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Breaking Down Barriers to Sustainable Eating at the University of Dayton

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INTRODUCTION
Greenhouse gases drive climate change. The Western diet is the cause of 20-30% of greenhouse gas emissions in the United States (Beverland, 2014). Animal agriculture contributes 37% of methane and 65% of nitrous oxide emissions - very potent greenhouse gases (Conrad, 2012). Although meat is one of the main pressures on the environment, human demand for meat is increasing (Welin and Van der Weele, 2012). An intervention that encourages sustainable eating to decrease greenhouse gases is imperative to decrease our CO2e emissions.

The intervention should encourage reduced meat and traditional dairy intake and increased fruit, vegetable, and grain intake. The purpose of this research is to: 1) determine the greenhouse gas emissions of the foods served in Virginia West Kettering (VWK) dining hall 2) develop, implement, and evaluate the effectiveness of a sustainable eating education intervention.

METHODS

Carbon Calculations
- Collected purchasing data from UD dining halls
- Calculated greenhouse gas emissions from the transportation and production of purchased foods via Clean Metric’s Food Carbon Footprint Calculator
- Analyzed results by comparing the emissions of products and total attitude score (p-value = 0.046).

Meal Plan Comparison
- The plant-based diet emitted 4.6lbs of CO2e for a day.
- The lacto-ovo-vegetarian diet emitted 8.2lbs of CO2e for a day.
- The omnivore diet emitted 11.9lbs of CO2e for a day.
- Overall, the lacto-ovo-vegetarian diet could save about 1,350.5lbs of CO2e per year compared to the omnivore diet.
- The plant-based diet could save about 2,664.5lbs of CO2e per year compared to the omnivore diet.
- Equivalent to 3,000 miles of tailpipe emissions

RESULTS

Carbon Calculations
- In 6 months, foods purchased by 2 dining halls produced over 2,517,277lbs of CO2e emissions.
- The top ten products bought by these dining halls constituted 92.97% of these GHG emissions.
- Beef contributed the most GHG emissions per pound of product, while mushrooms contributed the least GHG emissions per pound of product (Figure 1).
- Hot Dogs contributed the most GHGs per pound of meal whereas the Cream of Asparagus Soup contributed the least.

Meal Plan Comparison
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- The omnivore diet emitted 11.9lbs of CO2e for a day.
- The plant-based diet could save about 2,664.5lbs of CO2e per year compared to the omnivore diet.

Sales trends
- No significant change in behavior, knowledge, or attitude during the study.
- 17 participants
- Significant positive correlation between sustainable eating knowledge score and fruit, vegetable, and grain intake (p-value = 0.16).
- Significant negative correlation between number of animal products and total attitude score (p-value = 0.046).

Post-intervention results
- 41 participants
- Significant positive correlation between sustainable eating knowledge score and fruit, vegetable, and grain intake (p-value = 0.16).
- Significant negative correlation between number of animal products and total attitude score (p-value = 0.046).

The Green Life
- 8 educational posters were developed about health and sustainability of plant-based foods (See Figures 2 and 3).
- The Green Life has served 3x the amount of meals anticipated by management.

CONCLUSIONS
- Generally, animal products have higher emissions, whereas plant-based products have lower emissions.
- The plant-based meal plan saves twice the amount of greenhouse gas emissions compared to a lacto-ovo-vegetarian meal plan.
- The pre-intervention sample showed a significant positive correlation between fruit and vegetable intake (sustainable foods) and sustainable eating knowledge score, and a significant negative correlation between animal product intake and attitude score.
- Post-intervention results show intervention had no significant impact on behavior change.
- The success of the Green Life demonstrates the need for environmental change and permanent, visible education about sustainable eating.
- Limitations include: the omission of packaging and cooking emissions in the carbon calculations, and the omission of extremely processed foods that the Clean Metrics Food Carbon Footprint Calculator could not calculate.
- Further study should include the study of interventions designed for students that do not have a meal plan and must purchase their own food.

REFERENCES

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