USDA-ARS GRAPE RESEARCH WORKSHOP

Portland, Oregon
November 29-30, 2017

Summary: The ARS Grape Workshop was held November 29-30, 2017, at the Courtyard by Marriot Portland City Center Hotel in Portland, Oregon. The meeting brought together 31 ARS researchers from 15 of the 22 ARS Research Projects coded for grapes, which represent $15.334 million in ARS base funding. Five National Program Leaders (NPLs), two Area Directors, and two ARS Deputy Administrators (DAs) attended the meeting that began with opening remarks by Chavonda Jacobs-Young, the ARS Administrator and Acting Deputy Under Secretary for Research, Education, and Economics (REE) Mission Area of USDA. Thirty-two stakeholders participated from raisin, table grape, juice grape, and wine industries. Leadership from grape commodity groups were present including the National Grape and Wine Initiative (NGWI) President, Donnell Brown, and Research Chair, Nick Dokoozlian. Short presentations by select ARS researchers on the first day emphasized ARS accomplishments and innovation, both in grape research and other crops. Nineteen posters representing 15 ARS programs were presented at the evening reception. The second day included presentations on a new ARS water unit in California, USDA-NIFA funding opportunities, and the ARS Grand Challenge concept. ARS researchers and stakeholders divided into four breakout groups to produce vision statements for future research on Genetics and Vines, Water and Soil, Disease and Insects, and Labor and Technology. 335 vision statements were generated, discussed, and ranked. A top priority consensus statement was discussed by NGWI research committee chairs and selected for funding as a NGWI-ARS cooperative planning grant: Precision viticulture and decision-support systems to improve productivity and quality. One evening reception was supported by the Oregon Wine Board and the Willamette Valley Wineries Association, and another evening reception, two breakfasts, two lunches and snacks throughout both days were provided by NGWI.

Planning was conducted by monthly conference calls. Planning team members include Maureen Whalen (Crop Production and Protection (CPP) DA), Jack Okamuro (CPP NPL), Tim Rinehart (CPP NPL), Jennifer Klemens (CPP Program Analyst), Donnell Brown (NGWI President), and Nick Dokoozlian (NGWI Research Chair, VP Research Gallo Wine). Meeting participants were selected from 22 ARS projects that are coded for grapes. Of those invited, only one ARS location was not represented in person by ARS scientists or an Area Director. The ARS Office of National Programs participated across three of the four program areas, or 11 of the 17 National Programs, because Animal Production and Protection was not involved.

Purpose:

- Present an update on ARS accomplishments in grape and wine research, and at the leading edge of relevant research across the agency;
- Build collaborative relationships for integrated research projects that span disciplines, locations, and sectors (government, industry, university, and extension); and
- Develop a national strategy for future research in grapes.

Also:

- Highlight ARS researcher accomplishments since the last grape workshop in 2010.
- Introduce National Program Leaders as ARS points of contact for grape research programs.
- Connect ARS research programs with shared, high-level research goals (with buy-in).
- Build consensus among ARS scientists and stakeholders for a top-ranked research priority and **advance at least one topic to the funding stage with the NGWI-ARS cooperative planning grant.**

Meeting Outputs:

In general, the main driver in all grape production is producing the **highest quality product**, regardless of whether it's wine grapes, raisins, table grapes, or juice, with the **most efficient costs**. The balance between high quality products and costs of production is tuned to individual growers (crops, sites, and markets) and adjusted each season according to product, labor availability, weather, and climate.

Vision statements = 299 statements were submitted using the suggested format, 36 were freeform.
The preferred format was a sentence describing a positive vision for the future of grape production.

> "In the next ten years, grape production will use _____ to provide _____for _____."

Participants were asked to provide at least two vision statements in each of four categories.

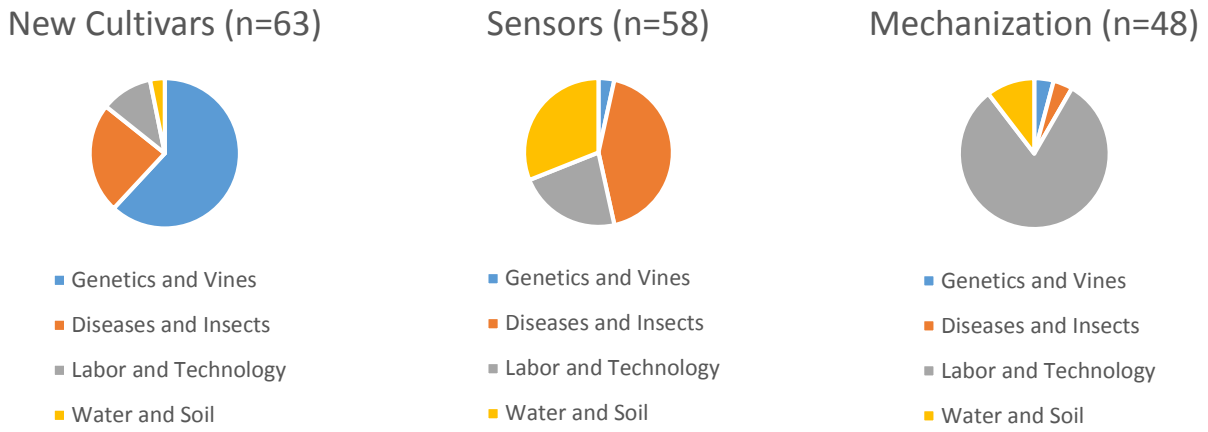
Genetics and Vines (87 vision statements submitted)
Disease and Insects (87 vision statements submitted)
Labor and technology (82 vision statements submitted)
Water and Soil (79 vision statements submitted)

Vision statements were produced and ranked by the four breakout groups independently. The top consensus statements within each group were selected for more detailed planning. All four groups reached a similar consensus, which was distilled into a single vision to be funded by NGWI as a NGWI-ARS cooperative planning grant.

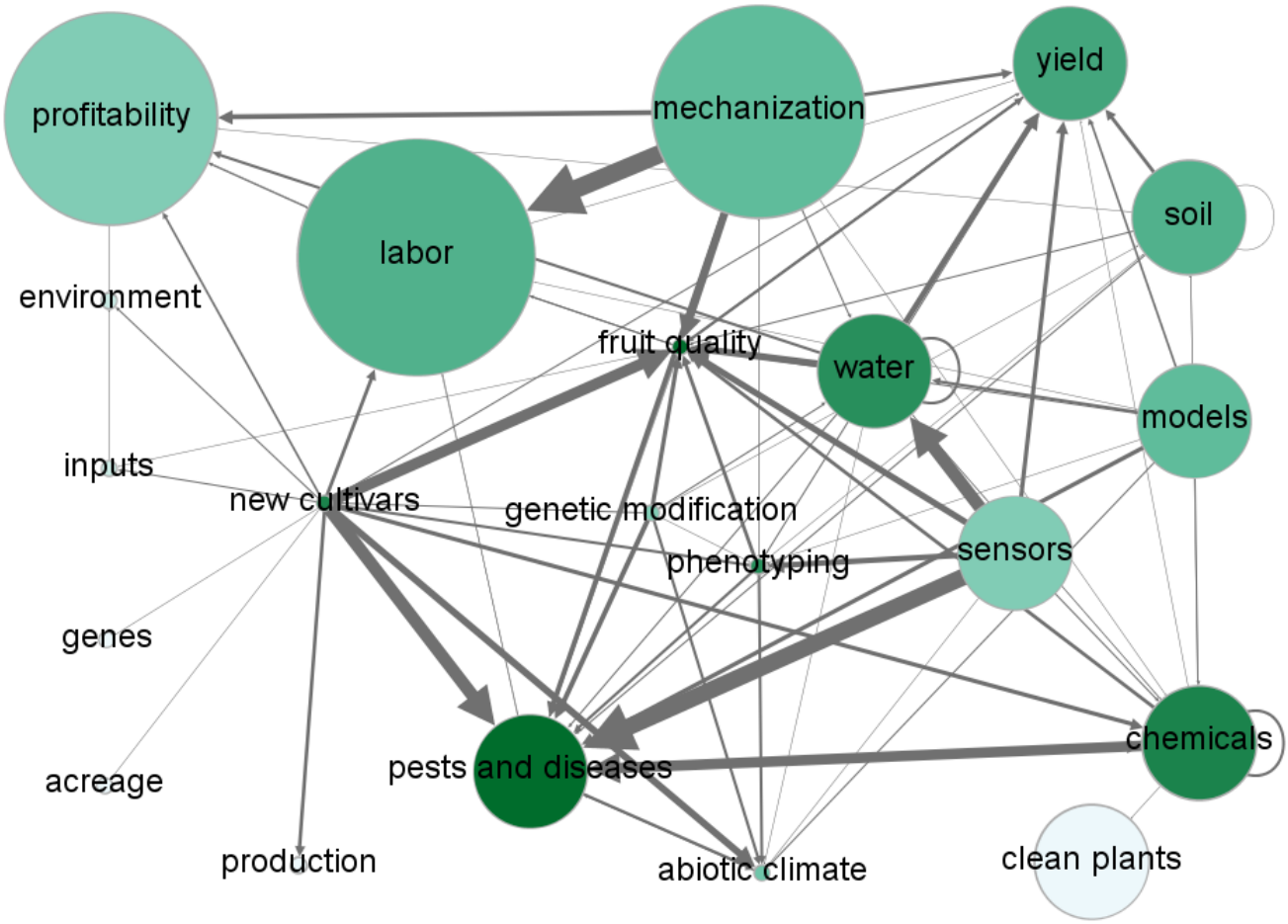
> "The grape industry is uniformly adapting and adopting precision agriculture technologies for viticulture to enhance sustainability by reducing inputs (labor and chemicals), improving productivity and quality of grape crops for real time decision-making and on-farm predictive, anticipatory action."

Concept and cluster analysis of the vision statements

New cultivars (62), sensors and imaging technology (57), and robotics and mechanization (42) were the most prevalent concepts that the grape industry "would use to…". GMO and gene editing was specifically mentioned 18 times, but listed separate from new cultivars. Some concepts had broad effects. For example, New Cultivars and Sensor Technology are found across categories while mechanization is concentrated in Labor and Technology.



The importance of Precision Agriculture, or site-specific crop management using real-time, sensor-based monitoring to create a decision support system for vineyard management, is reflected in the consensus vision statement and also the concept clustering shown below. Mechanization, sensors, and modeling are all thought to enhance water, labor, yield, fruit quality, and pest and disease resistance. This is complemented by new cultivars, and to a lesser extent phenotyping and gene editing, which are also expected to improve pest and disease, fruit quality, labor, and abiotic stress and climate factors.



Pests and Diseases and **Fruit Quality** were the most cited areas that will improve over the next ten years in grape production, and to a lesser extent **Profitability** and **Yield**. The relationship between Mechanization and Labor concerns was popular and consistent. New Cultivars and Sensors were major drivers for expected changes in Water, Pests and Disease, and Fruit Quality.

As such, the USDA-ARS Grape Research Workshop successfully communicated the **GxExM concept of a systems approach to grape improvement**, at least in the collective output of the vision statements. The role of fruit quality, including postharvest, was potentially under-represented in the inspirational talks on day one. Future references should include (**GxExM)xP**, where P=postharvest and directly connects gains from precision agriculture with improved product quality as well as increased efficiency and labor savings during production.