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University of Minnesota
West Central News

Life Cycle Analysis & Agriculture

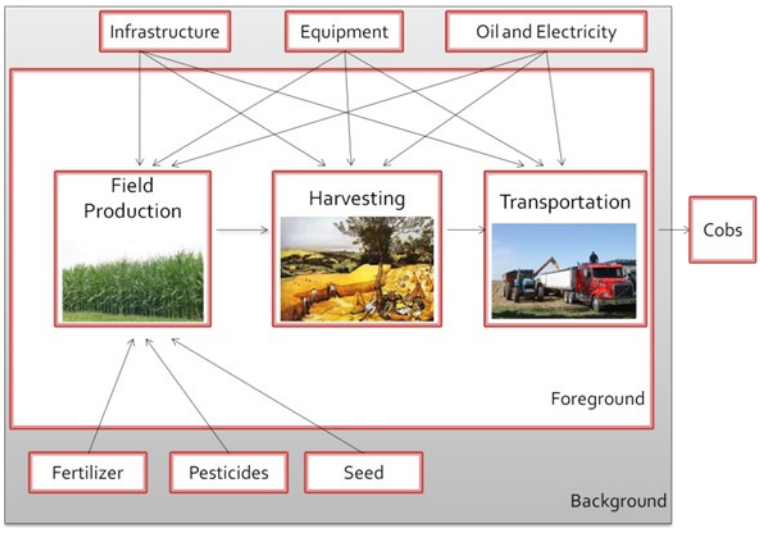
Joel Tallaksen, Biomass Gasification Project Coordinator

A common trend in many sectors of business is optimizing the sourcing of materials, the production of products, and the transfer of products to consumers. Optimization can be done to reduce the use of raw materials, labor, energy, or other inputs needed during operations of a business. A standard method of analyzing resource use in production systems is the life cycle analysis (LCA). In the past, LCA was primarily used to identify areas where money could be saved on raw material resources used during manufacturing. However, LCA is now being applied more for production energy and environmental impacts as energy prices have increased and concern has grown about carbon dioxide release.

Agricultural operations, much like manufacturing operations, use raw materials, labor, and energy in the production of grain and other products. Therefore, LCA techniques can be used to optimize inputs/outputs in the production of ag products. While the most notable agricultural production system analyzed using LCA methods has been ethanol production, LCA analysis can examine production in many different farming operations. Figure 1 illustrates the basic principle of LCA using an agricultural system. First, the operations needed to produce a product, in this case corn cobs, are identified. The next step is to identify all of the inputs needed for production. For grain production, this often includes energy, equipment, seed, infrastructure, and fertilizer. LCA analysis is designed to identify the amount of one input needed to produce a certain quantity of output. So in the corn cob example, the amount of fossil fuel energy needed to produce one ton of corn cobs is being analyzed. To complete the corn cob analysis, the amount of fossil energy for each input is calculated. For example it may take 1.5 gallons of crude oil per ton of cobs to make the pesticides needed for crop production. Similarly, fertilizer production may require a certain amount of natural gas to make the amount of nutrients needed for one ton of cobs. Once the amount of fossil fuel needed for each input is calculated, the sum of all the fossil fuels can be added up to determine the life-cycle fossil fuel use for one ton of corn cobs. This data can be used to compare how changing the farm operation or inputs might change the overall use of resources. In the corn cob example, we may see that changing to newer harvesting equipment might decrease energy use, thus saving money.

LCA methodology has a great potential to help agriculture by identifying areas were resources are being used unwisely or labor saving could be found. There are, however, concerns with the types of inputs included and how far to track resources back through some of the input pathways. This has been particularly controversial in ethanol production, where indirect factors have been included in some LCA work on ethanol production. Overall, LCA work is an important tool as large scale agriculture continues to optimize inputs. This optimization is likely to be important, as costs for fossil fuels and other inputs increase.

Figure 1. Lifecycle for Corn Cob Harvest (modified from Michael Hagen)



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A Brief History of USDA Food Guides

Connie Burns, Extension Educator, Health & Nutrition

*With the recent introduction of the new food icon for consumers, **MyPlate**, you might be interested n this brief history of USDA Food Guides*

1916 to 1930s: "Food for Young Children" and "How to Select Food"

- *Established guidance based on food groups and household measures.*

1940s: A Guide to Good Eating (Basic Seven)

- *Foundation diet for nutrient adequacy*
- *Included daily number of servings needed from each of seven food groups. The guide lacked specific serving sizes, and was considered very complex.*

1956 to 1970s: Food for Fitness, A Daily Food Guide (Basic Four)

- *Provided goals for nutrient adequacy. This guide did provide specified amounts from four food groups; it did not include guidance on appropriate fats, sugars, and calorie intake*

1984: Food Wheel: A Pattern for Daily Food Choices

- *Included goals for both nutrient adequacy and moderation. There were five food groups and amounts formed the basis for the Food Guide Pyramid*

1992: Food Guide Pyramid

- *Provided goals for both nutrient adequacy and moderation . The illustration focused on concepts of variety, moderation, and proportion*

2005: MyPyramid Food Guidance System

- *Introduced along with updating of Food Guide Pyramid food patterns for the 2005 Dietary Guidelines for Americans, including daily amounts of food at 12 calorie levels*
- *Continued "pyramid" concept, based on consumer research, but simplified illustration. Detailed information provided on website "MyPyramid.gov"*

2011: MyPlate

http://www.choosemyplate.gov/

- *Introduced along with updating of USDA food patterns for the 2010 Dietary Guidelines for Americans*
- *Different shape to help grab consumers' attention with a new visual cue*
- *Icon that serves as a reminder for healthy eating, not intended to provide specific messages*
- *Visual is linked to food and is a familiar mealtime symbol in consumers' minds, as identified through testing*

Resource: Center for Nutrition Policy and Promotion, June, 2011

AgCountry Auditorium

Aug. 22—CNE Monthly meeting

Seminar Room

Aug. 22—Greg Cuomo visit