Developing Life Cycle Analysis of California's Beef Production System 2010 Sustainable Agriculture and Food Systems Competitive Grants Program

Principal Investigator

Name: Sheila Barry

Title: Livestock/ Natural Resources Farm Advisor

Organization/University: University of California Cooperative Extension- Santa Clara

1553 Berger Drive San Jose, CA 95112

Phone: 408 282 3106 Email: sbarry@ucanr.edu

Collaborators

Name & Affiliation	Email	<u>Telephone</u>
Dan Drake, UCCE farm advisor	djdrake@ucdavis.edu	(530) 842-2711
Frank Mitloehner, UCCE specialist	fmmitloehner@ucdavis.edu	(530) 752-3936
Jim Oltjen, UCCE specialist	jwoltjen@ucdavis.edu	(530) 752-5650
Justin Oldfield, Ca Cattlemen's Assoc.	justin@calcattlemen.org	(916) 444-0845
Mel George, UCCE specialist	mrgeorge@ucdavis.edu	(530) 752-1720
Darrel Sweet, Rancher, CA Beef Council	dksweet@calcattlemen.org	(925) 443-7692
Ermias Kebreab, UC Davis AES	ekebreab@ucdavis.edu	(530) 752-5907

Location of Project

Statewide

Commodity Addressed

Beef Production and associated by-products including ecosystem services

Total Funds Requested: \$8,635

Objectives

- 1. To inform the planning group about LCA methodology and standards, raise their level of understanding, and develop a broader, base level of knowledge.
 - a. Provide access to an online LCA course and 3 hrs of training for planning group members. (We did not find an appropriate online course to provide access to; however, we provided a more extensive training course (6 hours) for planning group members and added objective #3)
- 2. To develop a grant proposal to conduct LCA for beef production systems in California and extend LCA results and implications to producers and industry leaders.
 - a. Complete a research and extension proposal that will be submitted to potential funding sources including the USDA and the California Beef Council.

Additional Objective

- 3. To describe the resources available for beef production in each region of California and the resulting production in order to help consumers and decision makers understand beef production and its connection with regional food production systems and to work towards the development of LCA for California's beef production.
 - a. Develop an ANR publication on California's beef production system with emphasis on efficiencies of the system based on available resources and other benefits i.e. ecosystem services.

Summary

This planning grant brought together UC Cooperative Extension advisors and specialist, AES faculty and industry leaders who work with beef producers to learn about Life Cycle Analysis (LCA) methodology and develop a research agenda and proposal to conduct LCA for beef production systems in California. LCA is an ISO-standardized biophysical accounting framework used to assess the resource use and emissions of a product life-cycle. LCA of beef production has been reported for some foreign countries and for production systems in the Midwest. To-date LCA has not been conducted for beef production systems in California. LCA would provide beef producers, researchers and beef marketers with information about the environmental performance of beef production systems in California. This information will be critical to addressing and prioritizing future research and production changes to produce and market more sustainable beef and beef by-products.

The research agenda developed by the planning group identified the need for regional information on California's beef production systems as a crucial first step. With input from the planning group a survey template was created to collect regional information of beef production resources (inputs and outputs). The survey template is being used to develop regional narrative description of beef production throughout the state. A data set which includes cattle numbers and forage resources by county was developed. Draft narratives are being created for the state, divided into 12 regions. The California Beef Council has provided funding (\$7000) to finalize the narratives and create a publication.

Specific Results

Objective 1. To inform the planning group about LCA methodology and standards, raise their level of understanding, and develop a broader, base level of knowledge.

a. Provide access to an online LCA course and 3 hrs of training for planning group members.

Results. A day-long training and discussion of LCA was held at UC Davis on July 20, (22 participants included industry leaders, UCCE advisors and specialists and AES faculty.) Training was provided by Dr. Alissa Kendall, UC Davis Department of Engineering. Participants indentified next steps and potential funding sources.

Objective 2. To develop a grant proposal to conduct LCA for beef production systems in California and extend LCA results and implications to producers and industry leaders.

b. Complete a research and extension proposal that will be submitted to potential funding sources including the USDA and the California Beef Council.

Results. Objective 3, describing California's beef production systems was identified as a crucial next step in the research agenda for LCA on beef production. A funding request was submitted and funded by the California Beef Council for \$7000 to develop a publication on the state's beef production system.

Additional Objective 3. To describe the resources available for beef production in each region of California and the resulting production to help consumers and decision makers understand beef production and its connection with regional food production systems and to work towards the development of LCA for California's beef production.

b. Develop an ANR publication on California's beef production system with emphasis on efficiencies of the system based on available resources and other benefits i.e. ecosystem services.

Results. Data is being collected to develop a publication. A data base of cattle numbers and forage resources by county for a three-year period was created from annual crop reports and Cal-Fire Forest and Rangeland Assessment Program. A survey template was created, with extensive input from the planning group, to develop regional narrative descriptions of input and outputs in the beef production system. To-date, 4 of 12 narratives have been drafted. Funding from the California Beef Council should provide for a completed publication.

Potential Benefits/Impacts on Agriculture and/or Food Systems

Although beef cattle production worldwide is increasingly being scrutinized for its environmental impact, beef producers in California have for decades demonstrated their interest in environmental stewardship. California's beef cattle industry represents the greatest agricultural land use in the state. Cattle graze roughly 40% of California's landscapes. Beef cow-calf herds grazing natural landscapes in California often provide environmental benefit in terms of fire fuel and habitat management, including habitat for many threatened and endangered species. Alternative management tools like mowing, prescribed fire and disking have environmental costs which need to be realized when considering the environmental impacts of beef production in California.

The beef industry is also integral to the largest agricultural industry in the state, dairy production. A significant percent of beef produced in California originates on a California dairy. Although there are undoubtedly environmental impacts for all beef production systems in California, its production also includes some environmental benefits. For example, cow maintenance to produce a calf has been shown to represent the greatest contribution to resource use and emissions in beef production in Iowa (Pelletier et al. 2010); however, many calves finished for beef in California are a by-product of the dairy industry with cow maintenance costs associated with milk production.

To date, there has not been a comprehensive look at the environmental performance (energy use, ecological footprint, greenhouse gas emissions and eutrophying emissions) of beef production systems in California. Life Cycle Analysis (LCA) has been conducted to evaluate green house gas emissions for beef production systems in Sweden (Cederber and Darelius, 2000), Ireland and the UK (Casey and Holden 2006a,b) and in Japan (Ogino et al., 2004, 2007). In the US, the only full LCA of beef production compared beef production strategies in Iowa (Pelletier et al. 2010). The results of these LCAs are generally not relevant to California because our production systems utilize different resources and in many cases have purposes beyond production. LCA of California's beef production systems will not only provide a comprehensive assessment but the results could also help beef producers identify environmental performance "hot spots." Results would also contribute to the LCA research for beef production systems worldwide.

The first step to developing an effective LCA is a clear description of the production system. For California's beef production system this means describing the forage and feed resources as well as the ecosystems services that dictate the scope and type of production in different geographical areas of the state. This description will be invaluable in educating consumers and decision makers about the beef productions connects to regional food production systems and conservation of much of California's natural landscape which is dominated by rangeland. As a result of this planning grant the development of a comprehensive description of California's beef production system is well underway.

Dissemination of Findings

This planning grant generated the following products:

- 1. LCA reference materials. The materials were provided to the planning group participants and included some examples of LCA research papers and report by the Environmental Working Group comparing the environmental impacts of 20 different food products.
- 2. Survey template for describing beef production systems in California. This survey template is being used to develop narrative descriptions for 12 regions of the state. UCCE livestock farm advisor and other local industry experts are being interviewed to develop the narratives.
- 3. Data set (cattle numbers and forage resources by county). This data set will be used with the narratives to develop an ANR publication on California's Beef Production Systems.

We intend to develop an ANR publication on California's beef production systems. This publication will set the parameters for LCA of the industry and will also provide crucial information to help consumers and decision makers have a better understanding of the industry. We also intend to develop a fact sheet or brochure from the publication that can be distributed by industry and conservation partners including the California Beef Council, California Rangeland Trust, California Cattlemen's Association, and the California Rangeland Conservation Coalition.

Literature Cited

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