

ANNUAL REPORT
Regional Research Project S-1067

Project Number: S-1067

Project Title: Specialty Crops and Food Systems: Exploring Markets, Supply Chains and Policy Dimensions

Chair: Bradley Rickard, Cornell University, Ithaca, NY 14853

Chair-Elect: Zoë Plakias, The Ohio State University, Columbus, OH 43210

Period Covered: December 1, 2019 through November 30, 2020

Date of this report: December 12, 2020

Annual Meeting: October 12, 2020 held virtually

Summary of Minutes from the 2020 Annual Meeting

In Attendance

We had 15 members in attendance: Karina Gallardo, Washington State University; Dawn Thilmany, Colorado State University; Ramu Govindasamy, Rutgers University, Greg Fonsah, University of Georgia, James Stern, Oregon State University; Margarita Velandia, University of Tennessee Knoxville; Zoë Plakias, The Ohio State University; Tim Woods, University of Kentucky; Kathryn Boys, North Carolina State University; Ariana Torres, Purdue University; Marco Costanigro, Colorado State University; Bradley Rickard, Cornell University; Alicia Rihn, University of Tennessee Knoxville; Kynda Curtis, Utah State University; Jackie Yenerall, University of Tennessee Knoxville.

The meeting was called to order by Bradley Rickard at 2:30 p.m.

1. We began by summarizing and thanking the efforts of the team (of Zoë Plakias, Margarita Velandia, and Kathryn Boys) that led the writing of our renewal proposal that was recently approved. Our S-1088 multi-state project will run during the period October 2020 to September 2025. We also thanked Karina Gallardo for leading the nomination of our multi-state project for the Experiment Station Section (ESS) Excellence in Multistate Research Award.

2. The minutes from 2019 S1067 meeting were approved.
3. Introductions and State Reports. Each member reported on their activities (comments below are brief summaries under the appropriate Objective).
4. Plans for the future. Members discussed the idea to submit a track session proposal into the SCE section of the AAEEA. We also discussed the idea of extending this proposal to an organized symposium if the track session proposal was unsuccessful. Possible themes for the track session could revolve around technological change, policies, and risk management strategies for fruits and vegetables.
5. The meeting was adjourned at 5 p.m.

Year-End Report by Objective:

Objective 1: Develop demand and market valuation models for the produce sector that can be used to evaluate effects of increasingly complex product differentiation schemes (organic, enhanced health claims, biodynamic), trade, commodity marketing programs, labeling programs (local, food miles, Fair Trade), traceability systems, and food safety events in the U.S. produce markets.

Ramu Govindasamy studied the profitability of farms in the northeastern U.S. which are often hampered by the high cost of production in the region. Production of high-value crops such as organic produce is one of the solutions to keep these farms viable in the region. However, production challenges and limited information related to marketing are likely to hamper the potential growth of organic agriculture in the northeastern U.S. A logit model was developed to predict who is more likely to buy certified organic produce using 1,100 respondents in the Mid-Atlantic region. About 87% of the consumers were willing to buy certified organic produce, and the remaining 13% were not. While 6% of respondents stated that they would not pay slightly more for organic produce, nearly 43 % of the respondents stated that they would pay more than 10 cents premium for a dollar's worth of organic produce. The results indicate that those who have a graduate degree, those who are influenced by an eco-friendly label, country of origin label, or pesticide-free label are more likely to purchase certified organic produce. Producers and marketers of certified organic vegetables and fruits can target customers with these specific traits to enhance their sales and profitability.

In addition, Govindasamy's recent research studies consumer preferences for pesticide free produce using an internet survey of 1100 Mid Atlantic consumers in five states during March 2016. We developed a logit model to predict the characteristics of those who willing to buy (WTB) a pesticides free fruits and vegetables in the Mid-Atlantic region of US. The Logit model results indicate that respondents those who consciously look for healthy food, think that food

advertisements always help the consumers to decide which agricultural food items to purchase, regularly check the food label, preferred organically grown but not local produce, thinks organic food does not contain GMO's, provide support for local farmers and agriculture, preferred to buy organic Chutney/Pickles, preferred to buy organic Juice, preferred to buy organic Wine are more like to buy pesticide free produce. Whereas those with an education of four years' college degree and high amount spent on each visit for fruits and vegetables are less likely to be concerned with pesticide free produce compared to others. The assessment of perception of consumers' willingness to buy pesticide free produce will help the producers, wholesalers, and retailers to target ultimate consumers to sell their produce.

During 2019-20, Brad Rickard from Cornell University worked with Tim Richards at ASU studying the effects of acquisitions that are occurring in the U.S craft beer industry. They use Nielsen data to study what happens to prices and market shares of beer brands that are acquired by large breweries. In some cases, there is clear evidence that prices fall for the acquired brand, and its market share increases in underdeveloped segments of the country. In addition, Rickard continues to work with hospitality colleagues studying consumer demand for sparkling wines (from the U.S., France, and Spain) in a set of surveys and experiments that investigate the role of peer reviews. Results here show that negative reviews for a competing wine can be more influential to demand than a positive peer review for your own wine.

Alicia Rihn from the University of Tennessee Knoxville has been working in the area of consumer behavior and horticultural marketing with a focus on studying direct to consumer channels, WTP for foods versus non-food, labor issues and the economic impacts of the pay check protection programs for firms in the food and beverage space.

Jackie Yenerall, also from the University of Tennessee Knoxville has recently focused on the interaction between food and health economics and is conducting research that uses a Food App Dataset to examines food acquisition across food outlets (FAH and FAFH). She is also interested in spatial dimensions between stores and how this impacts fruit and vegetable purchases. Recent work studies how COVID has affected food purchasing patterns.

Katherine Boys from North Carolina State University is working on an AFRI project that studies the role and effect of liability insurance on food safety practices. She is also involved in public health work examining the "healthy corner store" program assesses the effects of stocking/selling healthy foods including fruits and vegetables. Here the objective is to understand the economic impact from the perspective of both the retailer and the consumer. She continues to work on issues related to the international trade of organic food and the impacts of certification costs. Kathryn is now the department Extension leader at NCSU.

Marco Costanigro from Colorado State University continues his work with many colleagues at CSU on a variety of issues and topics. He noted his current work examining alcohol consumption patterns (at home and away from home) during COVID with a detailed dataset. He

also is studying the role of labels, regulations, and other information on alcohol purchases and consumption.

Impact: Understanding preferences and consumer demand for fruits and vegetables is crucial to the long-term profitability for stakeholders in the fresh produce supply chain. Members in our multistate research group are actively involved in work that carefully studies consumer behavior for fruits and vegetables, for key attributes in these crops, and to various promotional messages that are used to market these products. This work is important for identifying current and future trends in produce markets and to help stakeholders identify and pursue targeted marketing strategies to different consumer segments.

Objective 2: Analyze the relative benefits and costs, to producers and consumers, of government and industry-led marketing and policy programs (certifications, Leafy Greens marketing order, Country of origin labeling, farmers markets) using both theoretical approaches and empirical evidence from multi-state applied research projects.

Ramu Govindasamy from Rutgers University received a new grant from the Federal-State Marketing Improvement Program to examine the “Local Food, Direct Marketing, and Agritourism Activities as Value-Added Opportunities for Small Farmers in the Mid-Atlantic United States.” The overall goal of this project is to establish and develop a successful partnership fostering collaboration and sharing of best practices of local food direct marketing and agritourism activities, with a focus on boosting small farm profitability in the mid-Atlantic United States. He also continues to work with Kathy Kelley on surveys collecting data about consumer demand for specialty crops and wine. Also working with Alba Collart and Samuel Zapata on a grant proposal to specialty crop production and market opportunities in the United States.

Margarita Velandia from the University of Tennessee Knoxville explained that her recent work provides an examination of various production and consumption considerations for fruits and vegetables. Here she is working with Tim Woods on studying soil issues in high tunnels and the impacts of season-extension. She is also working on labor issues and the feasibility of automation in nursery crops, the interest and use for alternatives to plastic mulches in agriculture (in biodegradable mulches), and the TN farmers’ market reports have been put on hold due to COVID-19.

Kynda Curtis at Utah State University has been working on developing business plans and business planning materials with the Native American communities in the South-West. This includes work on a NIFA project that examines ownership structure and economic performance on reservations. She has also done recent work on climate change and its impact on Native American reservations. Her work continues to examine agritourism topics, food labels, and she has started working with Ariana on studying on-line marketing of food, and the development of websites to market the food, as it relates to COVID.

Greg Fonsah from University of Georgia produced approximately three dozen enterprise budgets for various fruit and vegetable crops in Georgia. This also extended to conduct some forecasting of economic conditions in the same markets. In addition, Greg continues to examine trade policy issues for specialty crops and the impact of COVID-19 on markets in the South-East.

James Sterns from Oregon State University is working on the effects of smoke (smoke effect not taint) and wildfires on the wine industry in Oregon. This extends to consider both the technical and economic effects, and the effects on relationships between wineries and grape growers. Also continues to be interested in the developing a framework to understand “sizing” questions in the wine sector given the host of marketing and regulatory issues. He is also interested in an approach to conduct/update enterprise budgets for fruit and vegetable crops and the evolving questions surrounding hemp markets.

Karina Gallardo from Washington State University has recently conducted work that revolves around on-going work with VitisGen2 on studying traits that are important to table grape consumers with Brad Rickard and Julian Alston. She is also working with Elizabeth Canales on a grant examining sugar claims/fact labels for berry crops. More recently she has become involved in an SCRI project looking at alternative techniques to manage spotted wing drosophila and another that examines management techniques to control fire blight in apples and pears

Bradley Rickard from Cornell University is currently working on a USDA-SCRI project evaluating the economic implications of adopting new rootstocks in apple production and comparing these effects to an orchard that adopts the newly released tree insurance products. The new rootstock cultivars and the tree insurance products both offer protection from fire blight, a destructive bacterial disease, that has caused significant economic damage to apple and pear orchard owners and notably in the eastern United States in selected years.

Impact: The produce sector is subject to a wide range of public policies and other initiatives that affect consumption and production of fruits and vegetables. Our group continues to study some of the most important topics in this space and sheds new light on contemporary issues that helps policymakers make more informed decisions.

Objective 3: Assess the changing coordination and supply chain management strategies being implemented in the fruit and vegetable sector and identify strategic organizational and marketing implications for a set of firms that are diverse in terms of commodity, marketing approach and size of operation (including small and mid-size farms).

Ariana Torres from Purdue University continues to work on the upcoming conference “Big Data Safe Foods” that was held online October 12-15, 2020. Topics covered included supply chain traceability, and consumer preferences for IPM specialty crops. Also working on food safety topics for vegetables grown in greenhouses, technological adoption to support local markets, and marketing strategies for processing activities.

Tim Woods from the University of Kentucky is working as part of team (with other S-1067/S-1088 members) on an AMS project examining the effect of COVID-19 on local food systems. Also participating in a NIFA funded project directed to estimate a local food vitality index, collaborating with faculty at North Carolina State University and University of Tennessee.

Dawn Thilmany from Colorado State University has recently been involved in the COVID-local food systems project with Tim Woods that also involves 16 organizations including CSAs, National Farm to School Program, restaurants, retail outlets, and the James Beard Foundation. She indicated that a webinar series from this group will begin in late-October 2020. Dawn continues to study Farm to School topics with Becca Jablonski, Alessandro Bonano and others. She also is working on farm viability issues and developing benchmarks using data from the USDA ARMS. Recent work examines SNAP issues and Dawn contributed an article with co-authors in the upcoming *AEPP* issue related to COVID-19 and local food markets.

Zoë Plakias from The Ohio State University continues to collaborate with Colorado State faculty and Jeff O'Hara on examining the economic effects of the National Farm to School program. Recent work is examining food security programs in rural southern Ohio that are connected to Amish produce auctions. At OSU she is taking a lead to organize and synthesize materials across her college on the impacts of COVID-19 for food and agriculture. Lastly, she is working on a new project that studies the impact of healthy food policies on food processors.

Impact: The produce sector often relies on the supply chain structure to successfully locate their products in the marketplace. Supply chains are particularly important to study in the fresh produce industry due to the coordination complexities and the number of crops involved. Work from our group has helped to identify successful practices and harmonize/standardize performance benchmarks throughout the sector across firms that conduct business in different regions and across different operation sizes.

Outputs and Dissemination

Outreach/Industry Presentations

1. Zoë Plakias. 2020 (November 13). "Impacts of COVID-19 on Consumer Behavior and Shopping Patterns." AEDE Agricultural Policy and Outlook Conference. Mode: Webinar. Available online at: <https://aede.osu.edu/programs/202021-agricultural-policy-and-outlooks/program>.
2. Brown, Ben, Joyce Chen, Ty Higgins, Cathann Kress, Zoë Plakias, and Ian Sheldon. 2020 (September 22). "Value Chains in Food and Agriculture." The Talk on Friday Avenue® Panel, Farm Science Review, OSU College of Food, Agricultural, and Environmental Sciences. Mode: Webinar. Available online at: <https://youtu.be/x-wuDinduJ8>.
3. Plakias, Zoë T. and Brent Sohngen. 2020 (June 23). "Food System Adaptations Due to COVID-19." Water Cooler Economics, OSU Department of Agricultural, Environmental and Development Economics. Mode: Video. Available online at: <https://u.osu.edu/aede/2020/06/23/food-system-adaptations-due-to-covid-19/>.
4. Lusk, J.L. and J.J. McCluskey. 2020. "Consumer behavior during the pandemic." CAST Report.
5. McCluskey, J.J. 2020. "Innovations for Supporting Contracting in Supply Chains." In Innovations in the Food System: Exploring the Future of Food, National Academies Press.
6. Gallardo, R.K. 2020. "Washington Tree Fruit Outlook". In Washington Agribusiness Status and Outlook. An Annual Report by Washington State University's School of Economic Sciences. Ed. T. Randall Fortenbery and Timothy P. Nadreau. Available online at: <http://ses.wsu.edu/impact-center/>.
7. Miles, C., A. Wszelaki, L. Devetter, S. Ghimire, and **M. Velandia**. 2020. "Economics of Soil-Biodegradable Mulch Use." Biodegradable Mulch Professional Development Workshop, November 18, 2020. (*Washington State University Collaboration*).
8. Velandia, M., X. Chen, J. Yenerall, S. Schexnayder, C. Trejo, K. Tanaka, H. Hyden, K. Rignall. "Factors Influencing Fruit and Vegetable Farmers' Willingness to Participate in Market Outlets with a Food Justice Mission: The Case of Fresh Stop Markets." Presented at the 2020 Food Distribution Research Virtual Conference, October 13, 2020. (*University of Kentucky Collaboration*)
9. Velandia, M., and A. Wszelaki. 2020. "Comparing the Economic Feasibility of using Plastic Biodegradable Mulches in Vegetable and Cannabis Production." Cannabis Research Conference, August 12, 2020.

10. Kelley, K. M. (March 12, 2020). "What's trending? An update on today's wine consumer and product trends," License to Steal Wine Conference, Lancaster, PA, 80 in attendance, Invited. Regional.
11. Kelley, K. M. (March 10, 2020). "Cause marketing," License to Steal Wine Conference, Lancaster, PA, 80 in attendance, Invited. Regional.
12. Kelley, K. M., & Schmidt, C. (January 29, 2020). "Food Trends 2020," Mid-Atlantic Fruit and Vegetable Convention, Hershey, PA, 300 in attendance, Invited. Regional.
13. Kime, L., Schmidt, C., & Harper, J. (June 29, 2020). "Reducing Financial Risk in Hemp Production," Hemp Webinar Series, NERME, Webinar, 34 in attendance. National.
14. Schmidt, C., & Bartley, B. (May 14, 2020). "Disruptions in the Food Supply Chains Explained," Empty Shelves at the Store? Food System Disruptions and COVID-19, Webinar, 367 in attendance. Regional.
15. Graziani, M., & Schmidt, C. (March 2, 2020). "Improving the Local Value Chain of Pennsylvania Craft Beer Preliminary results from Research & Coordination Efforts," Philadelphia Grain and Malt Symposium, Deer Creek Malthouse, Philadelphia, 150 in attendance. Regional.
16. Kelley, K. M., Schmidt, C., (May 20, 2020). "Wine Consumer and Product Trends: What May Change Due to the COVID-19 Pandemic," Penn State Extension, Wine and Grape Team Webinar, 185 in attendance. Regional.
17. Thilmany, D. The Real Economics of Local Foods: A Look at Farms, Supply Chains and Communities. Invited speaker to University of Wisconsin ARE Seminar series. January 2020. Madison WI.
18. Civita, N., W. Moschetti and D. Thilmany. Trends and Opportunities to Elevate Regenerative Agriculture in Colorado. Webinar to the Colorado Regenerative Ag Council. June 2020.
19. Thilmany, D. and D. Mooney. An Overview of the Hemp Industry in Colorado. Presentation to the National Farm Business Management Conference. June 2020. Virtual Webinar.
20. Thilmany, D. How the Coronavirus will reshape the US Food System. Virtual Presentation to Michigan State University Closing Bell. May 2020.
<https://www.youtube.com/watch?v=3pjxslATk04&feature=youtu.be>
21. Jablonski, BBR, M. Sullins, A. Card, A. Hill, J. Bayham. R. Hill and D. Thilmany. CSU Task Force on Colorado Food Supply: Rapid Response Research Related to COVID-19. May 2020.

22. Thilmany, D. Update on Rapid Response Food Policies. Virtual Presentation to the Colorado Food System Rapid Response Team. April 2020.
23. Thilmany, D. Mapping a Recovery Pathway for Food and Agriculture Relief. Presentation to StartUp Colorado. April 2020.
24. Unnevehr, L. and D. Thilmany. The Economic Impact of COVID-19 on U.S. Food Manufacturers. Presentation to the SafetyChain Industry Stakeholder group. April 2020.
<https://www.youtube.com/watch?v=cuXn79CWodU&feature=youtu.be>
25. Jablonski, B.B.R. and D. Thilmany. Mapping and Mitigating Potential Impacts of COVID-19 to Colorado Food and Ag. CSU REDI Rapid Response Webinar. April 2020.
<https://redi.colostate.edu/webinars/>
26. Thilmany, D. Exploring U.S. Organic Ag and Food Trends: Consumer driven Markets, Supply Chain challenges and Production Tradeoffs. Presentation to the High Plains Organic Conference. February 2020. Cheyenne WY.
27. Thilmany, D. The Price is Right. Presentation to the Colorado Fruit and Vegetable Growers Association. February 2020. Denver CO.
28. Thilmany, D. 2020 Colorado Perspective on Industrial Hemp. Presentation to the Wisconsin Ag Outlook Conference. January 2020. Madison WI.
<https://www.youtube.com/watch?v=J1GIBKka2Q8>
29. Jablonski, B. and D. Thilmany. Exploring Potential Market Opportunities for Colorado Produce. Interactive Presentation to the Western Colorado Hort Society Meetings. January 2020. Grand Junction CO.
30. Callaway J., J. Berning, M. Costanigro, J. Cannon, N. Palardy. CSU research updates. Colorado Brewers Summit online. November 2020.
<https://www.coloradocraftbrewerssummit.org/#agenda>
31. Curtis, K. (2020). "Beginning Farmer Business and Marketing" Half day session at the Utah Small and Urban Farms Conference, Salt Lake City, March 5, 2020.
32. Curtis, K., (2020). "Farmers Are Building an Online Presence to Sell Their Products." Interview with Utah Public Radio, USU Extension Education Highlights, October 20, 2020.
33. Curtis, K., (2020). "Consumer Spending Updates and Innovation in Local Food Systems." Utah Agriculture Outlook Webinar Series, USU Extension Applied Economics, November 17, 2020.

34. Curtis, K., (2020). "Covid-19 Impacts on Local Food Systems." Utah Agriculture Outlook Webinar Series, USU Extension Applied Economics, August 11, 2020.
35. Curtis, K., (2020). "Stocking Up on Locally Grown Food." USU INSTEAD Podcast Day 92, June 12, 2020.
36. Curtis, K., (2020). "Covid-19 Impacts on Local Food Systems – Nevada." Sage Outlook Podcast Series, University Center for Economic Development, UNR, May 28, 2020.
37. Curtis, K., (2020). "The Farm Shop" *Marketing in Motion* Blog post, USU Extension Applied Economics, September 15, 2020.
38. Curtis, K., (2020). "Four Months Out: What Happened to our Food System and Why?" *Marketing in Motion* Blog post, USU Extension Applied Economics, July 14, 2020.
39. Curtis, K., (2020). "Where are we Today." *Marketing in Motion* Blog post, USU Extension Applied Economics, June 10, 2020.
40. Curtis, K., (2020). "COVID-19 and Local Foods." *Marketing in Motion* Blog post, USU Extension Applied Economics, May 20, 2020.
41. Curtis, K., (2020). "Online Direct Sales: Part 4." *Marketing in Motion* Blog post, USU Extension Applied Economics, May 12, 2020.
42. Curtis, K., (2020). "Online Direct Sales: Part 3." *Marketing in Motion* Blog post, USU Extension Applied Economics, May 5, 2020.
43. Curtis, K., (2020). "Online Direct Sales: Part 2." *Marketing in Motion* Blog post, USU Extension Applied Economics, April 28, 2020.
44. Curtis, K., (2020). "Online Direct Sales: Part 1." *Marketing in Motion* Blog post, USU Extension Applied Economics, April 21, 2020.
45. Curtis, K., (2020). "Local Food Markets." *Marketing in Motion* Blog post, USU Extension Applied Economics, April 14, 2020.
46. Gallardo, R.K. and S. Galinato. "2019 Cost Estimates of Establishing, Producing and Packing Granny Smith Apples in Washington" – Washington State University Extension Bulletin TB74E, November 2020.
47. Gallardo, R.K. and S. Galinato. "2019 Cost Estimates of Establishing, Producing and Packing Cripps Pink Apples in Washington" – Washington State University Extension Bulletin TB75E, November 2020.

48. Gallardo, R.K. and S. Galinato. "2019 Cost Estimates of Establishing, Producing and Packing Fuji Apples in Washington" – Washington State University Extension Bulletin TB73E, October 2020.
49. Gallardo, R.K. and S. Galinato. "2019 Cost Estimates of Establishing, Producing and Packing Honeycrisp Apples in Washington" – Washington State University Extension Publication TB70E, April 2020.

Academic Presentations

1. Drugova, T., K. Curtis, and M. Kim, "Impacts of Drought on Tribal Economies." Selected paper presented at the Food Distribution Research Society Annual Meeting, Online, October 2020.
2. Curtis, K., "Impacts of COVID-19 on Local Food Producers: The Good, the Bad, and the Ugly." Invited presentation of the Symposium "The Impacts of COVID-19 on Local Food Systems in the West" held at the Western Agricultural Economics Association Annual Meeting, Online, June 2020.
3. Curtis, K., T. Drugova, and R. Ward, "Agricultural Producer Adaption to Drought in Utah: An Experimental Study." Selected paper presented at the 2020 Annual Meeting of the Australian Agricultural and Resource Economics Society, Perth, Australia, February 2020.

Publications

State, Station or Agency

1. Alston, J., O. Sambucci, B. Rickard, R.K. Gallardo. "Trait Economics-Annual Report". Project: VitisGen2: Application of Next Generation Technologies to Accelerate Grapevine Cultivar Development. Funding agency: USDA-NIFA-SCRI. November 2020.

Outreach/Industry Podcast:

1. Schmidt, C., and Kelley, K. M. (2020). "Wine Trends During COVID-19." All in Foodz Podcast. <https://blubrry.com/allinfoodz>
2. Kelley, K. M., Felitti, P. (2020). Virtual Gatherings with Food & Drink. All in Foodz Podcast. <https://blubrry.com/allinfoodz>
3. Kelley, K. M. (2020). Recent Trends in Consumption of No and Low- Alcohol Products. <https://blubrry.com/allinfoodz>

Outreach/Industry Publications

1. Denton, R., M. Velandia, Z. Hansen, and D. Lockwood. 2020. "Sample Budgets for Blueberry Production under Various Integrated Pest Management and Marketing Strategies." 2020. UT Extension.
2. Schmidt, C., & Kime, L. (2020). "Crop Insurance for Industrial Hemp." Penn State Extension.
3. Kelley, K. M., & Schmidt, C. (2020). "Wine consumer and product trends: What may change due to the COVID-19 pandemic, Part 3." Penn State Wine & Grape U. Blog, <https://psuwineandgrapes.wordpress.com/>
4. Schmidt, C., & Kelley, K. M. (2020). "Wine E-commerce During Covid-19 and Beyond." Penn State Wine & Grape U. Blog, <https://psuwineandgrapes.wordpress.com/>
5. Kelley, K. M., & Schmidt, C. (2020). "Wine consumer and product trends: What may change due to the COVID-19 pandemic." Penn State Wine & Grape U. Blog, <https://psuwineandgrapes.wordpress.com/>
6. Kelley, K. M., & Schmidt, C. (2019). On Premise and Off-Site Festivals and Events. Penn State Wine & Grape U. Blog, <https://psuwineandgrapes.wordpress.com/>
7. Kelley, K. M., & Schmidt, C. (2020). Food Trends 2020. 2020 Mid-Atlantic Fruit and Vegetable Convention Proceedings (pp. 168-170).
8. Kelley, K. M. (2020). Tasting Rooms and COVID-19. Penn State Wine & Grape U. Blog, <https://psuwineandgrapes.wordpress.com/>
9. Thilmany, D. and T. Malone. Local Foods and COVID-19. Invited contribution to CAST Commentary Economic Impacts of COVID-19 on Food and Agricultural Markets. June 2020. Online at: <https://www.cast-science.org/cast-releases-new-commentary-on-economic-impacts-of-covid-19-on-food-and-agricultural-markets/>
10. Thilmany, D. and T. Malone. Local Foods and COVID-19. Council for Agricultural Science and Technology COVID Policy Brief. June 2020. Online at: <https://www.cast-science.org/covid-19-and-agriculture-webinar-update/>
11. Thilmany, D. and T. Malone. Look at How Innovative Local Food Systems are Regulated. Current events pieces solicited by Food Logistics. May 2020. Online at; <https://www.foodlogistics.com/sustainability/article/21131349/covid19-gives-chance-to-take-a-fresh-look-at-how-innovative-local-food-systems-are-regulated>

12. Hill, R. A. Hill, D. Thilmany, B. Jablonski and J. Bayham. Workforce Changes and the Food Supply Chain Understanding and Mitigating the effects of COVID-19 on the Agricultural Workforce. CSU Task Force on Food Supply Policy Brief. <https://foodsystems.colostate.edu/covid19/> May 2020
13. Thilmany, D. B. Jablonski, B. Angelo, S. Low and D. Tropp. Mitigating Immediate Harmful Impacts of COVID-19 on Colorado Farms and Ranches Selling through Local and Regional Food Markets. CSU Task Force on Food Supply Policy Brief. <https://foodsystems.colostate.edu/covid19/>. April 2020
14. Thilmany, D. B. Jablonski, B. Angelo, S. Low and D. Tropp. Mitigating Immediate Harmful Impacts of COVID-19 on Farms and Ranches Selling through Local and Regional Food Markets. National Sustainable Ag Coalition Policy Report. Posted at: <https://foodsystems.colostate.edu/covid19/>. March 2020
15. Thilmany, D., M. Castillo and S. Low. The Tale of Two Food Supply Chains: Exploring the Emerging Bimodal Structure of US Food and Beverage Manufacturing. CSU Regional Economic Development Institute Report. December 2019.
16. Palardy, N, M. Costanigro, J. Cannon, D. Thilmany, J. Berning and J. Callaway. Beer Sales in Grocery and Convenience Stores: A glass Half-full for the Colorado Craft Brewers? CSU Food Systems Report. October 2020. https://foodsystems.colostate.edu/wp-content/uploads/2020/08/FF_BeerGrocery_8-26-20.pdf
17. Drugova, T., K. Curtis, and M.K. Kim (forthcoming). "Impacts of Drought on Tribal Economies in Utah." USU Extension Fact Sheet, Applied Economics/2020-XX.
18. Drugova, T., K. Curtis, and M.K. Kim (forthcoming). "Impacts of Drought on Tribal Economies in Nevada." USU Extension Fact Sheet, Applied Economics/2020-XX.
19. Drugova, T., K. Curtis, and M.K. Kim (forthcoming). "Impacts of Drought on Tribal Economies in New Mexico." USU Extension Fact Sheet, Applied Economics/2020-XX.
20. Drugova, T., K. Curtis, and M.K. Kim (forthcoming). "Impacts of Drought on Tribal Economies in Arizona." USU Extension Fact Sheet, Applied Economics/2020-XX.
21. Curtis, K.R. "Our Food System and the Impact of COVID-19." Cultivate Magazine Summer/Fall 2020, College of Agriculture and Applied Sciences, Fall 2020.
22. Curtis, K.R. "The Impact of Covid-19 on the US Food System." Fall 2020 Newsletter, Western Extension Risk Management Education Center, Fall 2020.

23. Drugova, T., and K. Curtis, (2019). “Does Consumer Knowledge of Organic Production Standards Influence Demand for Organic and Non-GMO Labeled Foods?” USU Extension Fact Sheet, Applied Economics/2019-06pr.
24. Drugova, T., and K. Curtis, (2019). “Do Consumers Who Prefer Gluten-Free Also Prefer Organic?” USU Extension Fact Sheet, Applied Economics/2019-07pr.
25. Curtis, K., K. Salisbury, V. Pozo, R. Ward, and C. Durward, (2019). “What Determines Produce Pricing in Utah?” USU Extension Fact Sheet, Applied Economics/2019-05pr.
26. Curtis, K., K. Salisbury, R. Ward, and C. Durward, (2019). “Targeting Farmers’ Markets in Utah: Understanding Fresh Produce Pricing.” USU Extension Fact Sheet, Applied Economics/2019-03pr.
27. Curtis, K., E. Rice, S. Slocum, and K. Allen, (2019). “Farm Shops: A Direct-to-Consumer Extended Season Opportunity.” USU Extension Fact Sheet, Applied Economics/2019-04pr.
28. Curtis, K., E. Rice, and D. Quarnstrom, (2019). “Adopting Organic Wheat: Grower Motivations and Concerns.” USU Extension Fact Sheet, Applied Economics/2019-01pr.
29. Curtis, K., E. Rice, and D. Quarnstrom, (2019). “Characteristics of Organic Wheat Growers.” USU Extension Fact Sheet, Applied Economics/2019-02pr.

Refereed Journal Articles

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1. Curtis, K., T. Drugova, and R. Ward, (2020). "Producer Response to Drought Policy in the West." *Journal of Food Distribution Research*, 51(1), 17-25.

Grants, Contracts

1. **McCluskey, J.J.**, Principal Investigator. "Social Interaction and Consumer Acceptance of Genome Editing in Domestic Livestock". Funding Agency: USDA. Dates: September 2020 to September 2022. Total amount awarded: \$441,817.
2. **Gallardo, R.K. (WSU), Canales, E. (MissState)**. Co-Principal Investigator. "VacciniumCAP: Leveraging genetic and genomic resources to enable development of blueberry and cranberry cultivars with improved fruit quality attributes". Funding Agency: USDA-SCRI. Dates: September 2019-August 2021. Lead PI. M. Iorizzo, North Carolina State University. Total amount awarded: \$6.4 M. Amount to Gallardo program: \$287,235.
3. **Gallardo, R.K.** Co-Principal Investigator. "Using Irradiation to Reduce Post-Harvest Defects on California Apples and Pears Exported to Mexico: A Technical and Economic Study." Funding Agency: USDA-TASC. Dates: September 2020-August 2023. Lead PI. A. Prakash, Chapman University. Total amount awarded: \$564,850. Amount to Gallardo program: \$196,788.
4. **Gallardo, R.K.** Co-Principal Investigator. "Epidemiology-Based Tactics to Abate Gray Mold of Apple and Pear in the Pacific Northwest." Funding Agency: USDA-NIFA-CPPM. Dates: September 2020-August 2023. Lead PI. A. Amiri, Washington State University. Total amount awarded: \$199,805. Amount to Gallardo program: \$43,502.
5. **Gallardo, R.K.** Co-Principal Investigator. "Economic Impacts of the Christmas Trees in Three Growing Regions of the United States." Funding Agency: Christmas Tree Promotion Board. Dates: July 2020-June 2021. Lead PI. R.K. Gallardo, Washington State University. Total amount awarded: \$40,000.

6. **Gallardo, R.K.** Co-Principal Investigator. “Comprehensive Fire Blight Management Systems for the United States.” Funding Agency: USDA-SCRI. Dates: September 2020-August 2024. Lead PI. George Sundin, Michigan State University. Total amount awarded: \$5,152,696. Amount to Gallardo program: \$276,224.
7. **Gallardo, R.K.** Co-Principal Investigator. “Moving from crisis response to long-term integrated management of SWD: A keystone pest of fruit crops in the United States.” Funding Agency: USDA-SCRI. Dates: September 2020-August 2024. Lead PI. Ashfaq Sial, University of Georgia. Total amount awarded: \$5,235,601. Amount to Gallardo program: \$184,580.
8. Cross-State Heterogeneity of Farm-Scale Hemp Production Costs. Subcontract with University of Kentucky and Cooperative Agreement with the USDA Ag Marketing Service. \$360,000. With D. Mooney and R. Hill at CSU. T. Mark and U. of Kentucky.
9. Local and Regional Food Systems COVID-19 Rapid Response. Subcontract with University of Kentucky and Cooperative Agreement with the USDA Ag Marketing Service. \$135,000 of \$1 million total grant. With B. Jablonski at CSU, T. Woods and J. Rossi and U. of Kentucky and S. Rocker at Penn State University.
10. Planning and Technical Support to Diversify Economic Opportunities in Colorado: A Proposed Technical Assistance Project. Proposal to the Economic Development Administration. \$575,000. With S. Weiler, S. Shrake, A. Sintas, R. Hill and in cooperation with Delta County. Fall 2020-March 2022.
11. Improving the Quality And Availability Of Financial And Market-Based Benchmarks For Diverse, Small And Mid-Sized Farms And Ranches. Proposal to USDA NIFA with U of Minnesota and U of Kentucky. \$250,000. June 2020-May 2022.
12. Estimating the Potential Impact of Expanded Healthy Food Incentives: Exploring Food System Impacts. Contract agreement with the SPUR, the San Francisco Bay Area Planning and Urban Research Association. \$125,000. With B. Jablonski and A. Bauman. January 2020-March 2021.
13. Rapid Response Supplement to: Integrating Community and Modeling Efforts to Evaluate the Impacts and Tradeoffs of Food System Interventions. Foundation for Food and Agriculture Research. \$91,000. With B. Jablonsky, R Cleary. L, Bellows, M. McCloskey. July 2020-January 2022
14. Ward, Curtis, etc. NIFA – Small and Medium-Sized Farm Program, 2020-2023. \$498,051. American Indian Small to Medium-sized Farms Profitability and Risk related to Reservation Land Access.

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16. Kelley, Kathy (PSU) and R. Govindasamy (Rutgers). "Local Food Direct Marketing and Agritourism Activities as Value Added Opportunity for Small Farmers in the Mid-Atlantic United States" funded by the Federal State Marketing Improvement Program by Agricultural Marketing Service, USDA for \$98,487.

Short term outcomes

During this reporting period, the S-1067 group has had a substantial number of outputs (listed above) and conducted research and extension activities that led to a number of outcomes. We will highlight some of the most notable outcomes below.

At USU, members have completed a project that provides fresh produce pricing information and developed and delivered curricula focused on enhancing grower ability to determine the market value of their products, which led to increased grower confidence and knowledge. Educational materials highlighted fresh produce prices across market types (farmers markets vs. conventional grocery stores), production methods, and seasons, as well as provided information on secondary data resources, and marketing and pricing strategies. Curricula was delivered through four one-day workshops, one large multi-state conference, and two field day/growing workshops, as well as through the USU Extension website. Approximately 900 growers and farmers' market managers participated. Follow up evaluations with program participants found that 100% would recommend the workshops and 60% would attend future workshops on the same topic. One year after workshop attendance, 75% had increased their customer base as well as their sales, 66% had adjusted their prices for each market served, 33% had added new markets to their sales efforts.

A S-1067 member Prof. Lamie worked on a Local Food Systems project with Cooperative Extension Agents; they developed and delivered a course with participation from three states (VA, NC, SC).

Through professional development workshops and producer conferences led by the S-1067 team at the University of Tennessee, they increased practical knowledge among fruit and vegetable producers and Extension agents working fruit and vegetable growers to make more informed decisions about the decision to transition from polyethylene (PE) mulch to biodegradable mulches (BDM). During this reporting period, the team provided information about the factors influencing the economic feasibility of adopting BDM to 20 producers from various US states at a virtual conference and 30 Extension agents from the Connecticut, New York, and New England regions during a professional development workshop.

The S-1067 members from Colorado State University showed that the promotion of local markets and policies that allow flexibility in the regulatory system appear correlated with food manufacturing start-ups. This is important evidence to those who have believed (but had little proof) that local and regional food systems are one potential economic development strategy for communities to pursue. In addition, this group found initial evidence that having food retailers and farmers markets align with local food producers will increase the economic activity catalyzed by those programs in local economies. Additionally, ongoing research under the FFAR project finds acquisition of school meals being related to household level overall healthfulness of food acquisitions in different directions. In yet another project with the Colorado Brewers Guild, they were able to assess the market impacts of new legislation to allow beer sales in food retailers on the supply chain decisions and performance of breweries of different sizes and market orientation. They found that small sized breweries (below 15,000 bbls) were not able to distribute through grocery stores. Regional craft brewers (15,000-6 million bbls) entered significantly the grocery store channels but experienced a commensurate decline in sales in the traditional liquor store channel while sales of craft brews through convenience stores remained limited.

Activity

Members of S-1067 remained very active in research and extension efforts that provided answers and solutions to real-world questions facing stakeholders in the specialty crop industry. They also disseminated this information to a wide community of producers, other supply chain participants, and policy makers. These activities lead to results that allow industry stakeholders to make more informed business decisions and to be able to more thoughtfully plan for potential changes in markets and policies.

For example, at WSU 4 enterprise budgets for 4 apple varieties (e.g., Granny Smith, Fuji, Cripps Pink, and Honeycrisp) were developed and disseminated to industry stakeholders. This information provides insights on the investment, fixed, and variable costs for establishing, producing, and packing apples in Washington State, as of 2019. These studies are available free of cost to all public. The work on the most profitable licensing schemes for new varieties of apples has provided important information valuable to academia institutions when developing new varieties of fruits. The work on investigating the costs and benefits of adopting marker assisted breeding provide useful insights on the plant breeding characteristics that would define the costs and revenues for academia plant breeding programs of adopting this new technology. The work on the estimation of growers' willingness to pay for selected plant traits in peaches and strawberries provides useful insights on the specific fruit traits growers find the most important when deciding to adopt a new variety.

At the University of Tennessee, the team conducted a survey of Tennessee and Kentucky fruit and vegetable farmers to evaluate farmers' willingness to sell produce through Fresh Stop Markets (FSMs). FSMs are "pop up" farm fresh markets organized biweekly for 22 weeks during the season at public spaces in food-insecure neighborhoods. Preliminary results suggest survey

respondents willing to sell produce through FSMs perceive reduction of marketing efforts, ability to plan before production season and to sell to low-income families as the most advantageous characteristics of FSMs. Additionally, survey results suggest more educated farmers, with annual gross on-farm revenue below \$25,000, selling produce through farmers markets, who run on-farm programs to educate the community about sustainable agriculture and food systems, would be more willing to sell produce through FSMs. This team also gathered information from various US non-profit organizations managing market models with a food justice mission, to better understand the financial and organizational factors that determine the success of these market models.

In addition, the team at the University of Tennessee investigated consumer preferences for sustainable food products using a national survey. We compared the preferences obtained from contingent ranking and contingent valuation methods for locally produced, organic, and naturally grown fresh produce products. Locally produced fresh produce received the highest preference ranking, while organic products receive the highest price premium. This result suggests individuals' rankings of a product are not consistent with their willingness-to-pay (WTP), or the existence of preference reversal in preferences for products grown using sustainable production practices.

Many members from the S-1067 project have been involved in efforts that discuss and analyze the impact that COVID-19 has had on specialty crop markets in the United States. Several members contributed to articles that will soon be published in a special issue of *Applied Economics and Policy Perspectives*. Through these COVID-based projects, members from our team have highlighted strategies and best practices that have allowed local and regional food businesses to stay viable during the pandemic. We have ongoing case studies being developed and will launch a survey in late 2020. Research is ongoing to study potential trade-offs of food assistance policies' effectiveness as it relates to the government's response to COVID-19.

At The Ohio State University, members have begun work on a new project focusing on the economic implications of incentive programs for fruits and vegetables. Here the work examines how to connect a public policy with health outcomes to better understand the impact of such programs on the economic activity of the food sector. Related work here looks at the impacts of healthy food policies and changes in demand for healthy food on farmers; a working paper on this topic was presented in October 2020 at the Agricultural Policy Research Working Group conference. In addition, Prof. Plakias at OSU recently submitted a proposal for a 3-year, \$500,000 USDA NIFA grant with Becca Jablonski (also a member of this multi-state group) to support a research project on the impacts of state-level per-meal Farm to School subsidies on school districts, farmers, and communities. Plakias also recently published a paper in *California Agriculture* on farmers' voting choice for mandatory agricultural producer organizations in the California peach and nectarine industry with co-authors at UC Davis. Lastly, Plakias organized a FAMPS-SCE track session proposal for the AAEEA annual meeting entitled "Innovations in Specialty Crop Marketing and Distribution" with three other members of this group (Kynda Curtis, Jackie Yenerall, and Kathryn Boys).

Milestone

The members of S-1067 have passed a number of milestones during this recent reporting period. First and foremost is the successful renewal of our multi-state project (now S-1088) from October 2020 to September 2025. The new project maintains most of the research and extension activities our members have worked on between 2015 and 2020 with S-1067, but also made some updates to the objectives so that they more closely align with our strengths and the current set of issues and research questions that exist today. Below are a few examples of milestones reached by our members at the University of Tennessee and Colorado State University during the most recent reporting period.

The group at the University of Tennessee have successfully increased awareness among manufacturers about farmer willingness to pay for biodegradable mulches, and awareness among policymakers about the economic incentives they might need to offer to farmers to increase the adoption of biodegradable mulches among fruit and vegetable farmers and reduce potential soil plastic pollution associated with the use of polyethylene mulches. In addition, this group has also increased consumer awareness about sustainable production labels (e.g., organic), as well as awareness among policymakers about the economic incentives they might need to offer to farmers to increase the adoption of sustainable production and reduce the potential pollution associated with conventional practices. T

Members from Colorado State University have worked under a FFAR Tipping Points grant to assess the outcomes from increased activity in direct and intermediated markets, specifically the Denver Food Vision with focused attention to increase institutional buying from rural Colorado. Additionally, this group has continued to study the economic impact of policy oriented towards institutions, that is, the Farm to School Programs, on farm profitability and fruits and households' fruit and vegetables purchases.

Intended potential long-term outcomes and impacts

The members in S-1067 (now in S-1088) have a long history of working together, and we continue to work on building an integrated research program that supports our project's objectives. Our long term goal continues to be thought of as the leading group of academics that offers economic information and data-driven results about the impact of technology, consumer preferences, and other supply chain considerations on specialty crop markets in the United States. As a multi-state research project, we have a long history of answering the most pressing economic, marketing, and policy questions facing specialty crop markets and our members have contributed to new knowledge in this arena at both the state-level, nationally, and internationally. A few examples are highlighted below, yet each member of S-1067 has contributed to this overall goal in many different and unique ways.

Government and policy regulations intending to reduce plastic pollution associated with the use of polyethylene (PE) mulch in agriculture vary greatly across the US, with some states imposing costs on producers, such as high disposal costs or stronger enforcement of regulation preventing the illegal disposal of PE mulch (e.g., burning), while other states have less strict regulations aiming to disincentive the use of plastic in agriculture. Regardless of the current state of US environmental regulations aiming to reduce plastic pollution, consumers and the private industry are already demanding strategies and products that have the potential to reduce plastic pollution.

The members at the University of Tennessee have a long-term commitment to understanding changes in regulations and consumer demand for produce grown using production practices that have the potential to reduce plastic pollution associated with the use of PE mulch. They have done considerable work to evaluate the costs and benefits associated with the adoption of more sustainable mulch products by US fruit and vegetable producers. Plastic biodegradable mulches (BDMs) are a sustainable alternative to PE mulch, as they do not have to be removed or disposed of, rather they are tilled into the soil or composted on site. These mulches are designed to be decomposed into water, carbon dioxide, and microbial biomass, eliminating the plastic pollution associated with the use of PE mulch. By increasing awareness about the benefits and costs associated with the adoption of BDM that have the potential to reduce plastic pollution associated with the use of PE mulch, making manufacturers aware of the potential barriers to adoption, and policymakers aware of the potential economic incentives that will promote adoption of BDM among fruit and vegetable farmers.

Availability and access to fruits and vegetables continues to be a public health concern in the United States. Members at Colorado State University, the University of Kentucky, and the University of Tennessee (among other schools) have examined the nutritional composition of diets among low-income households relative to higher-income households. This work has studied issues related to food access, their food budget allocation, the time they have to prepare healthier foods, and their perceptions of food affordability. An example of a market model trying to promote access to local and healthy foods among low-income families is the Fresh Stop Markets (FSMs). FSMs are “pop up” farm fresh markets organized biweekly for 22 weeks during the season at public spaces in food-insecure neighborhoods. FSMs provide local fresh produce to each market's shareholders on a sliding scale based on income. The relative success FSMs have had in addressing the food access needs of low-income communities in Kentucky has increased the interest in the replicability of this model among various stakeholders (e.g., non-profit organizations, government agencies, community leaders) in other states. Evaluating farmers' willingness to sell produce through FSMs is an important component for assessing the replicability of the model in other regions of the country, and one that has been limitedly explored in previous literature. Members in S-1067 have assessed farmers' willingness to participate in FSMs and understanding the financial and organizational factors affecting the sustainability of market models with a food justice mission.

There is widespread thought that the US agricultural market is currently dominated by foods produced with conventional practices. Production practices have slowly evolved since the introduction of sustainable labels such as organic, however, due to the higher production costs associated with organic practices and complex certification processes, farmers have met obstacles to adopting organic production practices. Many members from our multi-state project have spent significant efforts examining both the consumer demand for fruits and vegetables produced under organic (or other sustainability initiatives) as well as the implications for producers. Understanding consumer preferences for sustainable production practices' labels is vital for understanding the future market of products grown using these practices. Members of our group will continue to conduct surveys and experiments to better understand the market response to new labels that might encourage farmer adoption of sustainable production practices.

The work that continues among members at Colorado State University, we see a number of potential long-term impacts related to the availability of improved market-based data that will allow researchers in S-1088 to further assess risk, viability and performance of farms that have adopted (or are considering) a business strategy change to integrate more direct or intermediated sales. For those providing technical assistance, financing (i.e., Farm Credit) and risk management tools (RMA) to such producers, these analyses are vital.

Additionally, as some of the current work among S-1088 members focuses on the effects of food policy on consumers, our ongoing research will inform whether policies meant to improve farm performances (that is, support for local farming / farm-to-school programming) can have spillovers on household purchasing habits. Increasingly, we are looking beyond the farmgate to how policies also influence downstream manufacturers in the food and beverage industry.

Lastly, member's work in S-1067 (and now S-1088) has offered economic information on some of the most pressing and important questions related to the commercialization and adoption of new specialty crop cultivars. The selection of new cultivars is one of the most important considerations in the long-term development of a sustainable and economically viable industry. Work from our group has provided information that informs this debate and has performed an assessment of the potential long-term impacts on adoption based on growers' willingness to pay for new varieties and consumer demand for these varieties while also considering the complications that exist to enhance coordination among university breeding programs and organizations in charge of propagating these new varieties. Results from our research and extension programs have been used to improve the accessibility to new plant varieties, and we expect this to be an important topic moving forward given the surge in the number of new cultivars being considered in the fruit and vegetable sector. Also, insights provided on the costs and benefits of adopting cutting-edge technologies in university breeding programs could help policymakers to implement mechanisms to enhance adoption of cultivars that may provide net economic benefits to interested stakeholders.