

The Life Cycle Assessment for a Sustainable Georgia Food Hub

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Abstract

A food hub (USDA) is “a business or organization that is actively coordinating the aggregation, distribution and marketing of source-identified locally or regionally grown food products,” sourced from primarily small- to mid-sized producers to wholesalers, retailers, institutional buyers, or consumers at a central location. A food hub can also act as a central facility providing knowledge and technical support to its grower community. Georgia recognizes a dozen aggregation hubs that have a minimum of five farms (sources) plus one viable wholesale market.

Sustainability has three components – economic/profitability, societal well-being/quality of life, and environmental quality/enhancement. The challenges to developing a business case for sustainability are two-fold: forecasting and calculating benefits and costs for a hundred-year investment plan, and gauging the system-wide effects of sustainability investments in a life cycle assessment (LCA). A LCA is system-oriented because it attempts to integrate environmental requirements into each stage of the product development and marketing process so that total impacts caused by the entire system can be reduced. The LCA normally follows three distinct steps: an inventory analysis that identifies materials and energy resources and their flow patterns; an impact analysis of qualitative and quantitative assessments of the consequences to the environment; and an improvement analysis that contemplates actions that can be taken to improve upon current conditions.

The inventory analysis requires cooperation by all participants (farmers, markets, aggregation/distribution facility) to provide relevant, verifiable and quantifiable data on all processes, equipment, structures, labor, and land to quantify the carbon dioxide equivalent (CO₂e) contribution and sequestration (capture) to derive annual net carbon values (the impact assessment). The improvement analysis can be relevant and useful, especially if the net annual carbon is near carbon neutrality, as management strategy adjustments could be made without knowingly reducing product quality.

A price-based and an energy-based carbon footprint were derived for each facility using time-series and cross-sectional analysis for two Georgia food hubs (goat meat and purple hull peas food hubs). Carbon emission totals were calculated for each food hub by resource use and time

involved, and then converted into total CO₂e's for the aggregation and distribution facility, only. Farmer and marketer collaborators in each food hub were unwilling to complete the inventory questionnaire. The calculated net carbon footprints for the two food hubs were:

| Food Hub | Carbon Contribution | Carbon Sequestered | Net Carbon |
|-----------------|--------------------------------------|---------------------------|-------------------|
| | ----- MT CO ₂ e/year----- | | |
| Goat Meat | 2,173 | 157 | 2,016 |
| Hull Peas | 1,733 | 125 | 1,608 |