ISSUE  Agriculture is critically important to finding solutions to key challenges facing the United States, including economic growth, food security, human health and environmental sustainability. A U.S. Department of Agriculture survey shows the United States faces a shortage of “ag literate” scientists and professionals. There currently aren't enough graduates to meet the ag industry’s workforce needs. According to the Bureau of Labor Statistics, there are 25,700 new jobs for management and business in the agriculture industry annually, and more than 14,600 jobs in agriculture and science engineering. Only 5% of American students get their undergraduate degree in science and engineering. Statistics show that children lose interest in science, technology, engineering and math (STEM) topics as early as third grade.

UNIVERSITY RESPONSE: 4-H SCIENCE OF AGRICULTURE CHALLENGE  The University of Minnesota Extension 4-H program has made improving science literacy a priority, and is working to develop the next generation of agriculture leaders. Launched in 2015, the 4-H Science of Agriculture Challenge asks Minnesota youth to identify agriculture-related issues in their communities and develop science-based solutions. The first program of its kind in the country, the goal is to ignite excitement and passion about agriculture, increase ag and science literacy, and expand the pipeline of youth studying agriculture in high school and college, and pursuing agriculture-related careers.

Every year, teams of 4-H youth across the state work with adult mentors and agriculture experts to identify an issue and develop a solution using the eight science and engineering practices, which represent one phase of the Next Generation Science Standards, and mirror the practices of professional scientists and engineers: asking questions and defining problems; developing and using models; planning and carrying out investigations; analyzing and interpreting data; using mathematics and computational thinking; constructing explanations and designing solutions; engaging in argument from evidence; and obtaining, evaluating, and communicating information.
Areas of exploration represent the Pillars of Agricultural Literacy: Agriculture and the Environment; Agriculture and Animals; Agriculture and Technology; Agriculture and the Economy; Agriculture, and Food, Fiber, and Energy; and Agriculture and Lifestyle. Youth decide what issue to research, and creativity is encouraged. For example, teams could use remote-control helicopters to scout and solve weed issues; develop business plans for community food gardens; or design aquatic robots to research invasive species in local lakes.

**2016 4-H SCIENCE OF AGRICULTURE CHALLENGE**

In its second year, the 4-H Science of Science of Agriculture Challenge has tripled in size, with 35 teams of youth participating across the state. Issues being explored this year include drones used to monitor and protect livestock from predators; using biomass/feedstock waste for fuel and fertilizer; water quality (invasive species, ag runoff and prevention, etc.); food safety and harvesting practices; and aquaponics (growing fish and plants together).

Teams of youth will practice presenting their results at regional showcase events on April 23. Teams will move onto the statewide event on June 21-23 at the University of Minnesota, which includes presentations and judging, workshops, campus tours to explore agriculture and science resources at the University, and an awards celebration and showcase fair to share their work and connect with representatives from the agribusiness community who are eager to meet the next generation of leaders in agriculture.

Ag-related businesses have stepped forward to support the 4-H Science of Science of Agriculture Challenge, which will connect young people to possible future careers in agriculture. The Minnesota Corn Growers Association has contributed $43,000, which will be used to support the challenge and provide scholarships for the top three teams. Additional financial support has also been provided by American Crystal Sugar, AgStar, Jennie-O Turkey, Rahr Corp., Pentair, Minnesota Farm Bureau and Minnesota Farmers Union. 4-H is also providing grants to support teams in their research and their participation in the statewide event. As part of the ongoing effort to grow the program and ensure it is informed by emerging trends and issues facing agriculture, five roundtable discussions will be help in Rochester, Brainerd, Morris, St. Cloud and Crookston in March and April. Representatives and educators from local agriculture businesses will be invited to share ideas about future topics for teams to explore, and ways to support the program.

**RESULTS**

A study of youth development by Tufts University shows that young people who participate in 4-H excel in school and science, and are more likely to pursue a career in science, engineering or computer technology than their peers.

Through the 4-H Science of Agriculture Challenge, youth will:

- Get excited about and interested in agriculture.
- Provide leadership on important ag-related issues in our state.
- Have a greater knowledge of agriculture, and its importance in our economy and world.
• Gain 21st Century skills, including technology, health, business and economic literacy, critical thinking, problem solving, initiative and self-direction.
• Explore college study and careers in agriculture.

Z.umn.edu/4HScienceofAg

To learn more contact Joshua E. Rice, Assistant Extension professor, Science of Agriculture, at jerice@umn.edu, or 612-624-8415

About Extension 4-H: Minnesota 4-H is a youth development program available throughout Minnesota for youth grades K-1 year after high school. 4-H’s hands-on learning model helps youth obtain essential life skills such as problem solving, decision making, coping and communicating that prepare them to succeed in their school, college, community and careers. Research shows that youth who participate in 4-H have better grades and are more emotionally engaged with school, are more than twice as likely to be civically active and contribute to their communities, and are 47% less likely to have risky or problem behaviors.