

SECTION I : Cover Page, Project Summary & Funding Request

2010 Sustainable Agriculture and Food Systems Competitive Grants Program

Project Title: Developing Life Cycle Analysis of California's beef production system

Proposal Category:

- Planning Grant Education and Outreach Grant
 Research Grant Graduate Student Research Grant – Food & Society

Priority Area:

- Agriculture, Resources and the Environment (ARE)
 Food and Society (F&S)
 Social Learning in Agriculture and Food Systems (SL)

Topic(s) Addressed in Proposal:

- Climate Change (ARE)
 Nutrients and Water in Agricultural Landscapes (ARE)
 Harnessing Ecosystem Services (ARE)
 Closing the Loop: Sustainable Waste Management in Agriculture (ARE)
 Building Regional Markets (F&S)
 Community Food Security (F&S)
 Food System Assessments/Policy (F&S)
 Farmworker and Rural Community Wellbeing (F&S)
 Social Learning in Agriculture and Food Systems (SL)

Principal Investigator (main contact)

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Collaborators:

Identify by "" each collaborator from a county-based UC Cooperative Extension office or a community-based stakeholder group. All proposals must include at least one collaborator identified as such.*

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Project Summary -150 words or less

This planning grant would bring together UC Cooperative Extension advisors and specialist, AES faculty and industry leaders who work with beef producers to develop a research proposal to conduct Life Cycle Analysis (LCA) for beef production systems in California. Planning grant participants would be provided with LCA training and expert assistance in formulating their research proposal. 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 would also be critical to addressing and prioritizing future research and production changes to produce and market more sustainable beef and beef by-products.

Total funds requested from SAREP: \$ 8635

Section II. Project Narrative

A. Relevance to Priority Areas/Topics

This planning grant proposal is submitted under the priority area: Agriculture, Resource and the Environment and the priority topic: Climate Change- Energy and Climate Footprinting. It would bring together UC Cooperative Extension (UCCE) advisors and specialist, AES faculty, and industry leaders working with California's beef producers to develop a grant proposal to conduct Life Cycle Analysis (LCA) for California's beef production systems. 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. LCA has been conducted to evaluate green house gas emissions for beef production systems in Sweden (Cederber and Darelus, 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 germane to California because our production systems utilize different resources and in many cases have purposes beyond production. LCA of California's beef production systems would not only provide a comprehensive assessment but the results could also help beef producers identify environmental performance "hot spots." Results of this research would also contribute to the LCA research for beef production systems.

California's beef cattle industry represents the greatest agricultural land use in the state. Cattle graze roughly 40% of California's landscapes. The 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. In addition, beef cow-calf herds grazing natural landscapes in California often provide environmental benefit in terms of fire fuel and habitat management. Alternative management tools like mowing and disking have environmental costs which can be credited to beef production in a LCA. Through this proposal UCCE advisors, specialist, AES faculty and industry leaders can work together to identify relevant research data and gaps on the environmental cost and benefit of California's beef production that will be needed to draft a strong research proposal to conduct LCAs.

LCAs of California's beef production systems would provide producers information to produce and market more sustainable beef and beef by-products. It could also help consumers understand the environmental impacts and benefits of beef production in California. As other industries adopt LCA and incorporate them into marketing, consumer demand for the same data for beef will increase. It is important that LCA results reflect differences in production systems.

B. Relevance to Target Audience

This proposal would create a California beef LCA planning group made up of UCCE advisors, specialist and beef industry leaders to learn about LCA and develop a research proposal to conduct LCAs for California’s beef production systems. UCCE livestock advisors and specialist through their work with beef cattle producers throughout California have a thorough understanding of beef production systems used in California..

Although beef cattle production worldwide is increasingly being scrutinized for its environmental impact, beef producers in California have demonstrated their interest in environmental stewardship for decades. Results from LCA of beef production systems in California would help producers recognize environmental “hot spots” and opportunities. LCA could potentially be a decision-making tool to promote environmental sustainability in California’s beef industry.

C. Goals and 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. Objective: Provide access to an online LCA course and 3 hrs of training for planning group members.
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. Objective: Complete a research and extension proposal that will be submitted to potential funding sources including the USDA and the California Beef Council.

D. Methods/Activities/Timetable

	Task
April – May 2011	Confirm planning group members including LCA trainer.
April- August 2011	LCA on-line training to be completed and reference material provided by trainer to be reviewed by the planning group.
August- October 2011	Hold planning group meeting for training and proposal development.
October 2011- March 2012	Finalize research proposal and prepare proposal for submission to USDA and other potential funding sources.

E. Products

A comprehensive LCA requires expert knowledge about all segments of California’s beef industry as well as complete understanding of LCA methodology and application. This planning proposal will provide the opportunity to pull together such knowledge to

develop a strong research and education proposal. Products from this planning process include:

- LCA reference material
- On-line LCA course material
- Grant proposal to conduct LCA for beef production systems in California

F. Evaluation/Lessons Learned

The grant proposal developed as a result of this project will identify key players and their roles in future efforts. Information gaps and inadequacies found by the participants will be important areas to strengthen through the involvement of other researchers and producers.

G. Capabilities of Investigators and Cooperators

Sheila Barry, UCCE Farm Advisor has been serving the San Francisco Bay Area as a livestock and natural resource advisor for the past 11 years. Her applied research and extension program works with cattle ranchers and public agencies to promote working landscapes that conserve biological diversity and protect water quality. As the PI, Sheila will serve as a project facilitator. She will promote communication between planning group members and coordinate work efforts to complete a grant proposal. She recently returned from sabbatical where she had the opportunity to learn about carbon footprinting and Life Cycle Analysis. She attended a workshop with the National Renders Association to learn about the development and application of a carbon footprinting calculator. To learn about LCA methods and application, Sheila attended a two-day conference held by the Life Cycle Association of New Zealand.

Dan Drake, UCCE Farm Advisor. With more than 30 years working at the county level and the continuum between field and campus, Dan will help link and integrate basic theoretical production and environmental responses with practical on-the ground production practices. His broad experience at the local, national and international level will help evaluate LCA methods and their application to CA beef production systems.

Jim Oltjen, UCCE Specialist. In collaboration with the project team and with New Zealand researchers our cowherd simulation software PCRanch (Oltjen et al., 2008) will provide long term estimates of resource use and GHG emissions as affected by cattle management and land use decisions.

Justin Oldfield, Ca Cattlemen's Assoc. will provide connections with producers in the cattle industry.

Mel George, UCCE Specialist will provide information and data on seasonal rangeland and pasture forage production and utilization. He will also provide information on standard rangeland and pasture management practices.

Darrel Sweet, Rancher serves on the California Beef Council and National Beef Board. He provides a link to the industry, and will help validate production information.

Ermias Kebreab, UC Davis AES will develop/improve representation of enteric methane emissions from beef cattle based on his previous research (Ellis et al 2010).

H. Budget

Budget Category	Requested Funds	Matching Funds	Source of Matching Funds
Personnel -Sheila Barry, Project Facilitator (0.125 FTE)		\$12,925	UC ANR
Supplies and Expenses -meeting room rental -planning meeting expense (food) -conference call expense	\$ 500 875 50		
Travel UCCE advisors (14) -county office to UCD (mileage) -one night (per diem) Industry leaders (4) -mileage -one night (per diem) LCA expertise -air travel -two night (per diem)	 2100 1750 400 640 500 320		
Subcontract -LCA expertise honorarium	1500		
Total Funds Requested	\$8635		

Section III. Appendices

A. Literature Cited

Casey, J., Holden, N. 2006a. Quantification of GHG emissions from suckler-beef production in Ireland. *Agricultural Systems* 90: 79-98.

Casey, J., Holden, N. 2006b. Greenhouse gas emissions from conventional, agri-environmental scheme, and organic Irish suckler-beef units. *Journal of Environmental Quality* 35: 231-239.

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- Ellis, J.L., A. Bannink, J. France, E. Kebreab and J. Dijkstra. 2010. Prediction of enteric methane production by dairy cows in whole farm models. *Global Change Biology*, 16:3246-3256)
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