

A Life Cycle Assessment of Greenhouse Gas Emissions for Almond Production in California

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PROJECT SUMMARY

Objectives:

- Develop a comprehensive computer-based life cycle model for assessing the direct and indirect greenhouse gas (GHG) emissions, as well as the associated criteria air pollutants and energy usage involved in the production, hulling and shelling, and distribution of almonds in California.
- Use the model to calculate the GHG emissions, criteria pollutants, and energy per unit of production.

Background:

California almond growers have to contend not only with significant environmental variables, but also with a complex regulatory environment. Accordingly, in running operations and formulating their business plans, they have to take into account such factors as energy use, GHG emissions, and other forms of air pollution in both the short and long run. This project is designed to furnish growers, handlers and others in the almond industry with a model that will enable them to better understand the production processes and practices that contribute to GHG emissions, air pollution and energy use.

In 2010-2012, we created the baseline orchard management model to simulate all energy and resource inputs and waste, pollution, and co-product outputs, such as prunings and wood from removed trees. We also modeled energy and resource inputs and outputs for almond transport off-farm, hulling and shelling facilities, and bio-energy facilities. We used this model to calculate energy use, carbon flows and GHG emissions per lb of almond kernel, and estimated the relative impacts of different aspects of orchard management.

The LCA calculates that irrigation and fertilization use the largest amounts of energy in almond production. This includes the energy to get water to the orchard and to produce the nitrogen fertilizer. Similarly the model indicates that the use of almond biomass such as tree removals, prunings, shells, etc. for energy production could significantly off-set energy used in almond growing.

In 2012-2013, we will expand this model to include distribution to buyers, and we will improve the modeling of potential carbon credits arising from different biomass utilization options.

Project Cooperator: Sonja Brodt, Agricultural Sustainability Institute, University of California, Davis

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For More Details, Visit

- Poster location 23, Exhibit A & B during conference; or on the web (after January 2013) at www.almondboard.com/researchreports
- 2011.2012 Annual Report CD (11.AIR8.Kendall); or on the web (after January 2013) at www.almondboard.com/researchreports
- Related projects: 12.AIR2.Smart; 12.PREC1.DeJong; 11.STEWCROP4.Kimmelshue