

2022 Report

CSU Produce Network



**COLORADO STATE
UNIVERSITY**

By The Numbers in 2022

- Total clients reached: 1,425
- Total clients evaluated: 216
- Average % of clients reporting knowledge gained: 62.5%
- Average % of clients reporting intent or use of knowledge gained: 54%
- Educational events (talks/trainings/demos/webinars): 113
- Papers/reports/factsheets published/released: 13
- Active research projects: 29
- Active engagement projects: 33
- External partners/organizations engaged: 119
- External funds (grants, donations, etc.) used on projects and programs: \$691,402

Colorado Produce Overview

According to the 2017 Census of Agriculture, 85,405 Colorado acres were in fruit and vegetable production, contributing nearly \$304 million to Colorado in farm gate sales that is multiplied as it goes through the value chain. There were 54,115 acres of pulses (dry edible beans and peas) in 2017 contributing \$6M in 2021, according to USDA-NASS.

Colorado has a rich history of fruit, vegetable and pulse production, one that Coloradans enjoy through retailers, restaurants, institutions, and direct to consumer sales.

Produce is not only an important economic driver for rural Colorado through fruit, vegetable and pulse farms, it is a keystone of health and wellness.

CSU is proud to serve the needs of Colorado's produce farmers and welcomes input to improve its work and impact.

We are pleased to share a slice of our 2022 work from 11 contributors in this report.

A New Produce Sector Asset

The CSU Produce Network was formed in fall of 2022 and is composed of 31 campus and field based faculty and staff working in fruit, vegetable and pulse research and/or Extension outreach and engagement. It offers enhanced service to the Colorado produce industry through more informed, coordinated, and co-created CSU contributions. Members share their work and impacts through improved measurement and reporting of outcomes.

In 2022, Network members worked in various ways to benefit the Colorado produce industry.

This report is a snapshot of educational events, projects, research and other outputs delivered to fulfill its mission.



1425

Clients reached in 2022

188

Total Network Outputs

119

External Partners

\$691K

External Funds at Work in 2022



Table of Contents

COVID Impacts to Markets.....p 2

Leveraging New Crop Knowledge and Networks.....p. 2

The Next Generation of Farmers and Ranchers.....p. 3

Wine Grapes that Work in Colorado.....p. 3

New Vegetable Varieties for the Arkansas Valley.....p. 3

Outreach for Grower Success in Produce Safety.....p. 4

Tools that Help Organic Growers Thrive....p. 4

Resources to Keep Farm Workers Safe....p. 5

New Markets for Colorado Produce.....p. 5

Good News for Onion Lovers.....p. 6

Solar Energy has a New Neighbor.....p. 6

CFVGA Conference Goes Hybrid.....p. 7

List of Contributors.....p. 7

COVID Impacts to Markets

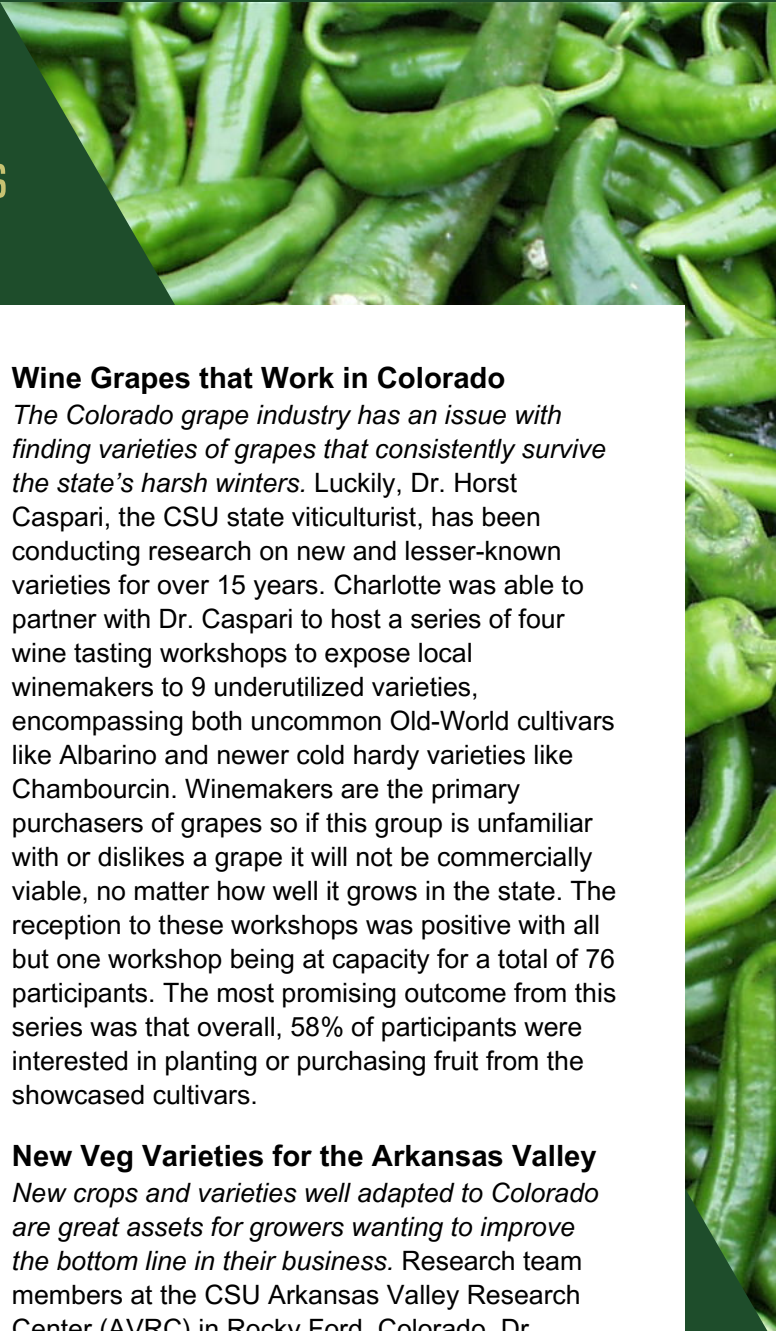
When COVID impacted markets for ag products, one of CSU's responses was to partner with collaborators to better understand impacts.

Through a USDA Ag Marketing Service funded COVID project, Dawn Thilmany, Becca Jablonski, Libby Christensen and team helped to assess market dynamic changes with federal and state partners (Farmers Market Coalition, CSA innovation Network, Wallace Center) that will influence the market access and opportunities faced by producers. That team produced 3 fact sheets and 2 webinars available to producers in Colorado and nationally. The project was funded by a \$600K grant and will conclude in 2024.

Leveraging New Crop Knowledge and Networks

When you want to go far, go together. In collaboration with Cornell University and under the leadership of Rebecca Wasserman-Olin (a CSU PhD student), CSU became part of the sweet potato clean plant network and supported the economic analysis of breeding and production work they are doing across the US. This was funded by a \$65K grant and we have applied as a team to be part of a \$2 million grant (with CSU getting \$600K of those monies). Although sweet potatoes are a minor crop in Colorado, this has allowed us to become integrated into a network that will allow us to propose work with key Colorado crops moving forward.





The Next Generation of Farmers and Ranchers

In addition to market intel, startup ag businesses need foundational business planning and management support for long term success. Martha Sullins, Dawn Thilmany and team continue to support the CSU Building Farmers and food entrepreneur programs across the state of Colorado, sometimes directly by CSU and sometimes in cooperation with partners (Valley Food Partnership, Pueblo Food Project, Poudre Food Partnership). These programs help producers to better understand business planning needs that will allow them to grow their revenues and market channels. The team has secured approximately \$125K to be part of or evaluate these projects and technical assistance programs through USDA-BFRDP award 2021-70033-35702.



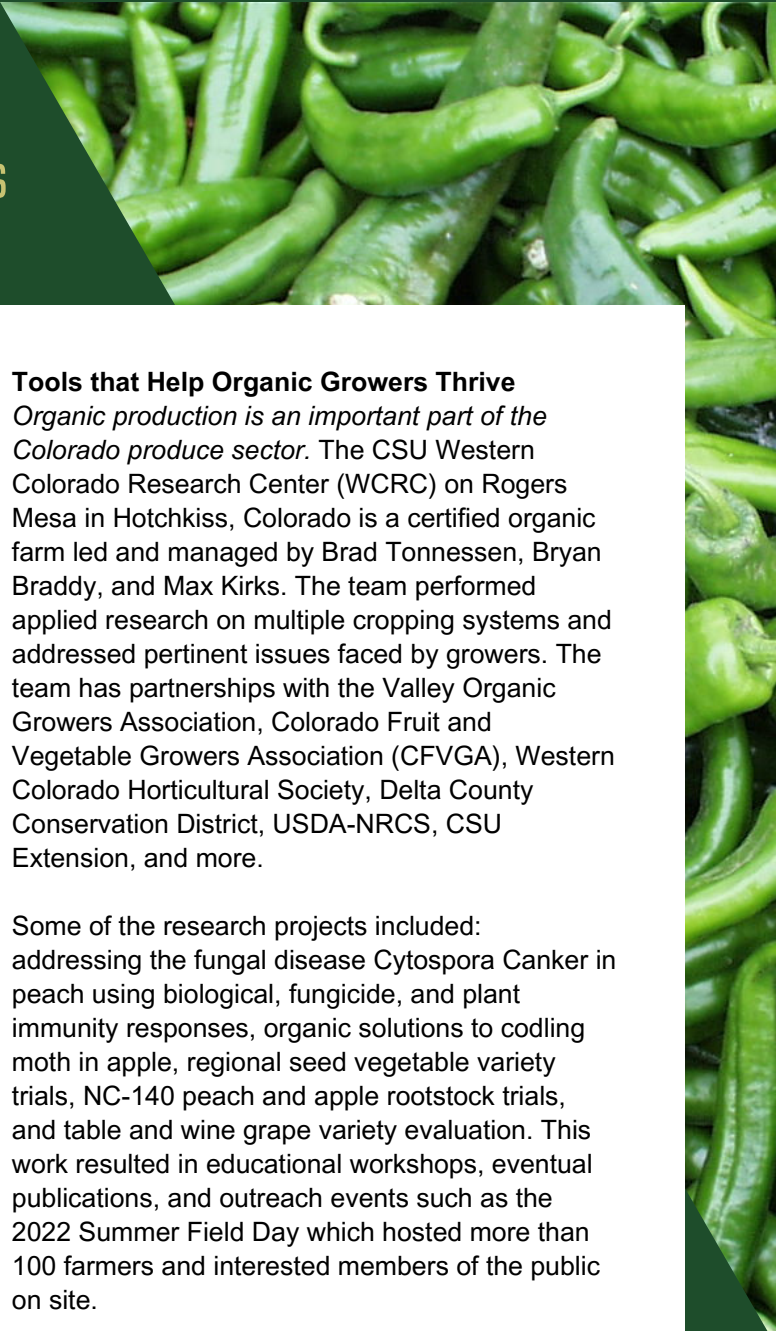
Wine Grapes that Work in Colorado

The Colorado grape industry has an issue with finding varieties of grapes that consistently survive the state's harsh winters. Luckily, Dr. Horst Caspari, the CSU state viticulturist, has been conducting research on new and lesser-known varieties for over 15 years. Charlotte was able to partner with Dr. Caspari to host a series of four wine tasting workshops to expose local winemakers to 9 underutilized varieties, encompassing both uncommon Old-World cultivars like Albarino and newer cold hardy varieties like Chambourcin. Winemakers are the primary purchasers of grapes so if this group is unfamiliar with or dislikes a grape it will not be commercially viable, no matter how well it grows in the state. The reception to these workshops was positive with all but one workshop being at capacity for a total of 76 participants. The most promising outcome from this series was that overall, 58% of participants were interested in planting or purchasing fruit from the showcased cultivars.

New Veg Varieties for the Arkansas Valley

New crops and varieties well adapted to Colorado are great assets for growers wanting to improve the bottom line in their business. Research team members at the CSU Arkansas Valley Research Center (AVRC) in Rocky Ford, Colorado, Dr. Jianbing (JB) Ma, Kevin Tanabe, Lane Simmons, conducted a series of vegetable variety trials aiming to test the environmental adaptability of broccoli, melons and sweet corn grown in Western US and then diversify the variety selections for vegetable growers in Southeastern Colorado. These projects were collaborative efforts with Seminis Vegetable Seeds which is the vegetable division of Bayer Crop Science. During the season, vegetable trials were demonstrated and shared with area CSU Extension agents, CSU College of Agricultural Sciences faculty members and local growers. By selecting novel vegetable genetics such as raised head broccoli, stem broccoli, seedless watermelon and extended shelf-life (ESL) cantaloupes at the Arkansas Valley, we hope to provide alternatives that may help growers reduce labor costs and increase profitability.

2022 Work and Impacts



Outreach for Grower Success in Produce Safety

Produce safety compliance is the gateway to produce sales, especially with wholesale buyers. The Colorado Produce Safety Collaborative or CPSC (Martha Sullins, Michele Ritchie, Eduardo Gutierrez-Rodriguez, from CSU and Beth LaShell from Ft. Lewis College. See coproducesafety.org) worked together to offer food safety training and education for produce growers. They created multiple opportunities to engage Colorado growers and help them learn about identifying and reducing risks on their farms and better positioning themselves to enter or remain in competitive markets. This work leveraged several partnerships, including the Colorado Fruit and Vegetable Growers Association, the Produce Safety Alliance, University of Vermont School Extension, Food Bank of the Rockies, and Fort Lewis College. The multi-modal approach to produce safety education and technical support (in-person and remote) has allowed growers to access new markets, meet buyer requirements, and ensure the success of their businesses by improving risk management strategies.

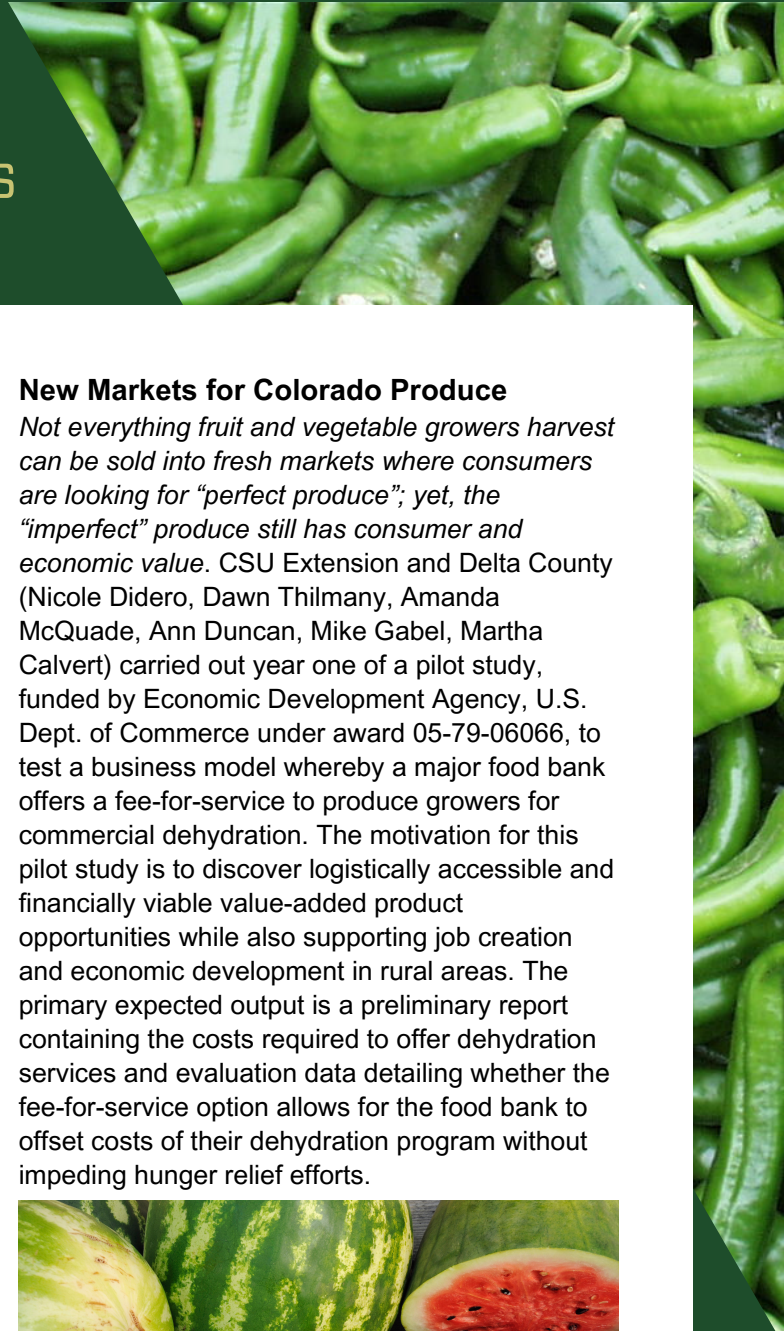
Tools that Help Organic Growers Thrive

Organic production is an important part of the Colorado produce sector. The CSU Western Colorado Research Center (WCRC) on Rogers Mesa in Hotchkiss, Colorado is a certified organic farm led and managed by Brad Tonnessen, Bryan Braddy, and Max Kirks. The team performed applied research on multiple cropping systems and addressed pertinent issues faced by growers. The team has partnerships with the Valley Organic Growers Association, Colorado Fruit and Vegetable Growers Association (CFVGA), Western Colorado Horticultural Society, Delta County Conservation District, USDA-NRCS, CSU Extension, and more.

Some of the research projects included: addressing the fungal disease Cytospora Canker in peach using biological, fungicide, and plant immunity responses, organic solutions to codling moth in apple, regional seed vegetable variety trials, NC-140 peach and apple rootstock trials, and table and wine grape variety evaluation. This work resulted in educational workshops, eventual publications, and outreach events such as the 2022 Summer Field Day which hosted more than 100 farmers and interested members of the public on site.



2022 Work and Impacts



Resources to Keep Farm Workers Safe

Colorado produce growers were concerned about recent legislation, the Colorado Agricultural Workers' Rights and Responsibilities Act (ALRRA, also known as SB21-087). CSU's High Plains Intermountain Center for Agricultural Health and Safety (HICAHS) knows about the strains of agricultural work and stepped up to provide growers with assistance in complying with the new law.

ALRRA requires growers to describe the altered work processes implemented on farms to reduce the risks of injury when hand weeding is done for more than 20% of a work week. To do so, Colorado produce growers needed a baseline understanding of ergonomic impacts to farmworkers. In partnership with CFVGA, the research team used wearable monitoring devices to measure the trunk positions of workers during weeding and harvesting tasks (43 workers from 4 farms). The data from these monitors were analyzed to determine the magnitude and lengths of stooped postures experienced by workers during these tasks.

The preliminary study insights include: 1) posture varies person-to-person, even for those completing the same task; 2) the length and types of stooped postures vary by tasks and specific product being harvested; and 3) stooped postures, and specifically risk of low back injury, can be minimized with the correct use of long-handled tools.

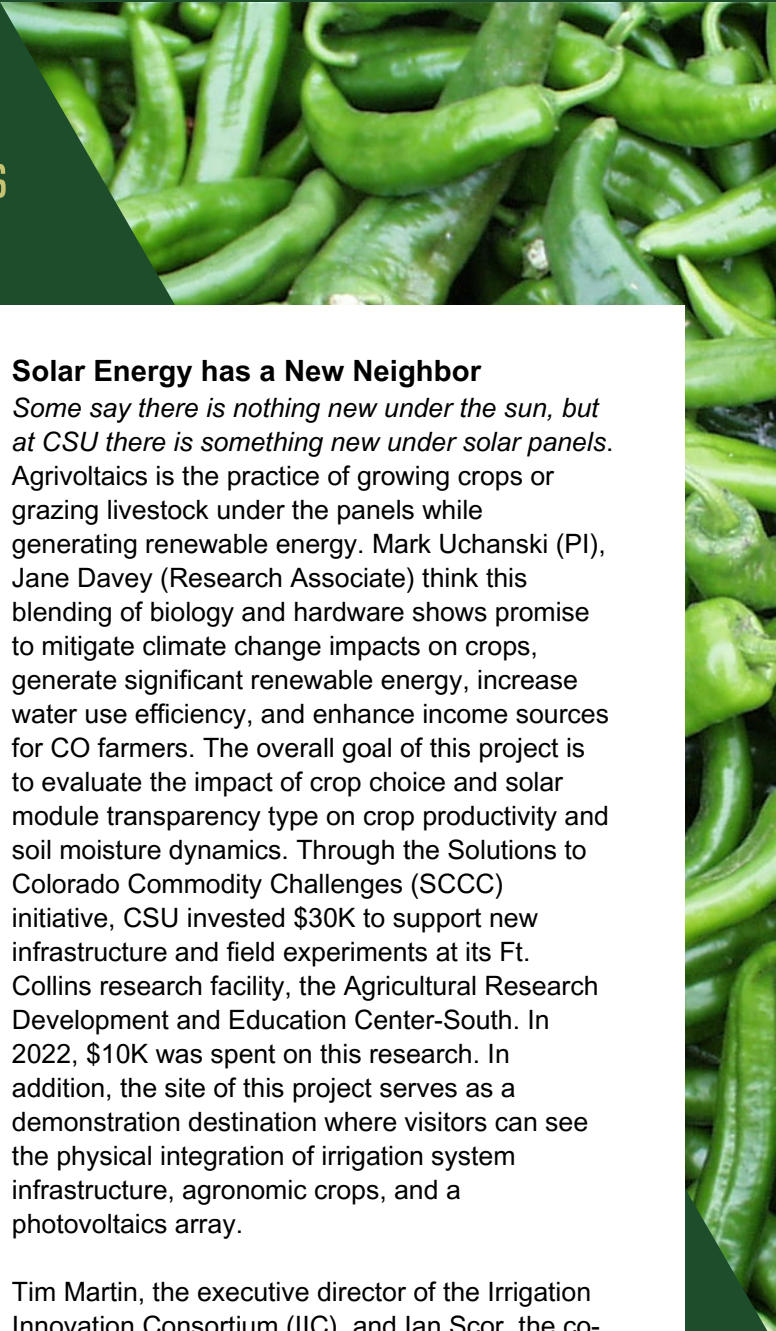
Among the heat illness prevention rules established by ALRRA was the requirement that employers provide annual training to employees on the signs, symptoms, risk factors, first aid, and local response procedures for heat-related illness.

The HICAHS team created two new resources: a training script (in Spanish and English) adapted from the University of California-Davis and a video featuring current farmworkers describing the practices they employ to keep themselves safe in the heat.

New Markets for Colorado Produce

Not everything fruit and vegetable growers harvest can be sold into fresh markets where consumers are looking for "perfect produce"; yet, the "imperfect" produce still has consumer and economic value. CSU Extension and Delta County (Nicole Didero, Dawn Thilmany, Amanda McQuade, Ann Duncan, Mike Gabel, Martha Calvert) carried out year one of a pilot study, funded by Economic Development Agency, U.S. Dept. of Commerce under award 05-79-06066, to test a business model whereby a major food bank offers a fee-for-service to produce growers for commercial dehydration. The motivation for this pilot study is to discover logistically accessible and financially viable value-added product opportunities while also supporting job creation and economic development in rural areas. The primary expected output is a preliminary report containing the costs required to offer dehydration services and evaluation data detailing whether the fee-for-service option allows for the food bank to offset costs of their dehydration program without impeding hunger relief efforts.





Good News for Onion Lovers

Onions may be the world's leading vegetable, yet they are threatened by bacterial diseases. CSU researchers Mark Uchanski (CO-PI) and Jane Davey (Research Associate) are Colorado's contributors to a national project to prevent rot in onions caused by bacteria. The central goal of this project is to support profitability and sustainability of onion production. U.S. bacterial pathogens cause more than \$60M in damages every year nationally due to a poor understanding of the pathogen and lack of management options. "Stop The Rot (STR): Combating onion bacterial diseases with pathogenomic tools and enhanced management strategies" organizes 24 scientists across the U.S. from 12 research universities to conduct a national survey across all onion growing regions and field research trials to develop effective solutions for disease management. A stakeholder advisory panel consisting of growers and members of the National Onion Association evaluate the project for potential adoption of management strategies that reduce the production cost and amount of chemical and biological control products applied onion crops.

In 2022, symptomatic onions were sampled from nine CO onion producers and storage facilities to determine the bacterial pathogens present. Onion research trials were also conducted at CSU to evaluate commercially available bactericides for their ability to manage bacterial bulb rots through field applications as well as in storage after harvest. Seven chemical companies, crop advisors, and application companies were involved in research at CSU. Research findings were shared at 2 national scientific association meetings and one CO stakeholder meeting with two technical papers accepted for publication and one graduate student awarded an M.S. degree from CSU.



Solar Energy has a New Neighbor

Some say there is nothing new under the sun, but at CSU there is something new under solar panels. Agrivoltaics is the practice of growing crops or grazing livestock under the panels while generating renewable energy. Mark Uchanski (PI), Jane Davey (Research Associate) think this blending of biology and hardware shows promise to mitigate climate change impacts on crops, generate significant renewable energy, increase water use efficiency, and enhance income sources for CO farmers. The overall goal of this project is to evaluate the impact of crop choice and solar module transparency type on crop productivity and soil moisture dynamics. Through the Solutions to Colorado Commodity Challenges (SCCC) initiative, CSU invested \$30K to support new infrastructure and field experiments at its Ft. Collins research facility, the Agricultural Research Development and Education Center-South. In 2022, \$10K was spent on this research. In addition, the site of this project serves as a demonstration destination where visitors can see the physical integration of irrigation system infrastructure, agronomic crops, and a photovoltaics array.

Tim Martin, the executive director of the Irrigation Innovation Consortium (IIC), and Ian Scor, the co-founder of Sandbox Solar serve as partners. Four field tours brought 35 stakeholders, including members of Jack's Solar Garden, agrivoltaics researchers, CO farmers, as well as members of the community to CSU's research farm. An agrivoltaics poster was shared at the annual meeting of the CFVGA, a departmental seminar was given to a room of 15 CSU researchers and students, a research paper was accepted for publication, a graduate research project was completed, and one student was awarded an M.S. degree at CSU.



CFVGA Conference Goes Hybrid

In 2022 Adrian Card led a team composed of CSU (Martha Sullins, Kristi Bartolo, and Mike Bartolo), CFVGA (Marilyn Drake), Colorado Department of Agriculture (Danielle Trotta) and produce growers (Cade Kunugi, Robert Sakata, and Jason Webb) to successfully plan and execute the Colorado Fruit and Vegetable Growers Association 9th annual conference at the Renaissance Denver Central Park hotel. After success with a 2021 virtual conference, the team received a \$25,920 award from Colorado Department of Agriculture's Specialty Crops Block Grant Program and deployed its most technologically complex conference February 28 – March 1, 2022, with 299 total attendees and 34 joining remotely through the virtual platform. All sessions were recorded for on demand playback for all conference registrants.

For day one 100% of evaluation respondents reported knowledge gained and for day two 33 – 100% reported knowledge gained. Each of the 17 sessions (3 general and 14 breakout sessions) were evaluated separately. Additionally, 15 produce buyers and 35 exhibitors attended.



2022 Report Contributors:

Dr. Todd Ballard, Extension Tri-River Area Specialist, Agronomy

Adrian Card, Extension State Specialist, Specialty Crops

Jane Davey, Research Associate, Specialty Crops, Dept of Horticulture and Landscape Architecture

Nicole Didero, Extension Western Regional Specialist, Food and Agriculture

Dr. Jianbing Ma, Research Scientist and Extension Vegetable Specialist, Arkansas Valley Research Center

Dr. Charlotte Oliver, Extension Western Regional Specialist, Viticulture

Whitney Pennington, Outreach Coordinator, High Plains Intermountain Center for Ag Health and Safety

Martha Sullins, Extension Regional Specialist, Ag Business Management and Food Systems

Dr. Dawn Thilmany, Professor, Dept of Ag and Resource Economics

Dr. Brad Tonnessen, Research Scientist, Western Colorado Research Center, Rogers Mesa

Dr. Mark Uchanski, Associate Professor, Specialty Crops, Dept of Horticulture and Landscape Architecture

Contact: Adrian Card, CSU Produce Network Coordinator, adrian.card@colostate.edu