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## Sustainability: The Future is Plant-Based

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### Sustainability: The Future is Plant-Based

#### ABSTRACT

“The Earth is what we all have in common.”

-Wendell Berry

The state of the declining environment and the rapid climate change occurring has caused unease in the conversation of long-term human sustainability. There has recently been growing interest in the possibility of the vegan diet having a positive impact on resource sustainability. The research in this area has been a widely developing topic in the past twenty years and the evidence of the vegan diet slowing down resource waste and pollution has led to hope that the climate change can be slowed. The methods of the following research were based on qualitative data. The cumulated research used has been presented to support the ideology of Aldo Leopold’s “The Land Ethic” theory as it was presented in *A Sand County Almanac* in 1949. The findings of the present research are as follows; finding number 1: a diet omitting animal products is likely to aid in reducing food shortage. Finding number 2: a diet omitting animal products is expected to help reduce land degradation. Finding number 3: a plant-based diet not including consumption of eggs is highly likely to reduce noxious gas emissions and fresh water waste. Future research towards correlation between plant-based vegan diets and resource sustainability should be placed on a few primary areas. The first area of focus is implementing education about the vegan diet into school systems as a part of the health education already in place. Another area of focus

should be dedicated to eliminating agricultural subsidies which make plant-based options more costly for both farmers and consumers.

## INTRODUCTION

Wendell Berry, prolific author, farmer, environmental activist, novelist and poet stated “The care of the Earth is our most ancient and most worthy, and after all our most pleasing responsibility. To cherish what remains of it and to foster its renewal is our only hope,” (Peters 64). Furthermore, in 1997 he stated “whether we and our politicians know it or not, nature is party to all our deals and decisions, and she has more votes, a longer memory, and a sterner sense of justice than we do,” (Little 4). I had an alarming interaction with a coworker recently when discussing the state of our declining climate. After our discussion, I offered that individual change can be the best bet in slowing the changes occurring in our climate and concluded that this is why I adopted a vegan diet many years earlier. To my surprise, my statement was met with a look of confusion as I realized that consumption and climate change were far from related in my coworker’s eyes. There is a disconnect present in our current society between what passes their lips and the effect of these substances on the Earth that shelters us. Whether the common American is conscious of it, the current state of typical agricultural farming and consumption practices in America may be having a dismal effect on the sustainability of our present and future generations. Growing concern has brought many recent academic and scientific entities to a possible solution to slowing the resource waste and promoting sustainability in coming years: Americans may need to ditch the animal products and adopt a plant-based, vegan diet to aid resource conservation.

The findings of the present research are as follows; finding number 1: a diet omitting animal products is likely to aid in reducing food shortage. Finding number 2: a diet omitting

animal products is expected to help reduce land degradation. Finding number 3: a plant-based diet not including consumption of eggs is highly likely to reduce noxious gas emissions and fresh water waste. Finding number 4: a diet omitting consumption of meat is exceedingly likely to reduce fresh water waste. Finding number 5: a diet omitting meat and dairy is likely to greatly reduce greenhouse gas emissions.

If the American people care to continue their residence on this Earth, it is their duty to connect the line between what we consume and the consequences of that consumption. We can no longer afford the same happy ignorance that our consumption practices have no effects on the environment we live in. This is about us, our sisters, brothers, mothers, children, grandchildren, and ensuring a habitable future for us all.

## LITERATURE REVIEW

The state of the declining environment and the rapid climate change occurring has caused unease in the conversation of long-term human sustainability. There has recently been growing interest in the possibility of the vegan diet having a positive impact on resource sustainability. The research in this area has been a widely developing topic in the past twenty years and the evidence of the vegan diet slowing down resource waste and pollution has led to hope that the climate change can be slowed. However, most of the studies have focused more on quantitative data and less on a qualitative conversation accessible to the common man. The goal of this thesis is to bring light to that significant quantitative data while also making the information a more accessible topic to the average reader.

I have analyzed the main research used in this thesis in two categories. First I will discuss the research which has an emphasis on the comparison of natural resource waste in a plant-based vegan diet versus resource waste in a diet containing animal products including meat, dairy, and

eggs. The second category I analyzed the research I am utilizing by is the topic of pollution and ecosystem sustainability in the production of plant-based foods versus pollution of meat, dairy, and egg production.

In the first category of natural resource waste, there are two studies in which researchers have provided relevant data to this thesis. The first is “Water Resources: Agriculture, The Environment, and Society” published by the American Institute of Biological Sciences in 2008 and cited over 300 times since. This cumulative study shows the water use needed in meat production versus water usage in plant production and their conclusions show significant evidence in the fact that plant production uses significantly less water than meat production and provides greater quantities of product. The second study I have referenced is a research study done by Brian Henning published by the Indiana University Press in 2011, sponsored by the Rotman Institute of Philosophy, and downloaded 90 times since. His study, “Standing in Livestock’s Long Shadow: The Ethics of Eating Meat on a Small Planet” focuses on water waste, land destruction in agriculture production, and grain waste used in animal production which could otherwise be used to feed people. This is relevant to show the greater sustainability in a plant-based diet versus a diet including animal products. Third is a study done by David Pimentel, a scientist who has been studying resource waste involved in animal agriculture since the late 1990’s. The study, “Sustainability of Meat-Based and Plant-Based Diets and the Environment” published in 2003 highlights the waste of food, water, and grain in animal agriculture.

In the second category of pollution and greenhouse gas emissions, there are four studies which have proved extremely helpful. The first, “Environmental Impacts and Sustainability of Egg Production Systems” is a study first presented in 2010 by the Poultry Science Association in

Denver, Colorado and cited 65 times since. This study highlights the emissions of harmful gases in egg production and negative impact on ecosystem health from egg production systems. The second is “The Effects of a Vegan Diet on Human Health, the Environment, and Animal Welfare as Compared to a Traditional Omnivorous Diet,” a study done by Doctor Joe Abraham in 2009 published by Louisiana State University. This study focuses heavily on emissions of harmful gases produces in animal agriculture. The third resource is an article: “Pollution from Giant Livestock Farms Threatens Public Health” by the National Resource Defense Council and published in 2001 by the Institute for Agriculture and Trade Policy. This resource shows the contribution of animal waste to pollution in agricultural settings and is an important representation of the Government’s voice in this matter. My final main resource of reference is a study done by the European Journal of Clinical Nutrition in 2006: “Evaluating the Environmental Impact of Various Dietary Patterns Combined with Different Food Production Systems.” This study highlights the environmental impact human consumption has in plant-based diets versus meat-based diets and has been cited over 230 times since it was published.

The overall focus of this thesis is to take the critical research of those who have laid the groundwork for the pivotal research, which has already proved successful in providing evidence of a plant-based vegan diet being the best for resource sustainability, and to combine this evidence into an accessible approach for the average reader to access this analysis.

## METHODS

The methods of the following research were based on qualitative data. In order to achieve this, I have referenced several sources of critical quantitative data which was important to the findings of this thesis. There are two terms I have used heavily in my findings; the first term,

veganism, as defined by the first official Vegan Society in 1944 and refined by the Articles of Association in 1979 when sanctioning the society, is...

“a philosophy and way of living which seeks to exclude – as far as is possible and practicable – all forms of exploitation of, and cruelty to, animals for food, clothing or any other purpose; and by extension, promotes the development and use of animal-free alternatives for the benefit of humans, animals, and the environment. In dietary terms it denotes the practice of dispensing with all products derived wholly or partly from animals.” (Watson).

This research has focused primarily on the dietary aspects of veganism. The second term, sustainability, as defined by the United Nations World Commission on Environment and Development, is “development that meets the needs of the present without compromising the ability of future generations to meet their own needs,” (“Sustainable Development”). These terms and the cumulated research used have been presented to support the ideology of Aldo Leopold’s “The Land Ethic” theory as it was presented in *A Sand County Almanac* in 1949. In short, this theory is “a moral code of conduct that grows out of these interconnected caring relationships” between people and care of the Earth we live on (“The Land Ethic”).

## FINDINGS

The findings of the present research are as follows; finding number 1: a diet omitting animal products is likely to aid in reducing food shortage. Finding number 2: a diet omitting animal products is expected to help reduce land degradation. Finding number 3: a plant-based diet not including consumption of eggs is highly likely to reduce noxious gas emissions and fresh water waste. Finding number 4: a diet omitting consumption of meat is exceedingly likely to reduce fresh water waste. Finding number 5: a diet omitting meat and dairy is likely to greatly reduce greenhouse gas emissions.

The first finding I will explore is the potential affects the vegan diet may have on food and grain sustainability. David Pimentel, a scientist of Cornell University who has dedicated his life to studying different diets and their impacts on the environment, finds that the United States livestock population consumes more than 7 times as much grain as the entire American population. If this grain were redirected to feeding Americans a plant-based diet, it is expected to be sufficient to feed at least 840 million people (Pimentel and Pimentel). This more than doubles the entire population of the United States Currently (“United States Population”). It is true that these animals would still need to graze for food under natural circumstances if removed from agricultural farming practices in America. However, the standard farming practice in America has created an imbalance of more livestock than people (2016), which is unnatural due to forced high-birthing rates in agricultural animal raising (“Livestock and Poultry: World Markets and Trade”). This problem would likely be corrected naturally over time with the reintegration of these farm animals into natural grazing patterns. If I had the resources, I would further investigate this matter. The World Health Organization reports that over 3 billion people worldwide are malnourished (Pimental and Pimental). Food shortage solution is a problem that Americans should care about.

Having discussed the first finding on food and grain sustainability, I will now move on to the second finding. The scientists of the Livestock, Environment, and Development Initiative supported by the World Bank reports that standard agricultural livestock raising practices are the chief environmental pollutant in regards to land use. Brian Henning of Indiana University (2011) concludes that “in the United States, nearly all (90%) of crop land is being depleted thirteen times faster than the natural replacement rate of one ton per hectare per year (Pimentel and Pimentel 2003, 662s). Overall, in the United States, livestock are responsible for an estimated 55



percent of soil erosion (Steinfeld et al 2006, 273). In some parts of the world the conversion of forest and grasslands to pasture or feed crops is depleting the land causing desertification,” (Henning 11). This is largely due to overgrazing and the overpopulated nature of these farming practices which are standard in America. If Americans converted to a plant-based diet, this would likely erase the need for the existence of such farming practices aiding in a reduction of land degradation. It is accurate that this land would likely need to be repurposed which could create possible economic complications, yet the focus of this study is primarily on present and future generations and not fixing past damage. With these alarming rates of deforestation and land destruction present largely due to standard American dietary practices, Americans should care about ethically adapting their diet to aid future land sustainability.

Having explained the possible positive impact on land sustainability, I will now explore the possible affect the omission of eggs could have on resource sustainability. The findings of an intricate study of egg production systems done by the Poultry Science Association (2010) shows that standard egg production systems have high greenhouse gas emissions such as carbon, nitrogen, phosphorus, etc., as well as high manure run off into surrounding fresh water (Xin et al.). If Americans eliminated consumption of eggs from their diets, the need for the current standard egg production systems would be virtually eliminated. This is highly possible to have a great impact on the reduction of emission of these noxious gases and manure runoff from grazing fields for hens. It is true that not all egg production systems use the practices of standard agricultural businesses in America, but the focus of this study is on mass market agriculture production and their effects on the environment. Sustainable practices should focus on mass production systems since they have the largest impact on the largest number of people.

Subsequently, I will report on the possible positive impact the plant-based vegan diet may have on fresh water sustainability. David Pimentel and the American Institute of Biological Sciences (1997) find that “agricultural production consumes more fresh water than any other human activity,” (Pimentel and Houser 4). Furthermore, “Producing 1 kg of animal protein requires about 100 times more water than producing 1 kg of grain protein,” (5). If Americans relied on plant based products for nutrition, the possible water conservation is immense due to lack of agricultural direction of this fresh water to raising animal protein for consumption. The potential conservation of fresh water resources in opting for a plant-based diet in place of the standard American diet including animal products is too great to ethically ignore. This study acknowledges that many conservation studies are being done to create conservation of fresh water in areas outside of dietary practices, but the greatest fresh-water use of Americans still proves to come from our dietary demands. The American Institute for Biological Sciences reports in their in-depth water resource assessment, “new water supplies likely will result from conservation, recycling, reuse, and improved water use efficiency rather than from large development projects,” (Pimentel and Houser 1). The United Nations Food and Agriculture Organization states that an estimated 64% of the world population will be in a state of living in “water-stressed” areas by 2025 (Henning 9), meaning the majority of the world would live in a state of water scarcity. This is a current and prevalent sustainability issue that Americans should care about.

Finally, having discussed the findings on fresh water sustainability, I will review the research on the possible reductions of noxious gas emissions. The fifth and final finding showed that the elimination of meat and dairy from the American diet would likely greatly reduce greenhouse gas emissions. Brian Henning livestock study published by the Indiana University

Press (2011) finds that the greenhouse gas emissions from livestock surpasses power generation emissions and transportation emissions. This is largely due to carbon dioxide emissions from deforestation intended to create agricultural land for animal grazing and feed crop, as well as the larger emissions of methane (heat trapping gas) emitted in meat production (12). If Americans opted for a plant-based diet, this would likely greatly reduce the need for these agricultural systems and therefore reduce their contribution to greenhouse gas emissions. This study acknowledges that local and non-industrial farming practices of raising animal protein may have fewer emissions. Again, the focus of this study is on mass farming practices affecting the largest number of people due to the emphasis on sustainability. The alarming fact, as Henning states in his study, is that “the food we eat contributes more to global climate change than what we drive or the energy we use,” (12). Thus the greatest impact on reducing greenhouse gas emissions has the prospective potential to come from dietary changes.

## DISCUSSION

The findings of the present research show a general consensus among various scientific and academic entities that a plant-based vegan diet would likely have a highly positive impact on resource sustainability in the future. While many Americans are discovering and adopting a vegan diet with the help of reports such as those referenced in my findings as well as documentaries like “Forks Over Knives,” (2011), “Food, Inc.” (2008), and “Food Matters” (2008), there are still gaps in the present research which deter early education to knowledge about the vegan diet, as well as gaps which hinder accessibility in adoption of the vegan diet.

Future research towards correlation between plant-based vegan diets and resource sustainability should be placed on a few primary areas. The first area of focus is implementing education about the vegan diet into school systems as a part of the health education already in

place. Another area of focus should be dedicated to eliminating agricultural subsidies which make plant-based options more costly for both farmers and consumers. Furthermore, future research should be dedicated towards government agency promotion of dietary shifts to aid the slowing of climate change. These initiatives would aid accessibility for the American populous in both areas of education about the vegan diet, as well as feasibility towards adoption of the vegan diet.

Though the focus of this study has been on mass market production and distribution of food, it is worth noting that local farming further correlates in reducing pollution and resource waste (Berry). Another future focus should be placed on implementing urban plant-based farming techniques in metropolitan environments to allow for local production of vegan foods. Some studies have argued that animal consumption should just be limited to local farming techniques in order to aid resource sustainability. Though this is true that local farming techniques of animal agriculture would reduce waste in comparison to factory farming techniques, it is also true that elimination of consumption of animal products would be an even greater reduction (Stanescu, Vasile). Even locally farmed animals have grazing techniques and feeding habits which degrade resources, no matter how pleasant and spacious the field they roam is.

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