Multistate Research Fund
IMPACTS

Emphasizing STEM in High School Agricultural Education

In 2020, the USDA indicated that 29% of all job openings in the agricultural industry require scientific and engineering expertise. But this demand for workers with STEM (science, technology, engineering, and math) training surpasses the available supply of qualified candidates. Leading agriculture-based corporations indicate they cannot find suitable graduates with an agricultural background and scientific expertise. Recruitment and preparation are both contributing issues.

Land-grant universities are working together to enhance our workforce of qualified agricultural scientists.

Researchers across the U.S. are collaborating to:

- Revitalize awareness and interest in agriculture as a career path.
- Ensure that agriscience students have the skills and knowledge they need to succeed in college and careers.
- Support teachers so that they have the training and resources to effectively teach agriscience that incorporates STEM.

Accomplishments

During the past five years, researchers examined effective practices and developed a conceptual model for embedding STEM in agricultural education.

- The team identified core disciplinary ideas for STEM-based agricultural education and incorporated them into the Next Generation Science Standards. This has provided a foundation for determining how agricultural education programs can improve curricula to meet STEM learning goals.

- Project members revised and published an Innovation Configuration (IC) Map to help define what effective high school agriscience education looks like. The IC map helps identify what components of existing programs are being implemented well and which components need additional work. The IC map also provides research-based best practices for teaching agriscience. Project members distributed the map at national, regional, and local meetings with agricultural educators, school administrators, state leaders, and others.

- Project members created a survey to identify the methods, resources, and techniques of exemplary agriscience teachers and are developing professional development models and resources. This work is helping inform professional development like teacher trainings and pre-service and in-service programming.

With clear STEM standards and better resources for teachers, agricultural education programs will be able to better prepare students for academic and professional success and meet the industry's demand for qualified agricultural scientists.

The Multistate Approach

This project involves land-grant universities in 13 states. The team has been active since 2012 and has support through at least 2027. This structure:

- Brings together researchers and educators with diverse expertise and creates a forum for regular communication and collaboration.
- Expands researchers' ability to study agriscience education programs in a wide range of settings over many years.
- Helps researchers formulate robust solutions.
- Improves efficiency by distributing the workload and reducing duplicative efforts.

This project is supported in part by the Hatch Multistate Research Fund administered by USDA-NIFA and by grants to participating institutions: Clemson University, University of Florida, University of Georgia, University of Idaho, Kansas State University, Louisiana State University, Michigan State University, Oregon State University, Pennsylvania State University, South Dakota State University, Utah State University, Virginia Polytechnic Institute and State University, West Virginia University. In 2022, S1071 was renewed through 2027.

Learn more: bit.ly/MRF-S1071

What is still needed?

With continued support, the team will increase distribution and adoption of the model it has produced for designing effective school-based agricultural education programs. The team will also evaluate the impact of their model so that it can be revised as needed. The team is also identifying barriers to lab-based learning (e.g., lack of facilities). Experiential learning can maximize student learning in agricultural science.