Connecting Research Stations to Area Agricultural Education Programs

Dr. Gaea Hock
Kansas State University
315 Umberger Hall
Manhattan, KS 66506
785-532-1166
ghock@ksu.edu

Dr. Jeremy Falk
University of Idaho
875 Perimeter Drive, MS 2040
Moscow, ID 83844-2040
208-885-6358
jfalk@uidaho.edu

Dr. Marshall Baker
North Carolina State University
Ricks Hall 210C
Raleigh, NC 27695-7607
919-515-2707
mabaker6@ncsu.edu

Connecting Research Stations to Area Agricultural Education Programs

Introduction/Need for Innovation

There are a shortage of agriculture graduates (CSREES, 2005) available to meet the estimated 5% increase in the number of annual job openings between 2015 and 2020 (Goecker, Smith, Fernandez, Ali, & Theller, 2015). USDA recognizes the need for a diverse agricultural workforce. "Diverse experiences, background and education are vital to a healthy agricultural sector that continues to meet the challenges of a changing world and the demands of markets at home and abroad" (USDA, 2016, para. 8). The National Academy of Sciences (NAS, 2009) specifically called for more purposeful connections between science and inquiry in agriculture to fill the critical need of future agricultural scientists.

Agriculture teachers have reported several obstacles when it comes to supporting students' research endeavors. Koehlmoos and Hock (2018) reported a lack of confidence and knowledge of the research process as reasons for teachers not incorporating research into their programs. Also mentioned as a lack of facilities and equipment and time to fit it into existing curriculum demands (Koehlmoos & Hock, 2018). In addition to classroom research projects, there has been limited engagement and participation in the FFA Agriscience Fair in Kansas, North Carolina, and Idaho. This event "recognizes student researchers studying the application of agricultural scientific principles and emerging technologies in agricultural enterprises" (2015, para. 1). When asked how to improve the Kansas FFA Agriscience Fair respondents mentioned the need for in-service training and support to increase student participation (Koehlmoos & Hock, 2018).

In an effort to increase the confidence and competence of agriculture teachers to support their students' research projects, collaboration and mentoring was established with local research station scientists through a grant funded USDA-NIFA project. This partnership is important because "a stronger relationship between and within youth, adults, and other community entities strengthens communities" (Graham, Arnold & Jayaratne, 2016, p. 50). The National Research Council (2009) also encouraged more collaborations and partnerships between universities and secondary students and teachers. Agriculture teachers need to be trained in strategies to use when teaching employability skills for future FANH scientists (Hughes & Barrick, 1993). Components of this specific training focused on content, linking previous knowledge to new concepts, and relationship building (Desimone, 2009).

How it Works/Methods/Steps

The first step in facilitating the cooperation between research stations/centers and area secondary agriculture programs/teachers was to identify all individuals willing to participate in the project. Work began by identifying the research stations in each state. In all three partner-states the project leads identified high school agricultural educators who were interested in connecting with local research stations to augment their instruction of research in their programs. Once teachers were identified, they were made aware of all state research stations, including the research focus of each, and were then connected to field and research staff at that site. Research center staff were also onboarded in various ways to build relationships and processes that facilitate the desired mentorship and engagement.

The training consisted of several key items: (a) introduction to the important role of regional research centers, (b) an introduction of the participants and partners and the role they play, (c) examples of research that is being conducted at the stations and the schools, (d) an overview of the Agriscience Fair and SAE connections, and (e) discussion of possible collaborations and needs of each participant. Time for discussion and idea generation was budgeted into the schedule and meetings generally lasted approximately 2 hours. Some of these meeting occurred in a face-to-face format while others occurred via video conferencing technology.

Results to Date/Implications

Ten teachers have been identified in each of the partner states. Twenty-eight of those teachers have completed the training and are now moving forward with the research collaborations outlined in the grant project. Eight research station scientists at five area research stations in Kansas participated in the initial training and collaboration meetings. Idaho has five research stations and six researchers who will continue working on the project. In North Carolina six research stations are involved including over 15 field staff and researchers. Teachers are including research stations in their opportunities for students to engage with SAE and the Agriscience Fair. We expect future participation and an increase in collaboration because of the relationships that have been built.

Future Plans/Advice to Others

The next step is to work with the students to get them ready to conduct the research. Trainings with the students have been scheduled or are already being conducted. Our goal is to increase the number and quality of agriscience projects competing in each state's FFA Agriscience Fair. To accomplish this, we will: (a) increase student interest in a career as a FANH scientist, (b) increase the number of students completing a FANH research project, (c) increase the quality and local relevance of student agriscience research projects, and (d) assess the effectiveness of our model of research center mentorship and engagement.

Collaboration between the university faculty members on this project allows for the creation of this innovative practice, mentoring guides, and communication tools. We would advise others to be purposeful in introducing your research center staff and researchers to your agricultural educators, be mindful of the research center time commitments, be flexible in allowing the relationships to grow organically, find creative ways to reduce the burden of mentorship on research center scientists and staff, and identify funding sources to support student research. Ultimately, the introduction of the researchers and SBAE teachers has been critical. We found all parties to have concerns, but also a willingness to engage.

Costs/Resources Needed

The funding for this innovation was provided by a USDA NIFA SPECA grant. The trainings in each state cost approximately $1,500 to conduct, with $900 spent on the training notebooks (25 total) and the remaining for university faculty lead travel. Each teacher was paid $500 for attending the initial training and agreeing to engage his or her students with the project. Research scientists were not paid for their involvement in the trainings. Therefore, it is crucial to find individuals who see the value in working with future generations of scientists.

References

CSREES. (2005). Employment opportunities for college graduates in the U.S. food, agricultural, and natural resources system. USDA, Cooperative State Research, Education and Extension Service. Retrieved from http://www.faeis.usda.gov

Desimone, L. (2009). Improving impact studies of teachers' professional development: Toward better conceptualizations and measures. *Educational Researcher, 38*(3), 181-199. Doi:10.3102/0013183X08331140.

Goecker, A.D., Smith, E., Fernandez, J.M., Ali, R., & Theller, R.G. (2015). Employment opportunities for college graduates in food, agriculture, renewable natural resources, and the environment. Retrieved from https://www.purdue.edu/usda/employment/

Graham, D.L., Arnold, S., & Jayaratne, K.S.U. (2016) Research Priority 6: Vibrant, Resilient Communities. In Roberts, T.G., Harder, A., & Brashers, M.T. (Eds). American Association for Agricultural Education national research agenda: 2016-2020. (pp. 49-56). Gainesville, FL: Department of Agricultural Education and Communication.

Hughes, M., & Barrick, R.K. (1993). A model for agricultural education in public schools. Journal of Agricultural Education, 34(3), 59-67. Doe:10.5032/jae.1993.03059

Koehlmoos, E. & Hock, G. (2018). *Perceptions of Barriers Limiting FFA Agriscience Fair Participation.* Referred paper session presented at the National AAAE Conference, Charleston, SC.

National Academy of Sciences. (2009). *Transforming Agricultural Education for a Changing World.* Washington, DC: National Academies Press.

National Research Council. (2009). Assessing 21st century skills: Summary of a workshop. Washington, D.C.: The National Academy Press.

USDA. (2016). USDA Announces $8.4 Million to Support a Diverse Next Generation of Farmers and Ranchers. Retrieved from https://www.usda.gov/media/press-releases/2016/06/30/usda-announces-84-million-support-diverse-next-generation-farmers