How a Life Cycle Assessment (LCA) Measures Up With Energy Flows For Our Food System

Figure 1. Life Cycle Assessment (Anctil and Fthenakis 2012).

Understanding methodologies in calculating the energy flows of food systems is an essential part of making systems more sustainable and efficient. Is a good tool to measure the environmental impacts of a food product the life cycle assessment? The first LCA studies in the 1960s researched the impacts of beverage containers like Coca-Cola (Pray et al. 2012).

Within our food system, an LCA analyzes the various stages of the food cycle to prevent a shift to other life cycle stages (Pray et al. 2012). For a candy bar, this could include the impacts of manufacturing it through the production chain, including sourcing of ingredients, fuel to extract material, transportation for ingredients and candy, as well as the resources used in the "cradle-to-grave" life cycle (Pray et al. 2012).

The LCA can potentially measure emissions, water, waste, and help minimize costs but there are many downsides of the LCA model (Pax 2013). A standard life cycle assessment (LCA) has three phases; goal

and scope, inventory analysis, and impact assessment (Pray et al. 2012). A fourth element could be life cycle interpretation (Reap et al. 2007). A survey was conducted on problems with the LCA model and it identified 15 problems concerning this scientific system (Reap et al. 2007). One of the six problems of utmost importance in using the LSA model is that the impact (phase 3) only takes the environment into consideration and not the economic and social impacts of the good that are being manufactured (Reap et al. 2007). Ingredients like corn syrup and synthetic chemicals that are used to flavor and color the candy impact nutrition, and the health of those who manufacture the candy, and unfortunately were not measured.

The functional unit for measuring food is unclear as caloric values, nutrition, and emotional value also play a role (Pray et al. 2012). Others argue that LCAs on food systems measure food systems differently like by mass or volume which makes it challenging to compare different food items (Pray et al. 2012).

We should create policies that provide solutions for methodologies that are more sustainable. In regards to sustainable development, the LCA model doesn’t necessarily promote sustainable decision making as sustainable production and consumption are lacking (Reap et al. 2007). These are a few reasons why we should question methodologies behind energy flows in our food systems so that we

can create a smaller footprint for our planet. After I conducted three LCA assessments on an organic vegetable and fruit farm, an organic dairy cow farm, and a goat meat farm, I came to the conclusion that each farm is unique and presents it's own challenges when analyzing data and computing formulas.

Multiple considerations must be taken into consideration when conducting an LCA. Which includes incorporating the availability and access to resources, waste management streams, value added value chains, regional location, marketing channels, the farming operation and management system, and energy measured as consumed by humans and machinery from a cradle-to-grave perspective. Ultimately a farmer, small business, non governmental organization (NGO), corporation, and so forth, must determine if the LCA will add value and improve a company's triple bottom line. Otherwise it can be extremely inefficient due to the lack of accurate data, thus taking an extensive amount of time to conduct an analysis, while it is extremely expensive to conduct a thorough assessment. Therefore conducting a SWOT analysis on a quarterly basis will allow you to measure your targeted areas of opportunity and weaknesses , perhaps in a more efficient manner so that your business enterprise can address alternative solutions for a more sustainable future head on.

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