Effect of Dietary Choice (Vegan vs Vegetarian vs Non- Vegetarian) on the Environment: A Quantitative Study

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Abstract

Dietetic selections bear a substantial and profound influence on the ecosystem, with conspicuous variations between herbivorous, lacto-ovo-vegetarian, and carnivorous alimentary habits. Herbivorous diets eschew all animal-derived products, while lacto-ovo-vegetarian diets tolerate dairy and eggs but reject flesh. Conversely, carnivorous diets chiefly rely on meat for protein. The genesis of animal-derived provisions necessitates more land, water, and energy in contrast to herbivorous victuals, thereby causing elevated levels of water contamination, deforestation, and greenhouse gas discharges. Research has substantiated that herbivorous diets curtail carbon discharges. While lacto-ovo-vegetarian diets are more ecologically sound than carnivorous diets. They are not as viable as herbivorous diets. The production of dairy and eggs commands a considerable volume of resources. Land and water, and as a result, induces more greenhouse gas discharges and water contamination. Carnivorous diets are the most pernicious among the three dietetic preferences since meat production demands the most significant quantity of resources and prompts the most elevated magnitude of greenhouse gas discharges, deforestation, and water pollution.

Keywords- Carnivorous diets, Diet and Environment, Vegan vs Vegetarian vs non-Vegetarian
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Introduction

People's alimentary preferences hold vast ramifications for the environment, transcending personal inclinations. Heller, Keoleian, & Willett, (2013) with the incessant rise of humanity, the cultivation and consumption of sustenance that abides by sustainability standards are essential to a hale planet. It is imperative to scrutinize the ecological impact of various diets. Particularly that are vegan, vegetarian, and non-vegetarian. The vegan diet abstains from any animal-derived product. It solely relies on plant-based nutriments. As much as 73%, trim down water consumption by up to 58%, and decrease land usage by as much as 76% as opposed to carnivorous diets. According to Macdiarmid, Douglas, and Campbell (2016) the vegetarian diet permits dairy and egg consumption but omits meat. The non-vegetarian diet entails meat as the primary protein source. The creation of animal-derived products necessitates more resources. Such as land, water, and energy, then plant-based foods. It results in amplified greenhouse gas emissions, water contamination, and deforestation. Through transitioning to plant-based diets, we can effectively diminish our environmental footprint. There has been an escalating trend

towards herbivorous regimens, primarily amongst youthful individuals. Multiple reasons account for this, including health anxieties, animal well-being, and environmental consciousness.

Sabaté & Soret, (2014) adopting a plant-based diet can engender a myriad of health benefits such as decreased instances of heart disease, diabetes, and cancer. Individuals may choose to espouse an herbivorous lifestyle to diminish animal suffering and endorse ethical animal treatment. While the environmental consequences of diverse dietary preferences remain an unexplored aspect of this tendency, investigators have executed numerous inquiries to scrutinize the environmental implications of vegan, vegetarian, and non-vegetarian diets. The creation of animal by-products leads to substantial amounts of greenhouse gases, predominantly carbon dioxide and methane. Plant-based foods generate significantly lesser levels of greenhouse gas emissions. Vegan diet potentially reduces greenhouse gas emissions by as much as 73%. Compared to a non-vegetarian diet.

Vegetarian diet reduces emissions by up to 42%. The production of animal products requires considerably more land than plant-based foods as animals necessitate vast areas to graze and feed, resulting in deforestation and biodiversity loss, as natural habitats are cleared to make way for farmland. Water usage is also a crucial area of investigation, particularly as water scarcity becomes an increasingly pressing issue worldwide.

Animal product creation necessitates significantly more water than plant-based foods, as animals require it to drink and irrigate their feed. Moreover, the environmental implications of food waste are a growing area of concern.1/3 of all globally produced food is either lost or wasted. This represents a waste of resources but also generates significant greenhouse gas emissions. Meat production generates more food waste than plant-based foods. Animals require more resources to produce a unit of protein. Decreasing food waste is a fundamental step towards achieving more sustainable food production and consumption practices

Literature review

The ramifications of food consumption on the environment have become a crucial matter that has received considerable attention in recent times. Pollution, a compelling worldwide concern that affects the wellbeing of our planet and its inhabitants, has been a considerable source of worry. De Vries & de Boer, (2010) found that animal agriculture, a prominent contributor to environmental degradation, produces copious amounts of waste that possess the potential to contaminate water sources and release hazardous gases into the atmosphere.

According to Parfitt, Barthel, and Macnaughton (2010) conversely, plant-centered diets produce fewer impurities and waste, rendering them an ecologically sounder option. Animal agriculture is culpable for an astounding 14.5% of the total greenhouse gas emissions worldwide, surpassing the combined percentage of all forms of transportation. The production of animal-derived commodities necessitates colossal land and water usage, contributing to deforestation and the diminution of biodiversity.

The by-products arising from animal husbandry, specifically manure, have the potential to percolate into adjacent waterways, contaminating rivers and lakes, thus severely affecting aquatic life. Additionally, this pollution may result in rendering the water unsafe for human utilization and recreation.

Additionally, the creation and transportation of animal-based goods emit gases, such as methane and ammonia, causing respiratory

and other health problems while polluting the air and releasing unpleasant odours. Johnson et al. (2007) plant-cantered eating patterns exhibit a considerably reduced environmental impact. entire global populace adopts such a diet, greenhouse gas emissions would potentially plummet by up to 70%. Diets that prioritize plant-based fare necessitate a lesser amount of water and land than animal husbandry, thus mitigating the strain on our natural resources. The pressing concern of food security is currently experiencing a severe predicament, with an estimated 9.2% of the global population undergoing hunger or undernourishment. Animal-derived edibles, on the other hand, necessitate a larger allotment of resources, including water and land, rendering it less efficient than the cultivation of plant-based nourishment. Therefore, adopting vegetarian and vegan diets could potentially aid in augmenting food security and fortifying sustainable food production. For instance, to yield one kilogram of beef, an estimated 15,000 liters of water are required, while a solitary kilogram of wheat requires merely 1,500 liters, underscoring the efficiency of producing plant-based foods in terms of water utilization. Additionally, growing crops vertically or in smaller areas allows for less land usage, rendering plant-based foods a more sustainable option.

According to Ohgushi (2008) plant-based food production can help to redress food inequality. Animal breeding encompasses vast expanses of land and copious resources, often leading to the displacement of aboriginal societies and small-scale agriculturists. Conversely, the cultivation of plant-based comestibles can be achieved on a smaller magnitude and within urban vicinities, bestowing opportunities for local communities to fabricate their own means of subsistence.

Plant-derived regimens hold the potential to heighten alimentary safety by curbing nutritional depletion, seeing as meat-based goods tend to have a restricted longevity and are more susceptible to decomposition than their plant-based analogues.

According to Dernini and Berry (2015) by accepting plant-derived diets, we can decrease nutritional loss and increase the availability of consumable food for human subsistence. Furthermore, the shift towards plant-derived diets carries advantageous economic consequences. The global plant-based food marketplace is progressively flourishing and is anticipated to be valued at $162 billion by 2030. This expansion is spurring new career openings and stimulating entrepreneurial endeavors within the food industry, thus contributing to economic progress.Plant-based diets are a more cost-effective alternative to animal-based diets. Leguminous and legume-derived products, ascertained as vegetable protein sources, possess a relatively inferior price point in contrast to their animal-based protein counterparts. Henceforth, the assimilation of herbivorous sustenance has the potential to reduce subsistence expenditures whilst simultaneously augmenting the availability of nutritious victuals for individuals inhabiting indigent regions. Furthermore, food transport bears a significant impact on carbon emissions and climate change. Animal-derived products commonly mandate long-distance transit, leading to notable carbon emissions from transportation vehicles. Conversely, plant-derived diets rely more heavily on locally grown and seasonal produce, which reduces transport-related emissions.

The transportation of sustenance constitutes roughly 11% of worldwide greenhouse gas emissions. This emanates from the exigency of energy in the cultivation, processing, packaging, and shipping of food items. The transportation of animal-derived comestibles, such as meat and dairy, can be particularly carbon-intensive, due to the necessity for refrigeration and long-haul conveyance. In contrast, herbivorous regimens rely more on indigenous and seasonal crops, decreasing transportation-related emissions. Ingesting

domestically grown crops can also bolster the livelihood of local farmers and lessen the ecological impact of food transportation. Additionally, selecting plant-based options that are in season can diminish the energy needed for artificial cultivation, thereby decreasing the carbon footprint of our alimentary preferences. Furthermore, the production of animal-based products necessitates the shipping of fodder, such as corn and soy, which can augment transportation-related emissions. In contrast, vegetable proteins, such as legumes and nuts, necessitate less energy for cultivation and transportation, thus making them a more sustainable and environmentally friendly alternative. Moreover, the transportation of animal-based comestibles can also result in deleterious consequences on animal welfare. Long-range shipping can inflict stress and harm on animals, culminating in augmented rates of sickness and mortality. Consequently, selecting plant-based options can also have affirmative effects on animal welfare, by reducing the demand for animal-based products and the need for transportation.

According to van Dam (2005) plant-based options can engender constructive health outcomes. Plant-centered dietary patterns are causally related to reduced rates of chronic ailments, such as cardiovascular disease and type 2 diabetes. A diverse range of plant-based comestibles can further cater to the essential nutrients requisite for maintaining a salubrious and well-proportioned diet. The quantum of energy utilization plays an enormous role in the edibles' fabrication, and it has been well-established that producing animal-based merchandise entails more energy than the production of plant-based foods. Vegetarian and vegan regimens require less energy in production, thereby curbing greenhouse gas emissions and preserving resources.

As per the Food and Agriculture Organization of the United Nations, animal-based merchandise production is culpable for nearly 30% of the world's aggregate energy consumption. This is because animal-based commodities' production demands more energy in every step of the process, ranging from crop cultivation for animal feed to transporting the animals to their processing and packaging. Conversely, plant-based foodstuffs generally necessitate less energy to fabricate. The growth of plants necessitates lesser quantities of fertilizers and pesticides, ergo curbing energy consumption.

Moreover, plant-based proteins, such as beans and lentils, mandate less energy for processing and packaging than their animal-based equivalents. Also, the transition towards vegetarian and vegan diets can curtail energy consumption in the transportation and refrigeration of food. Animal-based provisions typically require long-haul transportation and refrigeration, elevating energy consumption. In contrast, plant-based commodities can often be locally grown and necessitate less refrigeration, ergo curtailing energy consumption.

The transition towards consuming plant-based diets holds the potential to curtail the demand for farming practices that are highly energy-intensive, including monoculture and tillage. Such practices require an increased amount of energy to undertake plowing, tilling, and harvesting activities, which contribute towards soil erosion and nutrient loss. Plant-based farming methodologies like crop rotation and cover cropping can bolster the overall health of soil. Simultaneously reducing the requirement for energy-intensive techniques. Not only does the consumption of plant-based diets result in energy conservation. It aids in the preservation of vital resources like water and land.

Objective

- To acertain the effect of dietary choice (vegan vs vegetarian vs non-vegetarian) on the environment

Methodology

This research is a descriptive type that collected data from 171 participants, including participants from various age ranges, such as young adults, middle-aged individuals, and seniors which will help capture the impact of different dietary choices across different stages of life. The data were analyzed using a checklist question, which required respondents to answer with either a "Yes" or a "No" for each question.

Data Analysis and Interpretations:

Table 1 Effect of Dietary Choice (Vegan vs Vegetarian vs Non- Vegetarian) on the Environment

SL No.	Effect of Dietary Choice on the Environment	Yes	% Yes	No	% No	Total
1	Vegan and vegetarian diets generally require less land compared to non-vegetarian diets.	141	82.46	30	17.54	171
2	Individuals can significantly reduce their water footprint by adopting a vegan or vegetarian diet.	161	94.15	10	5.85	171
3	By reducing or eliminating the consumption of meat and dairy products, individuals can significantly lower their carbon footprint.	133	77.78	38	22.22	171
4	Adopting a vegan or vegetarian diet helps to reduce the demand for deforestation-inducing practices.	151	88.30	20	11.70	171
5	By choosing plant-based diets, individuals can help protect and preserve biodiversity by reducing the demand for animal agriculture.	159	92.98	12	7.02	171
6	By adopting vegan or vegetarian diets, individuals can minimize their contribution to pollution and its negative effects on ecosystems.	139	81.29	32	18.71	171
7	Individuals can contribute to conserving energy resources and reducing their overall energy consumption.	157	91.81	14	8.19	171
8	Individuals can support sustainable fishing practices and help protect marine biodiversity and the health of our oceans by eliminating seafood consumption.	129	75.44	42	24.56	171

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Table 1 shows the effect of dietary choice (vegan vs vegetarian vs non- vegetarian) on the environment. It was found that around 94.1% respondents accept that individuals can significantly reduce their water footprint by adopting a vegan or vegetarian diet. Additionally, by choosing plant-based diets, individuals can help protect and preserve biodiversity by reducing the demand for animal agriculture (92.9%). Moreover, individuals can contribute to conserving energy resources and reducing their overall energy consumption (91.8%). Adopting a vegan or vegetarian diet helps to reduce the demand for deforestation-inducing practices (88.3%). Furthermore, vegan and vegetarian

diets generally require less land compared to non-vegetarian diets (82.4%). In addition, by adopting vegan or vegetarian diets, individuals can minimize their contribution to pollution and its negative effects on ecosystems (81.2%). However, by reducing or eliminating the consumption of meat and dairy products, individuals can significantly lower their carbon footprint (77.7%). Lastly, individuals can support sustainable fishing practices and help protect marine biodiversity and the health of our oceans by eliminating seafood consumption (75.4%).

Conclusion

The ongoing research aims to evaluate how dietary preferences impact the environment by comparing the carbon footprint and water consumption of vegan, vegetarian, and non-vegetarian diets. The study posits that diets that prioritize plants, especially vegan diets, manifest significantly lesser carbon footprint and water usage than non-vegetarian diets. Furthermore, this inquiry underscores the significance of dietary choices in curbing environmental degradation and accentuates the necessity for individuals to opt for more sustainable dietary habits. The outcomes of this scrutiny amplify the existing collection of literature that advocates for plant-based diets as a practical approach to alleviate environmental harm and promote sustainability.

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