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 emission of the foods served in Virginia West Kettering (VWK) dining hall and 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 per pound of product

Meal Plan Comparison

- Calculated the greenhouse gas emissions of a nutritionally adequate plant-based, lacto-ovo-vegetarian, and omnivore diet

Education Intervention

- Ranking scales located at each dining station that ranks food by their emissions
- Educational table tents about general sustainability

Evaluation

- Evaluated with pre- and post-intervention questionnaires, face-to-face semi-structured interviews, and sales trends

The Green Life

- Development of 8 permanent educational posters that rotate weekly in front of a new plant-based dining station

RESULTS

Carbon Calculations

- In 6 months, foods purchased by 2 dining halls produced over 2,517,277lbs of CO_2e 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

- 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.
- 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

Pre-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).

Post-intervention results

- 17 participants
- No significant change in behavior, knowledge, or attitude

Sales trends

- No significant change in consumer food choices

Face-to-face interviews

- Report of increase in awareness, but no significant behavior change
- Students pointed to inadequate or inaccessible information and lack of convenience

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

Figure 1

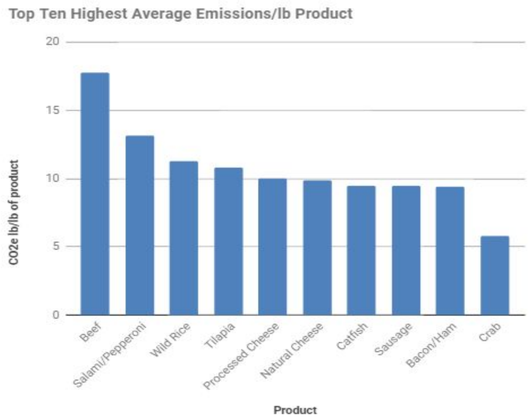


Figure 2

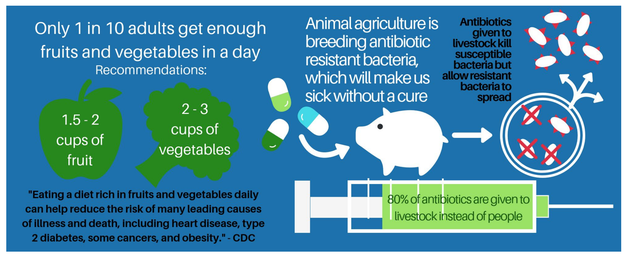
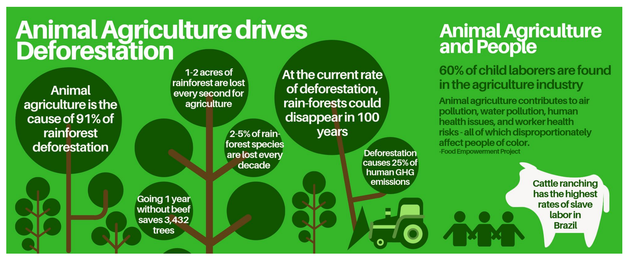


Figure 3



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.

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