



THE UNIVERSITY OF ARIZONA

Yuma Center of Excellence  
for Desert Agriculture

# IMPACT

2022  
ANNUAL  
REPORT



# Agricultural Water

YCEDA was formed to provide quick responses to pressing issues faced by desert agriculture production. From our start in 2014, our key focuses included water and nutrient management, plant pests and disease, food safety, soil health, and agricultural technology. With Arizona in a megadrought and the proclamation that 20-40% of annual Colorado River allocations must remain in Lakes Powell and Mead, water immediately became the #1 concern of YCEDA's stakeholders. We have responded in many ways:

## 1. Irrigation and Soil Salinity Research Project

**IRRIGATION EFFICIENCY** -- UArizona and USDA research partners are wrapping up a 7-year, multi-million dollar study which aimed to quantify existing water and salt management practices and identify opportunities for improvement. These studies show that the irrigation efficiencies of vegetable and rotational cropping systems in the Yuma area are very high. The data also show net in-season salt buildup, meaning pre-season irrigation for salt leaching is of paramount

importance to sustainability. Due to the need to manage salt regardless of irrigation method, and since any in-season water saving would increase subsequent off-season leaching requirements, it is not likely that wide-spread implementation of drip irrigation will result in significant water savings from the vegetable production systems in the Yuma area. A new whitepaper presents the findings, and crop-by-crop results are being published in peer-reviewed journals. As water scarcity continues, the study's outputs can help growers apply only what water is needed for the crop plus sufficient leaching to maintain a healthy soil salt balance.

**FALLOWING** -- The impacts of fallowing are not as straightforward as saving the irrigation water that isn't applied. Capillary rise of shallow saline water during fallow periods increases salinity in the root zone, and a pre-irrigation would be required to restore conditions suitable for salt-sensitive vegetable crops. Rotational crops produced in the desert continue for business continuity reasons and because they are thought to provide soil health benefits realized by the subsequent vegetable crops. Future research is needed to address this issue.

**IRRIGATION/SOIL SALINITY MANAGEMENT** -- The study has created a unique database which can be used for further research and forms the basis of a mobile App called DesertAgWISE that we are developing with the UArizona Cyber Communications Team. The DesertAgWISE App will use the research results, real-time weather data and satellite imagery to suggest watering schedules and amounts as well as track soil salinity balance for each field throughout the seasons. Anyone wishing to be an early adopter can visit [DesertAgWISE.org](http://DesertAgWISE.org).

## 2. Dairy Water Footprint Research Project

YCEDA has received funding to coordinate research with the Arizona dairy industry on minimizing dairy's water footprint -- especially through producer adoption of improved crop production techniques. The research will be performed by top Cooperative Extension researchers from around the state in the areas of dairy, Ag economics, agronomy, and soil health. Phase 1 includes analysis of producer adoption of water-saving techniques as well as in-person surveys of dairy producers to understand barriers to adoption. This should lead to Phase 2, which will address the knowledge and research gaps identified in Phase 1 to enhance adoption of proven techniques for water savings.

IMPACT



### 3. Sharing the Story of Ag Water Conservation & Innovation

**MEDIA INTERVIEWS** -- Through dozens of print, radio, television and social media interviews, YCEDA assures that Ag's voice is heard by sharing the story of desert agriculture's incredibly productive, efficient and reliable contributions to the nation's food supply and rural economies.

**YUMA AG WATER VIDEO PRODUCTION** -- We coordinated production of professional videos, 30 seconds to 20 minutes in length, that tell the story of Yuma agriculture's history, efficiency, productivity, and importance in an effort to inform the public and policymakers that desert agriculture makes excellent use of its water resources and is always working to improve productivity and efficiency. Please watch and share the videos, which can be found at [Yumaagwater.com](http://Yumaagwater.com).

### 4. Harnessing University Expertise

**PRESIDENTIAL COMMISSION** -- YCEDA's Executive Director is chairing the *UArizona Presidential Advisory Commission on the Future of Agriculture and Food Production in a Drying Climate*, with the intent of bringing university expertise and resources to bear on keeping agriculture productive in the face of water cutbacks and other challenges. We plan to be there for you with options and information as you make hard decisions.

## Plant Disease and Soil Health

The YCEDA plant health programs have made an impact on the industry by contributing to knowledge for disease management and by supporting projects that bring new expertise into the Ag industry. Our Fusarium wilt of lettuce program has provided growers with an independent evaluation of Fusarium wilt tolerance and a side-by-side comparison of varietal performance to help growers make planting decisions and evaluate pre-commercial cultivars from breeders so comprehensive data on disease tolerance is available before release. Our evaluations of public breeding lines provide data on performance in the field under high disease pressure and allows selection of the most durable breeding lines. A recent project examining the population of the Fusarium wilt pathogen has told us that the population in Arizona is likely still race 1, but we will monitor for new races that may emerge in the future. This project has expanded to include California, and a working group of US and International researchers was formed to continue screening for new races, develop new projects and harmonize evaluation methods.

YCEDA has new and ongoing projects addressing the important lettuce diseases downy mildew and impatiens necrotic spot virus (INSV). A trial was planted recently with commercial cultivars to confirm downy mildew resistance (DMR), and a set of lettuce lines will identify specific genes that can be used for breeding for the Arizona population and help identify the pathogen races. The population of the pathogen will shift over time, but if this trial continues yearly, the population can be tracked, helping growers make planting decisions and informing breeding programs on what resistant genes are durable.

A project addressing INSV in collaboration with Dr. John Palumbo has shown that the virus comes to Yuma via thrips on fall transplants and does not persist in high levels in the weed population over the summer. YCEDA continues to assist with this project by helping test thrips and weeds to track the virus throughout the year. This work has impacted the handling of transplants brought into Arizona and potentially reduced the spread of disease.

YCEDA's small grants program is another mechanism to stimulate research work and proof of concept on important topics in desert agriculture. These

grants have helped start new desert soil health programs including projects to investigate the benefit of cover crops and soil health products, the relationship between the soil microbiome and plant disease, and to develop a comprehensive soil health assessment in Yuma. These projects are being used to initiate larger projects that can add to growers' toolboxes for plant disease, water efficiency and productivity.

## Broadband Access for AgTech

High value specialty crops are the perfect place to develop and use the latest technology. Whether you call it AgTech, Smart Farming, Precision Ag or something else, one thing underlies all of the technologies that are rapidly being developed and deployed on the farm: broadband access from the farm field to the Cloud. And it has to be wireless, because you can't drag fiber behind a tractor.

YCEDA has successfully worked with Yuma County and the State of Arizona over the past several years to implement a county-wide broadband fiber network to ultimately bring high speed wireless service to all Ag areas in the county. That is all coming to fruition, with over \$30M already committed to building middle-mile infrastructure to lower the barrier for service providers to cover the area, and another \$6M for Ag wireless broadband towers. We also participated in a National Science Foundation funded planning project to explore high-speed networking for research into Smart Farms, with the goal of receiving funding to wire up the Yuma Ag Center as a Smart Farm and connect it to regional research and academic institutions.

It's all very exciting and is becoming reality. Yuma County will offer some of the best connectivity anywhere, which will attract researchers and developers from around the world to develop AgTech, and enable field sensors, drones, and automated equipment to be deployed anywhere, anytime.

## Laboratory Capabilities

With over \$3.5M of funding since 2020, YCEDA's wastewater-based epidemiology sewage testing COVID program has significantly contributed to the growth of our laboratory capabilities. In 2022, we acquired a state-of-the-art genome sequencer, a powerful technology that can read the DNA/RNA sequence of all pathogens, microbes, and/or targets of interest in a sample, and several members of our team have been trained to operate the machine. This instrument is the first of its kind in Yuma County and enables an entirely new suite of potential capabilities for analyzing public health, water quality, pathogen surveillance, and agriculture samples, amongst many more.

Through the success of this program, we continue to cultivate our research team and develop our staff. Over the past year, we added two full-time laboratory technicians dedicated to processing wastewater samples, a remote Ph.D. student at the University of North Carolina to conduct data analysis, a biostatistician to conduct disease modeling, and a collaboration with a public health expert from the Centers for Disease Control and Prevention (CDC) to our nationally recognized visiting researcher. As our capabilities grow, the Arizona Department of Health Services (ADHS) is supporting expansion of our disease surveillance to other communities in Arizona, including Santa Cruz and Pima Counties. In 2023, we are moving full steam ahead in adding new pathogens such as influenza, respiratory syncytial virus (RSV), and *Candida auris* to our surveillance system and look forward to continuing to bring in new technology, jobs, and expertise to Yuma County that will also allow us to impact food safety and plant disease challenges.





# YCEDA INVESTORS

## From the Director

I am very excited to share this 2022 Annual Report with our investors and stakeholders in the desert Ag industry! Why? Because we have accomplished so much, and so much of what we have accomplished is both relevant and timely with the big issues that agriculture faces. Whether it's mitigating water shortages and plant diseases, expanding our laboratory capabilities for public health, foodborne and plant pathogens, or driving infrastructure investment for on-farm broadband services to help modern AgTech flourish, we have responded to the needs expressed by our stakeholders in directly impactful ways. How? This only happens because of our unique support, partnership and collaboration with those directly involved in agricultural production in the desert as well as expert researchers from throughout academia.

Thanks to our growing track record, I believe we are at an inflection point of growth that will allow us to be even more impactful in these challenging times. Both financial support and collaboration from our partners in industry and academia are greatly appreciated as we strive to be uniquely impactful. I and all of our staff work hard every day to help our stakeholders be successful, and our door is always open to your ideas for how we can do that even more effectively.

To a prosperous 2023!

*Paul E. Brierley*  
YCEDA Executive Director

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## CONNECT WITH US



### EXECUTIVE OFFICES

899 E Plaza Circle, Suite #2  
Yuma, AZ 85365



### RESEARCH & LAB FACILITIES

6425 W. 8th St.  
Yuma, AZ 85364



928.773.6101



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