

**Nominating Region:** Southern Region

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**Project:** S1067 *Specialty Crops and Food Systems: Exploring Markets, Supply Chains and Policy Dimensions*

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**Issue:** Fruit and vegetable growers seeking to develop sustainable and profitable markets for their specialty crops must recognize and harness opportunities emerging from changes in consumer preferences and an increasingly complex food distribution system. Despite the increased popularity of fresh produce in the U.S., and the potential for enhanced marketing revenues for producers, the majority of fresh produce continues to be marketed through large-scale wholesale and retail partners who are concerned about the efficiencies associated with scaling-up. Fundamentally, little is known about the response of increasingly demanding consumers and food supply chain partners, the changing coordination and supply chain responses of fruit and vegetable enterprises, or the response to regulations and policies developed to oversee and guide new innovations in this sector.

This project has addressed the need for meaningful economic research focused on a diverse array of issues facing the fruit and vegetable industry in the U.S.; research that needed a critical mass of experts both related to markets and to the specialty crops that poise the most promise. As fruit and vegetable issues have received less attention in most agricultural and applied economics programs, so few members have a critical mass of colleagues in their state with which to collaborate. Hence, this research group has broadened working networks and leveraged various state-level efforts related to specialty crop economic research through cross-state partnerships. In addition, given the nature of specialty crops and the confounding issue of a traditional marketing system for large-scale wholesale and retail outlets, expertise from multiple states with a portfolio of fresh products is critical for a comprehensive market assessment of products needed to address seasonality in production and constant market demand on the consumer side. As a result, S1067 has provided a full assessment of potential implications for consumers and producers of domestically produced fruits and vegetables, and for policy makers to adapt to these new dynamics.

**Objectives:** S1097 members seek to evaluate and share opportunities that will allow specialty crop markets for fresh fruits and vegetables to remain economically profitable and competitive in the long run by:

1. Developing produce demand and market valuation models that can evaluate effects of increasingly complex product differentiation schemes (e.g., certified organic, enhanced health claims, biodynamic), trade, commodity marketing programs, labeling programs (local, food miles, Fair Trade), traceability systems, and food safety events in U.S. produce markets.
2. Analyzing the relative benefits and costs, to producers and consumers, of government and industry-led marketing and policy programs (e.g., certifications, Leafy Greens marketing order, Country of Origin Labeling, farmers' markets) using both theoretical approaches and empirical evidence from multi-state applied research projects.
3. Assessing 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).

## **Accomplishments:**

**Outputs:** During 2015-2019, S1067 members obtained 51 grants that resulted in the authorship of 213 refereed journal articles, along with 217 outreach industry presentations, 150 extension/outreach industry publications, 121 academic presentations, 27 books or book chapters, 22 refereed conference proceedings, 30 reports to states, stations, or agencies, and 41 blog posts. Academic contributions have advanced the assessment of the implications for consumers and producers regarding domestic and global shifts, and have contributed to improving producers, wholesalers, retailers, and consumers adaptation of these new dynamics. Associated extension and outreach outputs have increased the economic profitability for domestic fruit and vegetable producers and marketers.

**Outcomes:** Outcomes achieved by S1067 are vast. One of the most impactful outcomes was an assessment of how public policies - specifically related to food labelling requirements - affect consumers' food choice decisions and consumption. As an example, S1067 researchers found that consumers were more likely to waste food when date labels used words that suggest concerns for food safety versus quality or freshness. Similarly, consumer demand for certified organic products was assessed to identify six distinct types of information to help producers: characteristics of likely buyers, the most appealing product attributes, the effectiveness of food advertisements, the value of certified organic and natural labels, and preferred purchasing outlets. Willingness to pay price premiums were estimated for several products (blended wines; fruit quality characteristics of apples, peaches, cherries, and strawberries; sweet potatoes with cosmetic blemishes; biodegradable mulches to replace plastic use in agriculture; gene-edited apples and table grapes) and for various groups across the supply chain (producers, consumers, and marketing intermediaries). New methodologies to improve consumers' food choice decision modeling through the labels were developed, including subjective beliefs and preferences that enable more effective simulation of the effect of promotional and informational campaigns altering consumers' beliefs. Multistate teams also assessed fruit and vegetable supply response to the availability of crop insurance programs. In addition, the optimal fees and royalties for newly introduced apple cultivars, including new rootstocks that can be paired with cultivars to help producers deal with a variety of physiological problems in apple production, were quantified. To culminate this body of work, S1067 members developed a "Communities of Practice" to analyze the economics of local foods with partners in NY, VT, IA, TN, WI, MI, FL, WA, NC, and IN; this information (and more) was developed in cooperation with the Agricultural Marketing Service and published as a *Toolkit to Assess the Economic Implications of Food System*, available at: <https://localfoodeconomics.com>.

**Impacts:** The produce sector is facing complex product differentiation schemes, thus there was a need to evaluate the profitability of a diverse array of potential claims to increase demand including enhanced health, food safety, traceability, and production practices. Demand and market valuation model outcomes developed under this project have guided producers in improving production and marketing strategies. Advances have most notably focused on fresh fruit varieties with the greatest potential for commercial success, transportation strategies that optimize the distribution channel, and product labels that better inform the public. There is an abundance of government and industry-led marketing and policy programs; the team assessed the benefits and costs of such programs to both producers and consumers. The findings of the S1067 teams have provided policy makers with new information on two key topics: food waste mitigation and crop insurance as a risk management tool. The produce sector often relies on the supply chain structure to successfully locate their products in the marketplace. As such, it has been useful to assess coordination and supply chain

management to identify the most successful practices and harmonize/standardize performance benchmarks throughout the sector. For example, the Colorado Fruit and Vegetable Growers Association has increased its membership to over 300 members since partnering with CSU-S1067 members who provide educational programs in marketing, food safety, and supply chain innovations.

**Added-value and synergistic activities across mission areas:** This project has successfully established a team of scientists from both the academic and federal government sector to jointly and comprehensively address economic issues throughout the production, distribution and marketing system of fresh fruits and vegetables. Annual S1067 meetings have been attended by an average of 16 scientists whereby synergy has been fostered through the refinement of ideas, focus, and collaborations among academics in applied economics with distinct regional expertise. As a result, researchers at 26 different institutions have collaborated over the last five years, many of which leveraged external funding since 2015, amounting \$13 million accrued in grant awards. The S1067 also established research relationships with the USDA-AMS Food Systems Research Group to analyze the economics of local and regional food systems and report to the public via website as reported earlier, and on key topics such as the economics of CSAs (“community supported agriculture” systems), food hubs, supply chain innovations, and urban agriculture. Further, the USDA-ERS has supported engagement with S1067 members through cooperative agreements that allowed access to datasets and surveys to analyze emerging policy questions that allowed for an economic analysis of the economics of food safety regulation compliance, food loss and waste, changing consumer demand for produce linking to nutrition standards, changing contracts and supply chains, and local food systems. The regionally integrated research and extension faculty are currently working on two large SCRI grants to help guide the development of profitable blueberry, cranberry and grapevine cultivars; the establishment and success of S1067 is evidenced in these new collaborations that allow for a more comprehensive and expanded group of multidisciplinary faculty to better design cultivars.

**Evidence of multi-institutional and leveraged funding by state of lead PIs (of 51 total):**

- WA, MS. 2019-2023. Vaccinium CAP: Leveraging Genetic and Genomic Resources to Enable Development of Blueberry and Cranberry Cultivars with Improved Fruit Quality Attributes. PI. M. Iorizzo (NCSU). \$6,417,340. USDA-NIFA-SCRI.
- WA, NY. 2017-2021. VitisGen2: Application of Next Generation Technologies to Accelerate Grapevine Cultivar Development. PI: B. Reisch (Cornell). \$6,550,976. USDA-NIFA-SCRI.
- KY, SC, NC, AR. 2018-2020. Measuring and Building on Local Food System Vitality for Communities in the South. PI. T. Woods (University of Kentucky). \$493,560. USDA-NIFA.
- AZ, IN. 2019-2020. Increasing Market Profitability: Applying Economic Models to Optimize Vendor Mix Strategies and Target Market Areas. PI. L. Chenarides (Arizona State University). \$6,000. Institute for Social Science Research Seed Grant, Arizona State University.
- CO, KY. 2015-2017. Market Channel Assessments for Colorado Fruit and Vegetable Growers. \$108,000. PI. R. Jablonski (CSU). USDA-AMS-FSMIP.
- NJ, NY, PA. 2012-2016. Developing Wine Marketing Strategies for the Mid-Atlantic Region. \$94,947. PI. Kathy Kelley (PSU). USDA-AMS-FSMIP.

**S1067 Participating institutions and units:**

Arizona State University	University of Delaware Tech – Coop. Extension
Colorado State University	University of Florida
Cornell University	University of Georgia
Kansas State University	University of Illinois
Mississippi State University	University of Kentucky Tech – Coop. Extension
North Carolina State University	University of Maine
North Dakota State University	University of Missouri
Ohio State University	University of Tennessee
Oregon State University	University of Wisconsin
Pennsylvania State University	Utah State University
Purdue University	Virginia Tech – Coop. Extension
Rutgers University	Washington State University
Texas AM University AgriLife Research	University of Delaware Tech – Coop. Extension