Energy Analysis of Walnut Processing in California
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Background and Purpose
The United States is the third largest walnut producer in the world,1 and California is the largest producer in the United States.2 Many steps taken during walnut processing are energy intensive, including harvesting, drying, processing, and transportation. Therefore, the purpose of this project is to identify and categorize areas of energy consumption during walnut processing in California. Because energy estimates have not been updated within the last ten years, there is a need to re-evaluate current practices. By understanding the energetic costs of each step, walnut-processing methods can be improved.

Results
Based off participant data, drying accounts for 47% of the energy use in 1980, 11% in 2009, and 47% in 2017. In 2017, drying facilities used 22 MJ per kilogram of walnuts produced. In 2009 and 1980, 13 MJ and 39, respectively, were used. In 2009, there was a 72% drop in energy consumption from 1980. However, the data from 2017 suggests that overall there has been a 44% decrease in energy usage from 1980 to 2017.

Method
Drying data collected from drying facilities in northern California were gathered by administering phone and e-mail surveys. These data were compared to similarly collected data from 2009 and 1980. Data related to the other steps (harvesting, processing and transportation) in walnut processing were evaluated using published work.

Conclusions
• Drying accounts for a substantial amount of energy use
• Energy consumption among producers varies greatly
• Data are not readily available and are difficult to obtain
• Based on available survey data, energy use appears to be decreasing from 1980’s levels

Recommendations & Future Work
• Continue collecting data from local processors
• Obtain more contacts from regional advisers
• Modify survey based on feedback
• Obtain utility data for larger sample set of energy use
• Decrease uncertainty in calculation of all processing steps

References
4. Klimsky, K., Thompson, J., Grant, J., Haney, J., Elliske, R., Valley, N. S. J., County, L. SAMPLE COSTS TO HULL AND DRY WALNUTS.