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Katie Harner, Melanie Kieffer with Faculty Azzeddine Azzam

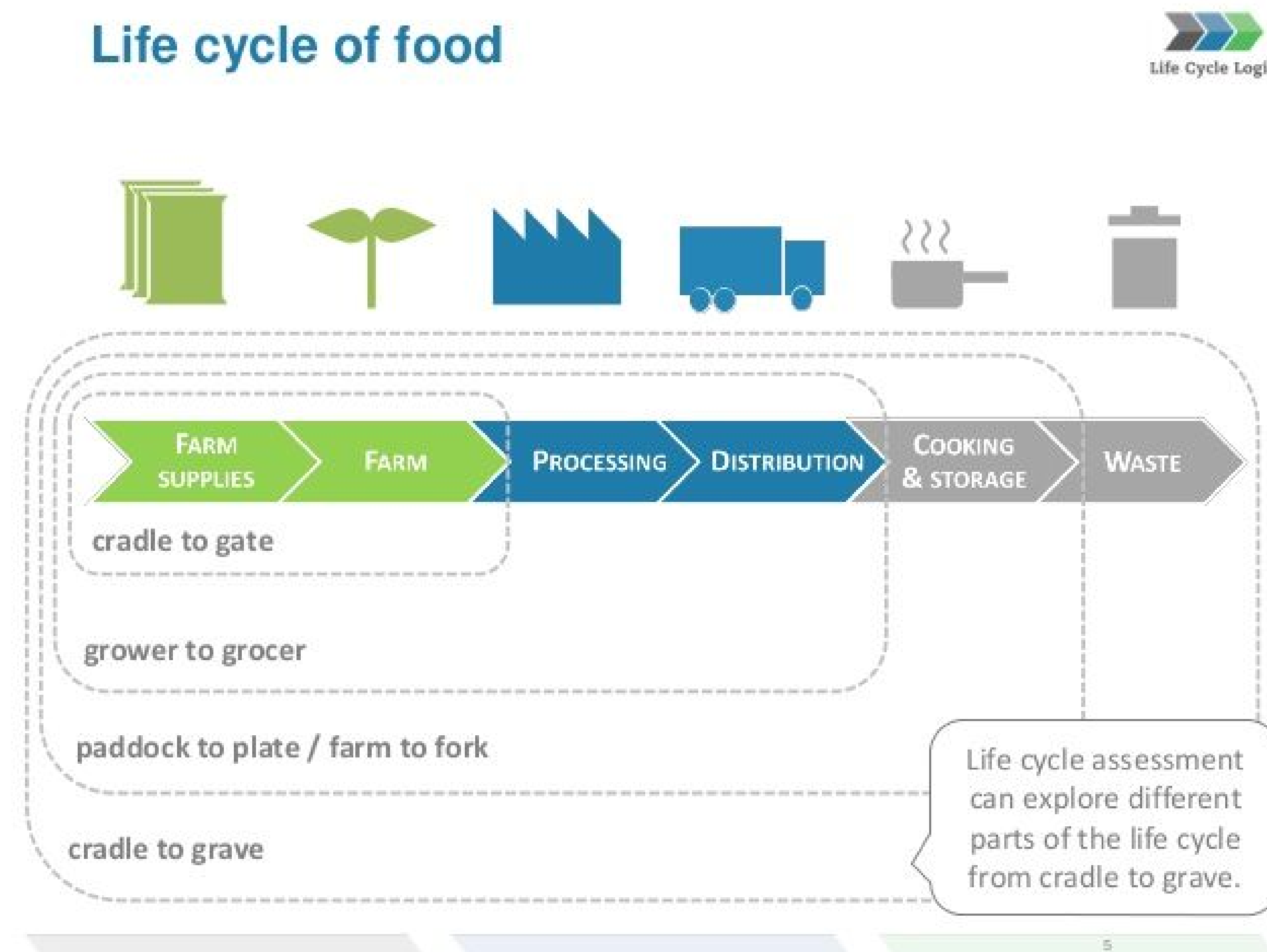
Background

Recognizing that the US food system is a significant contributor to fossil fuel combustion, accounting for about 15% of total energy use in the country, “local food” and “food miles” have become familiar terms in the public discussions surrounding the carbon footprints of alternative food systems. It would seem intuitive that the lesser the “food miles”, i.e., the lesser distance food travels, the smaller its carbon footprint and the more sustainable local food markets would be relative to conventional ones. However, the fossil energy that goes into transporting food from source to destination is only part of the total fossil energy used to grow process, distribute, consume, and dispose of the food waste. Hence, it is possible that a particular food that requires less fossil energy inputs in the growing stage may require more fossil energy inputs in the distribution stage, and vice versa. This renders the “food miles” unreliable when it is used as the sole criterion assessing the environmental performance of a local versus a conventional food system.

Methods

This study uses life-cycle analysis (LCA). In stage 1, the focus is on the fossil energy inputs used in the distribution and consumption of the fresh vegetables grown in Nebraska and sold in the local farmer’s market of the city of Lincoln. A series of surveys were given out at three local Lincoln Farmer’s Markets over the course of a month; the Haymarket, Old Cheney, and F Street locations. One survey collected a census of producers, zip code, distance traveled, type of vehicle driven from farm to market, assortment of vegetables sold, and vegetable prices. A separate survey for consumer collected distance traveled to the market, the type of vehicle driven, and zip code. After farmer’s markets ended for the season, data was organized. Data collection will continue into the spring as markets re-open.

Life-Cycle Analysis of Fresh Vegetables



Research Question

The research question this study will address is whether or not the produce grown elsewhere and imported to Nebraska to be sold in Lincoln grocery stores has a larger or smaller carbon footprint that similar produce grown in Nebraska and sold in Lincoln’s local food markets. This is a long-term study, and this academic year addresses the first stage in data collection in regards to local farmer’s markets; the following year will be dedicated to the comparative analysis of conventional supermarkets.

Picture Sources:
Moore, A. D. (2013, November 21). A life cycle assessment perspective of some foods (22 nov 2013 life c... Retrieved March 15, 2016, from <http://www.slideshare.net/AndrewDMoore/a-life-cycle-assessment-perspective-of-some-foods-22-nov-2013-life-cycle-logit>
Nebraska Map. (n.d.). Retrieved March 15, 2016, from <http://www.greenwichmeantime.com/time-zone/usa/nebraska/map/>

Results

Ranges from 5 to 179.5 for producer miles to market, with most values at the low end. The median is 28 miles. Average Frequency to market is one time a week for both producers and consumers. The top five vegetables producers were cucumbers, peppers, tomatoes, potatoes, and a tie between lettuce and green beans. The top five vegetables bought were lettuce, onion, peppers, sweet corn, and tomatoes. Due to incomplete data on surveys, the best and worst fuel efficiencies for makes and models were averaged. Among the 25 completed producer surveys, the average mile per gallon for city use was 15.12 MPG, while for highway use the average was 17.27 MPG. Of the consumer surveys, 56 had been completed to calculate the average of fuel efficiency: the average mile per gallon for city use was 22.77 MPG, while for highway use the average was 27.79 MPG. There were two consumers who had walked to market, one who had ridden a bike, and one who had carpooled with others.

Conclusion

Due to incomplete data on surveys administered during the fall farmer’s markets, the sample size of this project was smaller than previously anticipated. In continuation of this experiment, it would be critical to reevaluate the effectiveness of the surveys as well as proctoring tactics. Further analysis needs to be conducted over collected data before moving on to stage 2 of this long-term study; this phase focused on the distribution aspect of the LCA, however before moving on to conventional food systems it is imperative to contact the local producers who have signed up for our e-mail listing to gage the energy expenditure during the farming and processing stages of the life cycle. Stage 2 of this study will comprise of similar surveys, however, at this point they would be given in conventional food environments, i.e. supermarkets and grocery stores. This would make it possible to conduct a comparative analysis across different markets.