On December 14, 2015 an article titled *Vegetarian and "Healthy" Diets Could Be More Harmful to the Environment* was published on the Carnegie Mellon University website.

The article quotes Paul Fischbeck, a professor of social and decisions sciences and engineering and public policy at the institute.

He was a co-author of a paper *Energy use, blue water footprint, and greenhouse gas emissions for current food consumption patterns and dietary recommendations in the US*.[1]

Professor Fischbeck is quoted in the website article, stating "Eating lettuce is over three times worse in greenhouse gas emissions than eating bacon. Lots of common vegetables require more resources per calorie than you would think. Eggplant, celery and cucumbers look particularly bad when compared to pork or chicken."

The resources required for producing these food items were not published so the assumptions made in making those conclusions cannot be examined.

The three paper examined three scenarios.

1. *Reducing caloric intake levels to achieve 'normal' weight without shifting food mix.*This scenario decreases energy use, blue water footprint and green house gas emissions by around 9%. This finding is ignored in the popular press and is ignored in the article that appears on the university's website, despite the fact that Professor Fischbeck was interviewed for the article.

2. *Switching current food mix to USDA recommended food patterns, without reducing caloric intake.*Scenario 2 increases energy use by 43%, blue water footprint by 16% and greenhouse gas emissions by 11%. Note that the study is not comparing vegetarian or vegan diets. In this scenario, dietary pattern examined was the US guideline recommendations that include dairy, fish and seafood that has a very high environmental impact. The energy intake remains very high with the hypothetical participants consuming approximately 50% more energy than required to maintain a

> healthy weight.
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> 3. *Combines scenarios 1 and 2* by reducing caloric intake levels and shifting current food mix to USDA recommended food patterns, which support healthy weight. This scenario increases energy use by 38%, blue water footprint by 10% and greenhouse gas emissions by 6%. Scenario 3 also includes dairy, fish and seafood which is far removed from a vegetarian dietary pattern.

The conclusions of Paul Fischbeck are not justified based on the published article. The purpose of the paper was not to examine the impacts of vegetarian diets on the environment but to "measure the changes in energy use, blue water footprint, and greenhouse gas emissions associated with shifting from current US food consumption patterns to three dietary scenarios, which are based, in part, on the 2010 USDA Dietary Guidelines."

> The only valid conclusion from the published paper is that by simply eating an appropriate amount of food then the environmental impacts are reduced. Overeating is environmentally damaging.

At no point in the article is the impacts of lettuce, eggplant, celery, cucumbers, pork or chicken compared. The paper does not mention individual vegetables. Comparing the impacts of low-energy foods such as lettuce which make up only a small proportion of our diet to high-energy animal products that comprise of 70% of the US diet is meaningless.

In this setting, to properly assess the impact of vegan diets on the environment then animal-based products such as meat, dairy, eggs, fish and seafood should be replaced by a starch-based diet – a diet high in complex carbohydrates such as whole-grains, starchy vegetables, whole-grain breads and beans.

A 2018 French study, *Environmental Impacts of Plant-Based Diets: How Does Organic Food*

Consumption Contribute to Environmental Sustainability?,[2] reached different conclusions.

This study investigated the relationship between a pro-vegetarian diets and diet-related environmental impacts.

Food intake and organic food consumption ratios were obtained from 34,442 French adults using a food frequency questionnaire which included information on organic food consumption for each group. Three environmental indicators were used to assess diet-related environmental impacts: greenhouse gas emissions, total energy demand and land occupation.

Comparing the top 20% consumers of plant-based foods with the lowest 20%, the environmental impacts were significantly less.

- Green house gas emissions: 49% reduction
- Energy demand: 27% reduction
- Land occupation: 41% reduction

The conclusion of the paper stated, "Organic food consumption was also an important modulator of the relationship between pro-vegetarian dietary patterns and environmental impacts but only among participants with diets rich in plant-based products."

Footnotes

1. Tom, M. S. et al. (2016) Energy use, blue water footprint, and greenhouse gas emissions for current food consumption patterns and dietary recommendations in the US. Environment Systems and Decisions. 36 (1), 92–103.
2. Lacour, C. et al. (2018) Environmental Impacts of Plant-Based Diets: How Does Organic Food Consumption Contribute to Environmental Sustainability? *Frontiers in Nutrition*. 5 (2018), 8.