sciencedaily.com/releases/2019/09/190930215122.htm>.

³ "Back Away From the Steak." *Focus on Healthy Aging*, vol. 23, no. 6, June 2020, p. 2. *Gale In Context: High School*, <https://link.gale.com/apps/doc/A627002683/SUIC?u=watkinson&sid=SUIC&xid=627b804c>. Accessed 12 Nov. 2020.

⁴ Frey, Malia. "Chicken Breast Nutrition Facts and Health Benefits." *Verywell Fit*, Dotdash, June 2020, www.verywellfit.com/how-many-calories-in-chicken-breast-3495665.

⁵ "Back Away From the Steak."

⁶ Atli Arnarson, BSc. "Pork 101: Nutrition Facts and Health Effects." *Healthline*, Healthline Media, 28 Mar. 2019, www.healthline.com/nutrition/foods/pork.

proteins. Fish promotes heart health because of its omega-3 fatty acids that lowers triglycerides without raising cholesterol. It is advised for someone to only eat canned tuna once or twice a week because of its high mercury content.⁷ Out of these four meats, chicken and fish are the healthiest replacements for red meat because of their leanness with pork coming in third since it also is a meat with lower fat content. Though beef has a high protein count and vitamins, it also has a high amount of fat that makes it less healthy than the other meats. A healthy diet would consist of chicken, fish, fruits, vegetables, grains, nuts and seeds, and dairy products.⁸

Vegetarian based diets have been used in a variety of ways to help people with health problems.⁹ Even though vegetarians do not eat meat, there are several vegetables and grains that are good sources of protein. Fruits, vegetables, grains, nuts and seeds, and dairy products are all key components to a vegetarian diet. Grains like rice and wheat contain carbohydrates which give the human body energy. Dairy, nuts, and seeds are great ways for vegetarians to get protein. Tomatoes, broccoli, potatoes, and bananas are examples of vegetables and fruits that contain important nutrients and vitamins.¹⁰ These nutrients are vital in keeping a person's body and immune system healthy. If done properly, a vegetarian diet helps the immune system and helps prevent inflammation. This is thought to be due to the antioxidants, fibers, and vitamins within fruits, vegetables, grains, nuts and seeds, and dairy products. This being said,

⁷ Frey, Malia. "Tuna Nutrition Facts and Health Benefits." *Verywell Fit*, 25 Aug. 2020, www.verywellfit.com/tuna-nutrition-facts-calories-and-health-benefits-4114019.

⁸ "Eat Well." *NHS Choices*, NHS, 2019, www.nhs.uk/live-well/eat-well/.

⁹ "Vegetarian Diets and Diabetes." *NYTimes.com Video Collection*, 28 Oct. 2018. *Gale In Context: High School*, <https://link.gale.com/apps/doc/CT561434363/SUIC?u=watkinson&sid=SUIC&xid=04bdfbba>. Accessed 16 Nov. 2020.

¹⁰ "Top 20 Fruits and Vegetables Sold in the U.S." 2019 | *Produce Marketing Association*, PMA, 2018, www.pma.com/content/articles/2017/05/top-20-fruits-and-vegetables-sold-in-the-us.

vegetarian diets are not for everyone. If a vegetarian does not eat the correct foods, there is an increase of risk for iron, zinc and vitamin B12 deficiencies.¹¹ A balanced vegetarian diet provides people with all the nutrients they need.

III Globalization

Across the globe, there are cultures that focus on eating a majority meat diet. Other cultures strictly eat a vegetarian diet. Cultural eating habits are influenced by people's environments and their beliefs surrounding health, religion, and care for animals.¹² Certain ecosystems can lead groups of people being dependent on different types of food. The Inuit are Native Americans that live in Alaska, Canada, and Greenland. The Inuit people live in geographical areas mostly surrounded by snow and cold weather, which is not a conducive environment for growing crops. This forces them to eat a meat and fish based diet that consists of moose, ducks, salmon, whitefish, and etc. They secure these animals by hunting and fishing. Inuits traditional hunting and fishing style allows for a sustainable and healthy diet.¹³ Similar to the Inuit's, the Maasai tribe located in Kenya and Northern Tanzania rely on meat. Their main source of meat comes from cattle, and two thirds of their daily calories rely on fat. Even though they consume 600-2000mg of cholesterol a day - the American Heart Association recommends people each 300 mg a day - Maasai's have a low rate of disease. This is due to a fatty acid binding protein called FABP1. It is found in the liver and is the reason

¹¹ Yasmine Craddock, and Joel Craddock PhD Candidate, Probst Senior lecturer. "Eat Your Vegetables – Studies Show Plant-Based Diets Are Good for Immunity." *The Conversation*, 16 Dec. 2019, theconversation.com/eat-your-vegetables-studies-show-plant-based-diets-are-good-for-immunity-107964.

¹² "The Factors That Influence Our Food Choices." Edited by France Bellisle, *The Factors That Influence Our Food Choices: (EUFIC)*, 2006, www.eufic.org/en/healthy-living/article/the-determinants-of-food-choice.

¹³ Gadsby, Patricia, and Leon Steele. "The Inuit Paradox." *Discover Magazine*, Discover Magazine, 19 Jan. 2004, www.discovermagazine.com/health/the-inuit-paradox.

for lowering the cholesterol levels in the Maasai people.¹⁴ Under the American Heart Association guidelines for a healthy diet, both the Inuit and Maasai diets would not be considered healthy, but considering their bodies and environments, they live healthy lives with these diets.¹⁵ Although there are cultures that rely on meat for their daily food intake, others rely on a strictly vegetarian or vegan diet.

There are various reasons why people become vegetarians. Eight percent of the world follows a vegetarian or vegan diet. Five percent do it for ethical reasons, and 2.7 percent do it for religious reasons.¹⁶ Jainism is an ancient Indian religion that practices the belief of non-violence. Jain monks (Jains) follow a strict diet that excludes meat, fish, eggs, root vegetables, or animal ingredients. They believe in the conservation of all living things, including certain plants when it involves killing the plant. Eating plants like potatoes, onions, garlic, and carrots is forbidden because in doing so it either kills microorganisms in the plant, or the plant completely. Instead, they eat foods like baby spinach, zucchini, bananas, cashews, and etc. Even while following this diet, Jain's live healthy lives and are able to sustain themselves.¹⁷ Although both diets are different and contradict the United Kingdom National Health Service, each culture has found ways to make their diets suitable for performing homeostasis.¹⁸

¹⁴ Bhatia, Aatish. "Milk, Meat and Blood: How Diet Drives Natural Selection in the Maasai." *Wired*, Conde Nast, 2012,

www.wired.com/2012/09/milk-meat-and-blood-how-diet-drives-natural-selection-in-the-maasai/.

¹⁵ Bhatia, Aatish.

www.wired.com/2012/09/milk-meat-and-blood-how-diet-drives-natural-selection-in-the-maasai/.

¹⁶ Jacimovic, Darko. "20 Remarkable Vegetarian Statistics [The 2020 Serving]." *Deals On Health*, 20 Nov. 2020, dealsonhealth.net/vegetarian-statistics/.

¹⁷ Priyanka. "Jain Diet." *Pinkie's Palate*, 16 Feb. 2017, pinkispalate.com/jainism/jain-diet/.

¹⁸ "Eat Well." *NHS Choices*, NHS, 2019, www.nhs.uk/live-well/eat-well/.

IV Environment

Humans have come up with various ways of producing meat. Natives would hunt for their food, and now companies produce mass amounts of food. The mass production of meat and vegetables has had an environmental impact on the globe. Meat production has significantly created a larger carbon footprint than vegetables and crops on the environment. In the modern day food industry, most products need an incredible amount of water. One pound of beef takes 2,500 to 5,000 gallons of water; pork 1,630 gallons; lamb 1,188 gallons; and chicken 510 gallons. Animals require a vast amount of water, and cows are at the forefront of this need. One cow drinks an average of two to five gallons per day. There are approximately 94 million cattle in the U.S., which means all the cows in the U.S. drink a total of 282 million gallons of water a day. It is also necessary for cows to eat six to nine pounds of hay every day. Combined with the process of producing and shipping beef, 441 pounds of boneless beef needs 820,000 gallons of water. Compared to cows, chickens have a five times larger population in the U.S., and they only need 63 million gallons of water a day. That is 22% of 282 million gallons.¹⁹ While using a profuse amount of water, livestock also take up 80% of global agricultural land and only produce 20% of the calories needed for the world's population.

Both water consumption and use of land contribute to the CO₂ footprint of livestock. Combined with production, inefficient transportation, and natural causes, livestock such as cattle, sheep, and goats created 178 million metric tons (mmt) of CO₂ in the U.S. during 2018. While cows create CO₂ on their own, the production and

¹⁹ Leahy, Stephen. *Your Water Footprint: The Shocking Facts About How Much Water We Use to Make Everyday Products*. Firefly Books, 2015.

transportation of meat produces two times more CO₂. Halting food transportation for one year would save the equivalent of driving 1,000 miles. On the other hand, eating a vegetarian diet once a week could save the equivalent of driving 1,160 miles.²⁰ While integrating CO₂ emissions, use of water, and the use of land, vegetarian products have an advantage when it comes to the production of meat.

The average U.S. citizen daily diet takes 1,000 gallons of water to produce. With that in mind, meat substitute companies such as *Beyond Meat* have advertised that their products save water to create a smaller CO₂ footprint, and develop a healthier burger. Vegetarian products believe in changing the environment.²¹ *Beyond Meat* markets their ¼ pound substitute burger patty with 99% less water, 93% less land, produces 90% less CO₂, and 46% less energy than the average beef burger.²² Normal ⅓ pound beef burger uses 660 gallons of water, but a *Beyond* burger takes 58 gallons of water to produce.²³ Other vegetarian foods like olive oil, rice, milk, wheat, tomatoes, and corn are among the top 30 foods that produce the highest amount of greenhouse gas emissions. These popular food items are behind beef, lamb, chocolate, pork, chicken, and a few others. Compared to beef, which can produce 70 greenhouse gas emissions per kilogram (kgCO₂) and lamb can produce 24 (kgCO₂), olive oil and rice produce 6 to 4 (kgCO₂).²⁴ Vegetarian based diets are clearly superior to meat based diets when it comes to their environmental impact. While proving vegetarian products

²⁰ Center for Sustainable Systems, University of Michigan. 2020. "Carbon Footprint Factsheet." Pub. No. CSS09-05, <http://css.umich.edu/factsheets/carbon-footprint-factsheet>.

²¹ *Beyond Meat - Go Beyond*®, Beyond Meat, www.beyondmeat.com/.

²² *Go Beyond*®

²³ Sassaman, Ezra. "How Much Water Does It Take to Make a Burger?" *Stone Pier Press*, Stone Pier Press, 8 Mar. 2019, stonepierpress.org/goodfoodnews/how-much-water-does-it-take.

²⁴ Ritchie, Hannah, and Max Roser. "Environmental Impacts of Food Production." *Our World in Data*, 15 Jan. 2020, ourworldindata.org/environmental-impacts-of-food.

produce fewer greenhouse gas emissions and decrease someone's carbon footprint, they also use less water and less land to grow.

V Conclusion

The world is at a moment where current means of food productions will not be sustainable in the future. The environmental impact of meat consumption on ecosystems is too great to go unnoticed. While countries like the U.S. produce and export meat in a fashion that harms the environment, people like the Inuit and Masai hunt only for what they need. They do not mass produce meat, which allows for carbon footprint to stay low. The Earth today is losing water at a rapid rate. Meats like beef and lamb will be obsolete given the advancements products like *Beyond Meat* is processing. These beneficial replacements have proven to be better for people's health and the environment. With CO₂ emissions on the rise, MIT researchers believe the only true solution for our environment is to replace our current food system with plant based production.²⁵ Someday soon, the human race will have no choice but to change their diets for the betterment of the world.²⁶

²⁵ Baskin, Kara. "The Future of Meat." *MIT Sloan*, MIT, 22 Dec. 2020, mitsloan.mit.edu/ideas-made-to-matter/future-meat.

²⁶ "Globally, We Consume around 350 Million Tons of Meat a Year." *The World Counts*, TheWorldCounts, 2020, www.theworldcounts.com/challenges/consumption/foods-and-beverages/world-consumption-of-meat/story.