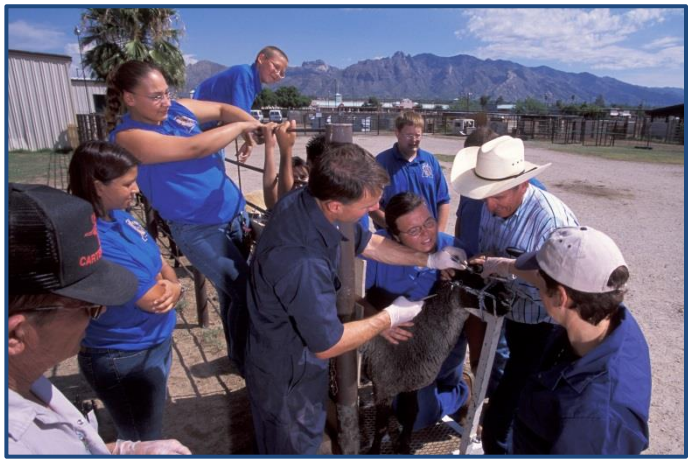
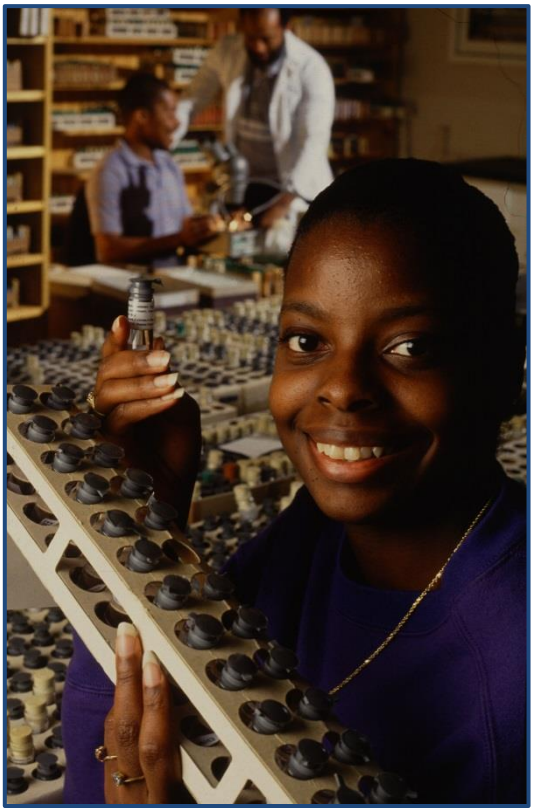
United States Department of Agriculture

Education Listening Session, August 1, 2013

Final Report

Office of the Chief Scientist





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EXECUTIVE SUMMARY

On August 1, 2013, the Research, Education, and Economics (REE) mission area of the U.S. Department of Agriculture (USDA) sponsored an education listening session for stakeholders. Approximately 60 attendees from schools, universities, professional and scientific societies, as well as numerous USDA representatives, came together to discuss the future of agriculture, food, and natural resource (AFNR) education. Interested stakeholders, whether present at the meeting or not, commented on the major challenges, needs, and opportunities in the future of agricultural and food-related education. Between presentations given at the listening session and letters afterwards, the USDA gathered approximately 120 unique suggestions.

Many points were echoed repeatedly by different participants. The following statements reflect the most common themes and key messages that came from discussions, presentations, and written comments. They do not represent value judgments or opinions of the USDA.

Modernize the image of agriculture:

- USDA needs to promote the rebranding of agriculture internally and externally through its partners. Agriculture needs to attract more youths into the field by emphasizing its cutting-edge relationship to the science, technology, engineering, and mathematics (STEM) fields, as well as opportunities in economic and social science fields. The current culture of sustainable, organic, local, and creative food also provides opportunities to recruit youth to agriculture by appealing to their conservationist ethic.

- USDA, in partnership with other Federal agencies, needs to lead a national initiative on agricultural education that solidifies the place of AFNR content in STEM education. This needs to include evaluating existing programs, defining standards for AFNR content, setting benchmarks of success, and constructing metrics for assessment.

Provide professional development for educators:

- USDA should put more energy and resources into providing professional development opportunities for AFNR educators, starting with a national dialogue with school districts and higher education institutions on the importance of AFNR education. Providing grants to institutions that develop content and improve technique in AFNR education, and to teachers who want to participate in training, would support an educator base in teaching the most current AFNR science with confidence.

Promote best practices in education:

- USDA should promote modern instructional techniques in its education initiatives to reach and retain the interest of the broadest audience. This includes mixing traditional classroom instruction with experiential activities, promoting learning in formal classroom settings along with informal "daily life" settings, and using blended learning frameworks that allow students to interface with information electronically at their own pace, path, time, and place.
- USDA should promote inquiry-based and experiential learning by opening the doors of its labs to students and educators and incentivizing its employees to take on more interns and mentees. Lab and field experiences in the classroom, as well as internships, mentoring, and job shadowing promote "deeper learning" (see: *Education for Life and Work,* National Academies Press 2012).

Build partnerships with the public and private sector:

- USDA should build partnerships with businesses and professional organizations to make scarce resources go further and connect with the broadest audience possible. Partnering with agricultural businesses to develop curricula may help address local shortages of trained workers. Coordinating with 2- and 4-year institutions may help strengthen the STEM pipeline and provide an entry point for more minority students into careers in AFNR. Collaboration with professional and educational organizations to develop

educational materials and market those materials may help broadcast USDA information to a broader audience.

- USDA should build more and stronger partnerships with 2- and 4-year institutions. Community colleges hold enormous potential for recruiting students into AFNR fields because they are often in rural areas and may have a high return on investment because graduating students often have close community ties. Land-grant universities continue to be important contributors to AFNR STEM education but are facing big resource challenges. Support for minority-serving institutions is especially important for increasing diversity in AFNR fields.
- USDA and partner organizations should make it clear that whether students have a Ph.D. or a 2-year technical degree, there are interesting, satisfying, secure jobs in the field of AFNR.

Allocate and advertise resources effectively:

- USDA should reorganize its education webpage: it should be structured based on content and then further structured by audience.
- USDA needs to further agricultural education through its granting mechanisms. An education component should be thoughtfully written into all grants, and USDA should ensure that principal investigators follow through. Further, USDA could start a new granting opportunity specifically aimed at agricultural literacy or education.
- USDA needs to better advertise its education resources and capabilities. This could be through more listening sessions and direct communications with stakeholders, more participation at conferences of professional societies, and through partnerships with professional, scientific, and agricultural societies to co-develop and market USDA education products and information.

INTRODUCTION

As the Federal agency that feeds, fuels, and clothes the Nation, the United States Department of Agriculture (USDA) is committed to making sure that the next generation of farmers, foresters, natural resource scientists, food safety inspectors, nutritionists, and all related disciplines are educated and able to help make sure the United States has a healthy, clean, safe, prosperous, and food-secure future.

In an effort to better take stock of and coordinate its education programs, scholarships, and other offerings, the Education Coordinating Committee (ECC) was formed in late 2012. This committee, part of the larger USDA Science Council, meets approximately monthly to discuss education-related issues both within USDA and more broadly within the Federal Government. The ECC seeks ways to coordinate education efforts and efficiently leverage limited assets across USDA education offerings. One of the initial efforts of the ECC was to perform a survey of USDA education programs, scholarships, educational websites, and other education offerings. The survey, conducted in winter 2013, did not include Extension programs and found 101 programs across all mission areas that aim at educating students, farmers, landowners, and the general public. The results of the survey are shown in Appendix I.

From this survey, it was clear that USDA was very active in educating America about agriculture, food, and natural resources (AFNR); however, whether or not resources were being used most effectively was unclear. At the same time, the White House proposed a reorganization of STEM education funds across the Federal Government, pulling money for education out of many agencies and redistributing the funds to the National Science Foundation (graduate and undergraduate education), U.S. Department of Education (K-12 education), and the Smithsonian Institution (informal education). To get a better sense of the needs of the user community, as well as gather ideas on how to best direct efforts in AFNR education through this reorganization, the ECC held an Education Listening Session in which education stakeholders were asked to share their thoughts about needs, challenges, and the future of AFNR education.

The listening session, held in the Whitten Building on August 1, 2013, drew approximately 35 stakeholders from education and science-oriented non-governmental organizations (NGOs), as well as academics who work in the field of agricultural education. Muquarrab Qureshi, Deputy Director of the Institute of Youth, Family and Community at the National Institute of Food and Agriculture (NIFA), opened the session with a presentation on USDA education programs and activities. Afterward, participants listened to brief (10-minute) presentations from stakeholders and discussed issues of education needs in breakout groups, moderated by USDA. All attendees, as well as anyone from the public, were invited to submit written comments about the needs and the future of AFNR education, which are summarized in this report.

This report is structured to first provide an overview of USDA education programs and activities, and then a summary of comments from discussion sessions, official written submissions, and output from breakout sessions. **The "Summary of Comments" section represents statements made during the listening session and comments submitted by stakeholders after the listening session, and they do not represent value judgments or opinions of the USDA.** No attributions are made, and in most cases the words are summarized, rather than direct quotes, but there are some exceptions. The "Next Steps" section represents a response from USDA on how some of these topics may be addressed in the future. The end of the report contains appendixes showing breakout session questions, the agenda for the meeting, a list of meeting attendees, and the USDA education programs survey. Copies of all officially submitted comments will be kept on electronic file in the USDA Office of the Chief Scientist and are available upon request.

EDUCATION AT USDA

Altogether, USDA has a significant portfolio of both informal and formal programs that educate our Nation's students, teachers, children, families, and senior citizens about the whole spectrum of agriculture, food, forest, and natural resource issues. But USDA does not rest easily when it comes to education because there are some major concerns facing the field of science, technology, engineering, and mathematics (STEM) education today. One of the major issues is the "leaky pipeline," which is the idea that as students go through school and beyond, the number of people who stay in STEM fields consistently and slowly declines, essentially "leaking" out of the field.

Multiple reports in recent years, including the recent 2012 PCAST Report to the President on Agricultural Preparedness and The Agriculture Research Enterprise, address concerns about the lack of new STEM graduates and what that means for STEM fields like agriculture. In the PCAST report, it was noted that the primary concern is support for a well-trained workforce. Currently, the best students do not view agriculture as an attractive career option, and relatively few graduate students enter into agricultural fields. This is especially true of minority and first-generation college students. The result of this is that industry has difficultly recruiting technical employees for its research programs and often turns to foreign students and workers instead. This situation must be reversed, and the question is: How? USDA's vision is to support the STEM pipeline through education, workforce development, and capacity-building all in the name of an improved agriculture, food, and natural resource (AFNR) industry in the United States.

Currently, the USDA education portfolio is diverse. It spans many agencies and mission areas, and its content is tailored to reach many different audiences. However, there are some common themes, which include learning and engagement, training and education, internships, capacity-building, and education campaigns and outreach. The 101 programs that span all the mission areas strive to strengthen that pipeline, but better coordination and leveraging of resources is needed. For that reason, the ECC was formed and will continue to function to ensure that there is synergy and sharing of resources and best practices among these diverse programs and agencies. While a full list of

current USDA education offerings is included in the appendix, a summary of some of the activity within each USDA agency is described here.

Agricultural Research Service

The Agricultural Research Service (ARS) is USDA's principal intramural scientific research agency. It employs 7,000 people, including 1,800 Ph.D. scientists, and it has a $1.1 billion annual budget which is spent on, among other things, 1,000+ research projects. Unlike NIFA, ARS does not have any formal education programs; however, it is still very much involved in training the next generation of scientists through graduate traineeships and mentoring. In 2012, for example, there were 702 graduate students, 1,002 undergraduate students, 335 postdoctoral researchers, 878 adjunct appointments, and 659 scientists serving as advisors throughout ARS. Many of these people are also foreign visitors who take their experiences at ARS and bring them back to their home countries. ARS also collaborates with 1890 land-grant universities, through Centers of Excellence, specific cooperative agreements, capacity-building grants, scholars programs, and student internships. So, while not formally involved in education programs, ARS plays a significant role in training and mentoring agricultural scientists around the United States and the world.

Animal and Plant Health Inspection Service

The Animal and Plant Health Inspection Service (APHIS) has a mission to develop and apply scientific methods that benefit agricultural producers and consumers, protect the health of American animal and plant resources, and sustain agricultural ecosystems. APHIS informs the public and especially students in the fields of science, biology, veterinary medicine and other related disciplines about their unique agricultural safeguarding work. It also aims to give students opportunities to work for APHIS or learn from experts as a way of recruiting new employees.

APHIS has three primary ways it interacts with education. First, there is the AgDiscovery Program, which is a 2-4 week program on college campuses that encourages younger kids to think about careers in agriculture. Since 2002, APHIS has partnered with a growing number of universities and colleges across the country to support AgDiscovery. The program now occurs in 17 schools in total, 11 of which are historically black colleges and universities; approximately 240 students participated in the

program in summer 2013. APHIS also sponsors many scholarships and internships, including $200,000 in dedicated funding for 12 USDA 1890s scholars during fiscal year (FY) 2013.

Also, in 2013, 35 Thurgood Marshall interns participated in a 10-week summer program designed to employ undergraduate and graduate students who have an interest in agriculture-related disciplines. Since the early 1990s, APHIS' Veterinary Services program has helped undergraduate and graduate veterinary students prepare for careers in veterinary public health through its Saul T. Wilson, Jr., Internship program. In 2012, APHIS supported five students through this program with $10,000 each for tuition, books, and fees. The program also provides students with paid internships at APHIS during academic breaks, which, upon graduation, turn into permanent appointments.

For almost 20 years, APHIS has provided 4-year scholarships through the USDA 1890 National Scholars Program to students pursuing bachelor degrees in agriculture or a related science at 1890 land-grant institutions. Finally, APHIS experts have developed two courses on regulatory plant protection and risk analysis that are offered annually via distance education at several universities.

Economic Research Service

The Economic Research Service (ERS) primarily provides information to educators rather than direct programming or support for education. ERS research, market analysis, and data are provided free of charge on the ERS website. It offers extensive information on issues related to the farm and food sector, natural resources, international agriculture and trade, and rural America. It also provides education-related research and data. This includes socioeconomic data and research on education and the relationship between education activity and household well-being, with a particular emphasis on the rural economy. ERS does support a distance learning program which brings experts from the agency into the classrooms of minority-serving institutions via interactive real-time video seminars.

Farm Service Agency

The Farm Service Agency (FSA) serves all farmers, ranchers, and agricultural partners through the delivery of effective and efficient agricultural programs for all Americans. FSA does not have formal education programs, though it does have education challenges, especially when it comes to providing

small and beginning farmers access to capital and access to information about best practices for managing farms, including finances and business plans. FSA's biggest educational needs are for providing technical assistance and training in financial concepts and management. It works on developing types of training and assistance in financial literacy that will be most effective.

Food and Nutrition Service

The Food and Nutrition Service (FNS) is committed to reducing hunger in America by providing children and low-income people access to healthful food and nutrition education. FNS offers a series of Web and printed content targeted at different audiences and age groups. Materials include "Healthier Middle Schools," "Nutrition Voyage," "My Plate," and various curricula about healthy eating that contain teacher guides, original songs, parent handouts, and posters, in English and several other languages. In addition to these curricula about eating, there are additional materials designed for third to sixth graders that focus on nutrition and gardening.

Food Safety and Inspection Service

The Food Safety and Inspection Service (FSIS) provides consumer education through its Office of Public Affairs and Consumer Education, which develops and disseminates consumer food-safety educational programs and information. The Food Safety Education Staff (FSES) plans, coordinates, conducts, and supervises FSIS' consumer food-safety education campaigns and related outreach activities. FSES is the originator of the Food Safe Families campaign, developed in partnership with the Centers for Disease Control and Prevention, the U.S. Food and Drug Administration, and the Ad Council. This campaign, and others developed by FSES, promotes the Clean/Separate/Cook/Chill safe food-handling behaviors to consumers. The goal of these efforts is the prevention of foodborne illness caused by consumer mishandling of meat and poultry products.

FSIS develops fact sheets, brochures, video news releases, webcasts, public service announcements, press releases, and other documents and publications in support of Agency programs and initiatives. Operation of the USDA Meat and Poultry Hotline, the USDA Food Safety Discovery Zone traveling exhibit, and the FSIS Web-based initiative "Ask Karen" are key components of this educational program, and the staff develops the technical information that supports each of

them. FSES also develops consumer food safety content for mobile device applications, such as the "Ask Karen" mobile app supported by iPhone and Android systems.

FSIS advises the Under Secretary for Food Safety, the Administrator, and other key officials on food safety strategies and initiates contacts with, and responds to, inquiries from the media, consumer groups, industry officials and organizations, and various other constituents regarding food safety education.

FSIS also maintains liaisons with other Government agencies and partnerships on consumer food safety education campaigns and initiatives.

Forest Service

The Forest Service (FS) is very engaged in educating the Nation about forest, natural resource, and conservation issues. Forest Service Conservation Education has several products that focus on educating children and families about conservation. These include the *Natural Inquirer*, which is a middle school science journal that communicates Forest Service research and promotes active learning through the scientific process. Each year, the Forest Service distributes more than 60,000 journals to classrooms across America. It also runs a program called Forest for Every Classroom, in which educators meet with natural resource professionals and learn ways to bring the forest to their classrooms. More than 143 teachers in Vermont, New Hampshire, and Texas have participated in the Forest for Every Classroom teacher training program. The Forest Service also manages the Discover the Forest.org website and public service announcements. This is a partnership with the Ad Council that encourages tweens and their parents to get outside and discover the forest.

The FS provides educational resources such as the Book of Stuff to Do Outside, and the Smurfs Activity Sheet provides educational content. Movie studios have donated character rights to the Forest Service, which has partnered with studios on movies to promote natural resource issues, such as promoting conservation through *The Lorax*. FS Conservation Education also has distance learning programs such as Monarch Live, Pollinator Live, Wetlands Live, and the upcoming Climate Change Live, which provide learning experiences on pressing conservation

issues to schools across the United States. More Kids in the Woods and Children's Forests are annual series of challenge cost-share agreements. Monies from these programs fund projects nationwide that partner FS units with local organizations to get kids learning outside.

Urban Connections is a program that provides educational programs for youth in several cities in the northeast and Midwest, including Boston, Chicago, Detroit, Milwaukee, and Minneapolis/St. Paul. The National Symbols Program assists fire prevention and conservation educators through the production of educational and promotional materials highlighting Smokey Bear and Woodsy Owl. The Smokey Bear & Woodsy Owl Poster Contest, managed in partnership with the National Garden Clubs, Inc., receives approximately 30,000 entries per year from first to fifth graders across the Nation.

Every year, more than 50,000 children in Head Start programs learn conservation practices through the Forest Service's partnership with the Office of Head Start. Green Schools! is a project partnering with Project Learning Tree. Through that program, the Forest Service guides students, teachers, and administrators through a series of investigations and projects to make schools more energy efficient and environmentally sound.

Working with the National Environmental Education Foundation, The Children and Nature Initiative educates pediatric health care providers about prescribing outdoor activities to children. The program also connects health care providers with local nature sites so that they can refer families to safe and easily accessible outdoor areas. Hands on the Land is a national network of field classrooms and agency resources to connect students, teachers, families, and volunteers with public lands and waterways. Hands on the Land brings classroom learning to life in America's largest classroom. And finally, Environmentors envisions young adult leaders from diverse backgrounds becoming active stewards of their communities and the environment. Students work with mentors to develop rigorous environmental science projects and have a chance to compete for college scholarships.

FS has other programs outside of Conservation Education. In 1991, Forest Service established a partnership with Southern University (SU) to launch the Nation's first Urban Forestry degree

program. The partnership provided a full-time Forest Service liaison to coordinate the Agency's financial and career-development assistance to program students. In October 2012, FS awarded the program a grant to establish an Educational Forest on the campus to serve as an outdoor classroom, providing hands-on educational learning experiences.

In collaboration with other USDA agencies, FS has also started the Southern University Beginning Agricultural Youth Opportunities Unlimited (BAYOU), which is a summer learning experience program for high school seniors and incoming college freshmen interested in agricultural careers. BAYOU introduces students to all SU agricultural degree programs through the use of technology, research, lectures, and hands-on experiments in an effort to provide the best overview of the diverse careers available to agricultural degree graduates.

Finally the FS has the Forest Stewardship Program. This is the most extensive private forest landowner technical, educational, and planning assistance program in the United States. Assistance and education are delivered through State forest agencies, university extension programs, and many partners. The program provides management plans and supports workshops, outreach, and a variety of tools for private forest landowners. Twenty million acres are currently under active Forest Stewardship Management Plans.

National Agricultural Statistics Service

The National Agricultural Statistics Service (NASS), like ARS, does not have any formal education programs; however, it does support graduate fellowships and internships within NASS and provides statistics information for K-12 education. NASS tells America's story with numbers and informs Americans about the U.S. supply of food and fiber, providing information to schools and teachers about such topics as how many acres in the U.S. are farmed, where the farmers are located, and how many head of cattle are in U.S. ranches.

National Institute of Food and Agriculture

The National Institute of Food and Agriculture (NIFA) is USDA's principal extramural scientific research, education, and extension agency. In 2012, the formal education investment included support

for 24 programs, through 531 awards, which amounted to ~$31 million in support of teaching, ~$20 million in support of research, $16.5 million in support of extension, and $112 million in formula funds. This includes partnerships with fifty-seven 1862 (land-grant) universities, eighteen 1890 (historically Black land-grant) universities, thirty-four 1994 (tribal) universities, and 311 Hispanic serving institutions (HSIs). The theme for education in NIFA is that it is a kindergarten through college continuum that includes learning and engagement, scientific and technical workforce development, and capacity-building for minority-serving institutions.

NIFA's education programs can broadly be classified into learning and engagement programs, scientific and workforce development (including scholarships and fellowships), and capacity-building for minority-serving institutions. There are also special programs that recognize excellence in teaching, and youth and 4-H programs. The 4-H program, in particular, has been extremely successful at getting kids into the sciences, with a recent study showing that 50 percent of children who participated in 4-H as youths want to continue on to a career in science (*Evaluating the 4-H Science Initiative: The 2010 Youth, Engagement, Attitudes, and Knowledge Survey*). Statistics from 2012 show that there were 11.2 million youths and 0.5 million adults engaged in 4-H in every State and nearly every county in the United States. All of this engagement was supported with $60 million in Federal funds and $131 million in private funds, and it created partnerships with land-grant universities, Federal agencies, the 4-H Council, and many others.

Natural Resources Conservation Service

USDA's Natural Resources Conservation Service (NRCS) helps America's farmers, ranchers, and forest landowners conserve the Nation's soil, water, air, and other natural resources. All programs are voluntary and offer science-based solutions that benefit both the landowner and the environment.

NRCS works locally through field offices in nearly every county in the country. Though the agency does not have a formal education program, educational outreach is provided at State and county levels, depending on local resources and areas of focus. Many students have worked in the field and in NRCS offices by volunteering for the Earth Team, the volunteer branch of NRCS; some have gone on to pursue successful conservation careers.

A variety of education items are distributed through the national NRCS Distribution Center and the NRCS Education webpage, including animations, publications, and education links for teachers and students in kindergarten through college. It is the fifth most viewed page on the national NRCS website. In 2013, NRCS had 20,090 publication orders: 46 percent of these orders (9,300) were for K-12 educational materials. These publication orders totaled 1,665,236 individual publications, 54 percent (905,824) of which were for K-12 audiences.

Rural Development

Rural Development (RD) has no formal education programs, but instead focuses on providing information and funding projects in rural communities. One of the ways it does this is through promoting understanding of the cooperative business model with units comprised of instructors' guides and lessons. RD also developed an online community-development course that is available through AgLearn, and it developed an online, interactive course on the practice of community-development led by two co-facilitators. RD's outreach is through a bi-monthly *Rural Cooperatives* magazine and a clearinghouse of over 150 research and information publications, some of which are directed to youth and educators at all levels.

RD also funds the National Sustainable Agriculture Information Service, which provides information and other technical assistance to farmers, ranchers, extension agents, educators, and others involved in sustainable agriculture in the United States. Finally, RD supports the Agriculture Marketing Resource Center, which is an electronic national resource for producers interested in value-added agriculture. The Center provides information on commodities and products, market and industry trends, and locations of value-added resources.

SUMMARY OF COMMENTS

There were a total of approximately 120 unique suggestions that came as a result of the stakeholder presentations, associated discussions, and breakout sessions. Many comments were echoed multiple times by different organizations, particularly comments that were related to strengthening the STEM/agriculture pipeline, redefining the image of agriculture, and improving teacher training and analyses of best learning techniques. Comments are summarized below, using language that as accurately as possible replicates the original statements. They are grouped into sections based on prominent themes, and there may be some repeats between sections due to the multi-thematic nature of the comments. No preference was given to comments by any particular individual or organization. If and when organizations are mentioned, however, it is because they made a comment that specifically called out their organization's capacity or because another organization or commenter specifically referred to the resources of a particular organization.

Creating a New National Initiative

Many expressed an interest in USDA coordinating nationwide initiatives to improve agricultural education and catalyzing a national-level dialogue on recruiting to agriculture, food, and natural resources (AFNR) fields, facilitated by engaging in more dialogue with stakeholders across the country to gather input on the path forward. There is also underutilized research that exists on how to improve student recruitment—USDA just needs to use this work more intentionally as it develops a national program. To support a national initiative, USDA could create an agriculture and natural resources "center" in conjunction with the U.S. Department of Education that functions to bring together in one place all the people and resources that support agriculture and related education across the Federal Government.

Strategy suggestions for this center include: starting with basic agriculture literacy early in students' education; including a rigorous science and math component; leaving room for innovation and discovery; providing mentors; providing credentialing, such as through a badging program tailored for agriculture education, modeled on the one the MacArthur Foundation has with the U.S. Department of Education; and focusing on redefining agriculture as a highly scientific and technical field.

An important component of a new initiative would be to have a long-term USDA multi-dimensional effort to enhance agricultural education in the high schools. This effort could include program expansion, enhancing community linkages, supporting curriculum development, and promoting teacher preparation and effectiveness. This initiative should expose talented high school students in rural and urban settings to academic and career opportunities in the agricultural and life sciences, especially crop and food animal production and research. The "strategy" should also include both formal and non-formal approaches to education and encourage and support lifelong learning.

USDA also needs to establish some sort of permanent national needs assessment and impact tracking system. With this information, USDA will be able to determine the specific areas that require more funding, more emphasis, and/or other strategic partners for advancing STEM agriculture education. USDA and the AFNR education communities need to do a better job of sifting out the most promising ideas for improving education in colleges of agriculture and persist in their development and implementation over the long term. Gathering this data and systematically assessing programs may enable the community to more accurately identify those programs and practices that are most effective. This assessment could be run through the land-grant schools and/or extension offices in each State. It should be a comprehensive assessment of all of the educational activities run by USDA, funded by USDA, and/or involving USDA employees, as well as other agriculture-related training within each State (formal and non-formal). To begin this process, USDA could create an inventory of existing programs, analyze data gathered through reporting requirements for grants, and do exit interviews to identify root causes of entering and leaving the agricultural system.

To evaluate success, USDA and partners will have to design success metrics, define benchmarks, develop common points of reference, create consistent data systems, and define excellence in teaching. To be truly effective, it is important to get both quantitative and qualitative data. This assessment should include a longitudinal study so that students/participants/trainees could be tracked for several years post engagement to determine the relative effectiveness and sustainability of each program. This could be done through multi-investigator "challenge" type

grants or through some sort of partnership with the National Science Foundation (NSF) or the National Academy of Sciences (NAS). Whatever the mechanism, it needs to allow for input and ideas on measurement and metrics from all stakeholders, which encompasses all U.S. citizens.

Many participants also requested that the Federal Government submit a "roadmap" for Federal consolidation of education, if that initiative passes. USDA should make sure that it plays a leading role in highlighting the need for coordination on AFNR education. Further, within the Federal Government coordinating groups, USDA should push for "STEAM" (science, technology, engineering, agriculture, and math), not just STEM. Agriculture needs to get elevated as a major aspect of a scientific and technical education.

Redefining the Face of Agriculture

Almost every commenter, either in person or via written submissions, remarked about the need to broaden public perceptions about the field of agriculture. The field of agriculture is a highly technical and scientific field that touches on food science, ecological restoration, and clean energy technologies, as well as advanced production techniques involving greenhouses, cutting-edge plant breeding, and waste management. However, it is often not portrayed in this way. Many suggested that the field of agriculture needs to get away from imaging and messaging focusing on "farmers and fields" and instead start using images and messages that reflect the highly technical nature of the business. If USDA can help the public understand the many facets of agriculture, the field of ANFR is likely to attract many more students and other participants into the field.

USDA needs to show students the range of career options: farmers are one career, but so are plant breeders, food scientists, land-use planners, conservation biologists, mechanics, and loan officers, to name just a few. The Purdue and USDA Living Science website (www.agriculture.purdue.edu/usda/careers) is one way to showcase those options and should be kept current. To update the image of agriculture, USDA could fund a national advertising and recruiting strategy. The ad strategy might be run with the Ad Council and could be something like "I Am Agriculture," showing images of people in non-standard agriculture professions.

While positioning agriculture as a STEM field is a good tactic for reaching a new audience, focusing on the food component of agriculture also has potential. Unlike any time before in U.S. history, we have a culture that is exceptionally focused on food, be it through purchasing organic and local food, experimenting with new types of cooking, or trying new international cuisine. Because of this, emphasizing the role agricultural science has to play in developing new tastes, growing new varieties, and ensuring the farm-to-plate process is local could attract a whole new cadre of students.

As we rebrand agriculture, we need to be careful not to isolate people, particularly students who may not want to or be able to get a 4-year degree. We need to let students know that many satisfying, stable careers in the field of AFNR can be accessed through 2-year technical degrees or other technical training. Students that perhaps did not originally intend to enter an agriculture field should also be targeted and shown that their degrees would be very useful in an agriculture-related field. These could include scientifically trained students such as pre-med, pre-vet, and pharmacy students. There needs to be a concerted effort to show students these careers through coursework, as well as through mentorships and internships.

Finally, USDA and other agriculture educators need to work to get agriculture recognized as a science credit in high schools. It is currently treated as an elective, which means that when school districts have to make cuts, agriculture is often one of the first classes to go on the chopping block. USDA could work with the U.S. Department of Education to make sure that agriculture-focused coursework gets counted as science, and to make sure that students know that STEM is an extremely valuable line of training, no matter what their eventual career.

Boosting Minority Support

A significant part of capacity-building is improving minority support. It was noted that the pipeline for minorities appears to be leakier than that for non-Hispanic White students, with a lower percentage of minority students earning doctoral degrees in the biological sciences and all STEM fields than their White counterparts. Greater attention needs to be paid to minority students, who are often very community focused and may come from communities with a rich agriculture and food history. These students could be a great asset to the agriculture, food, and natural resource (AFNR) science fields. Concerns were voiced about the level of funding and recruiting attention that is

dedicated to minority-serving institutions, particularly those that serve Native American, Hispanic, and African American students.

There is enormous potential for recruiting to the AFNR workforce in these communities. For example, Native American institutions are place based and often very closely tied with their communities and with natural resources: of the 73 million acres that compose American Indian reservations, more than 75 percent are agricultural and forestry holdings, many of which are fallow or underused. For this reason, agricultural science education is particularly important for Native American students. Additionally, much of the research conducted at 1994 institutions is done in cooperation with other land-grant institutions, resulting in good science and good partnerships. Colleges serving these and all minority students need more resources focused on underserved students at the undergraduate level.

Much of the USDA education funding supports graduate-level research, and more resources need to be devoted to student success at the community college and early undergraduate level when new entrants into agriculture are being recruited. These resources should focus on faculty development, curriculum innovation, international development, and facilities development. Additionally, more research funding is needed that is directed towards minority-serving institutions, particularly the 1994 (Native American) institutions that are still lagging behind their other minority counterparts. One commenter noted that in Fiscal Year 2012, the 1994 institutions competed against one another for $1.8 million in research funding, while 1862 colleges received $236 million in formula funds, and the 1890 institutions received $51 million.

The Turtle Mountain Community College (TMCC) in Belcourt, North Dakota, is an example of a college that currently offers some critically important STEM degree programs, which retain and graduate Native American students. However, the college urgently needs to construct a new science lab for its STEM classes. Currently, TMCC is not in compliance with Occupational Health and Safety Administration (OSHA) standards for class size, and this threatens the college's accreditation status. The new science lab has been designed and it is ready to be put out to bid, but TMCC lacks the estimated $1.6-$2.2 million to fund the project. Once built, the new space will meet all standards for a science lab classroom that can accommodate up to 25

students. In the current lab, only about 10 students can fit – OSHA and accreditation challenges are raised if 12-15 students try to use the existing lab. This sort of situation hampers the educational progress of budding scientists, lengthens time to graduate, and increases the cost of education for students already living at or near poverty. While this is just one example, many minority-serving community colleges and universities need funds for facilities development to support experiential learning.

Finally, when it comes to minority recruitment and retention, there are many best practices that could be applied. To reach the most diverse audience, USDA and others in the agriculture education community should make sure that education and recruiting materials are available in multiple languages. By limiting recruiting materials to English, USDA and agriculture institutions may be missing out on the large Hispanic population in this country, as well as other nationalities that have a rich food, agriculture, or natural resource tradition.

Whenever possible, students should be used as recruiters because they are a trusted and often admired source for younger students. Student recruiters expressing themselves online or in person have the benefit of being young, enthusiastic, and able to provide first-hand knowledge about their experiences in agriculture. Framing the message as one of "What can you do for your community?" could also be valuable in recruiting minorities, as many of them are very community focused and come from tight-knit groups.

One specific recommendation for retention of minorities is that USDA look to the Virginia Tech Post-baccalaureate Research and Education Program (PREP) that is funded by the National Institutes of General Medical Sciences for underrepresented students in the biomedical and behavioral sciences. PREP students conduct independent research in the lab of a research mentor, enroll in graduate-level courses, take a Graduate Record Examinations preparatory class, and attend a conference such as the Annual Biomedical Research Conference for Minority Students. The program has had great results: during the previous 4-year grant period: 95 percent of the PREP students enrolled in a graduate program, of which 76 percent matriculated into a Ph.D. program. To enhance diversity in agriculture, USDA could benefit from a PREP-like

program to increase the number of underrepresented students pursuing a Ph.D. in agricultural sciences.

It is not enough to train minority students if the jobs aren't accessible. USDA and its Federal and State partners need to actively recruit and hire minorities, provide mentors, and place minorities in positions of leadership to provide role models for the students following in their footsteps.

Change Granting Priorities and Criteria

Change to promote recruitment of minorities was just one suggestion for adjustment to USDA granting criteria. There were also broader suggestions that USDA needed to take better advantage of integrated granting mechanisms and challenge areas to develop creative, innovative, impactful projects that truly address STEM and agriculture education needs. Currently, there is too much variation in what passes as an integrated grant. Education is often added as an afterthought just to make the grant eligible for review.

USDA needs to place much more emphasis on the education component, perhaps by urging grantees to partner with educators as a condition for the grant. Supplemental funds could also be added to more research grants to allow for development of an education component, perhaps using the Coordinated Agricultural Project (CAP) grants as a model for how to integrate research and education. In addition, a funding area needs to be added to NIFA that deals with "agricultural literacy," "agricultural awareness" or another similar term. Or, if the addition of a new priority area was not possible, simply including more language that supports research efforts in this field would be helpful.

The Secondary/Postsecondary Educational Challenge Grants provide much-needed funding to local schools to drive program development and technology upgrades to better prepare students for successful careers in STEM, including agriculture, food, and natural resource (AFNR) careers. These grants also provide incentives to community colleges to work closely with high school agriculture programs to assist with dual credit and various career transition programs. These grants need to be bolstered because they are very successful in their positive impacts on agriculture education.

Rural Youth Development Grants provide funding for FFA, 4-H, Girl Scouts, and Boy Scouts and help to develop and implement programs that serve rural youth. The Rural Youth Development Grants Program "is intended to break down barriers to participation, especially for rural youth; enhance opportunities for youth involvement in policy and decision-making; create safe and inviting environments for youth activities; and improve access to information and technology." These funds have been used by FFA to provide "Living to Serve" grants to local FFA chapters, which teach youth to serve and engage with their community. These grants serve a traditionally underserved segment of the society, and therefore these grants need to be maintained, at a minimum, and, ideally, increased.

Academic Programming and School and Curriculum Needs

USDA should assist in agricultural curriculum development, not just provide information. A set of standards for knowledge and skills in the field of agriculture, food, and natural resources (AFNR) could be developed, possibly in conjunction with the U.S. Department of Education that has experience in doing this. Backwards design should be used to plan the assessment: USDA and partners need to decide what the end goals are and then walk backwards from these to develop the curricula. USDA can then use its abundance of "information" to create educational products for teachers and students that target specific goals, in collaboration with education leaders and curriculum designers. For example, including real data in curricula might produce positive results. For example, the Ecological Society of America partnered with the University of Maryland to give college students real data from the Chesapeake Bay, asking students to formulate questions that they could answer with existing datasets.

USDA data could be used to fill the data gap. Several participants also noted that as we look to designing curricula, we need to think more about partnering with businesses. Businesses are often aware of the leaks in the workforce pipeline and are also the most well-financed part of the pipeline. They are likely to be able to work with high schools and colleges to design curricula that address skill needs. Further, they have the resources to advertise and disseminate new programs better than any college or government can. USDA should also play a role in quality control of already existing curricula generated by commercial companies. These instructional materials offered by commercial

companies must be scrutinized and evaluated more carefully to ensure that they are addressing the needs of the teachers and the school programs. This responsibility would fall on AFNR teachers and school districts, but USDA could open a dialogue with these players about the need for more careful evaluation of teaching materials.

Many comments addressed the specific components of successful academic programming. Blended learning was a common topic, largely because studies have shown that blended learning is very successful and has better results than online or in-person learning alone for promoting "deeper learning" (see: *Education for Life and Work*, National Academies Press 2012). Various comments addressed the need for blended learning by developing:

- Programs that include field trips or trips to labs.
- Programs that teach soft skills (communication, management) as well as scientific skills.
- Curricula that are mixtures of online learning, virtual labs, classroom learning, and hands-on practices.
- Service learning opportunities and cross-disciplinary training.
- More internships, externships, job shadowing, and mentoring.

One commenter noted that hands-on learning at an early age has a bigger impact on deeper learning and retention than do classroom experiences. Webinars and other online ways of learning also have potential to reach farmers and rural students who might not have access to other resources. USDA could catalyze the development of these blended learning opportunities by hosting national meetings or beginning a national dialogue on this subject, particularly in the area of bringing the many disciplines that touch on AFNR together.

Several participants suggested the use of "informal" approaches within "formal" education to promote deeper learning. Projects that link people to their communities are especially useful for bringing informal approaches into formal settings. Community or place-based approaches also ensure better integration of the AFNR sciences into the community and increase awareness of these issues in the community. For example, more "citizen science" approaches could be a useful component of new curricula or a new initiative on agricultural education. Citizen science approaches are great informal learning experiences because they are centered on experiential learning, are usually place based, and

often encourage family participation, which helps spread the enthusiasm of children to adults and older siblings.

The 4-H is also a good example and potential partner because its model is based on training trainers, project-based learning, bringing students onto campuses, and functioning at the community level. To ensure that these approaches are shared among educators, USDA could play a role that encourages partnerships between formal and non-formal educators, or help link 4-H with local schools. A USDA-sponsored mentoring program could also provide high-impact informal learning opportunities. USDA could encourage its labs throughout the Nation to set up mentoring programs with high school students and could use these programs as an opportunity to gather data on effectiveness of mentorship for recruiting students into agriculture degrees. Creating safe spaces for trial and error will also be an important part of developing these informal approaches. One novel idea in informal learning that warrants further attention was to develop an "Ag for America" program, like Teach for America, in which young adults are placed in agriculture-related careers for a couple of years to help with development in rural or other low-income areas, in exchange for loan forgiveness.

USDA also could think about how to support and expand the very successful agriculture high school model in more communities around the United States. Examples like the Chicago High School for Agriculture and the W.B. Saul High School in Philadelphia have been very successful in sending students on to higher education and retaining students in the AFNR fields. As an alternative, capacity could be built in urban school systems to have an "agriculture immersion" model as one track of education. Further, recruiting more urban students into the field will bring diverse perspectives into the AFNR fields and provide a much-needed avenue for jobs for urban students. USDA could play a role in this by starting a dialogue with school districts and State agriculture and education agencies around the United States about the need for more agriculture in urban schools.

As an alternative to this model, more preparatory programs that help kids get into agricultural college programs are needed, which could be part of the national initiative that was noted above. Meanwhile, USDA must also keep in mind learners of all ages. The agriculture education community needs to start thinking younger—there needs to be more efforts to expose pre-K, elementary, and middle

school students to hands-on and other experiences in AFNR. It was noted that there already are some very successful models for recruiting younger students that are available: FFA and 4-H use blended approaches to teach students and reach students at a young age, and they have been very successful in strengthening the agriculture pipeline.

USDA and other agriculture educators should look to these programs to understand best practices. One commenter noted that teens are actually the most difficult to engage in informal education and that agriculture education might benefit from more targeted marketing of informal approaches to teens at places where they are concentrated, such as shopping malls. The USDA should not, however, forget about non-traditional learners, including, but not limited to, students who only attend school part-time, students who have delayed their post-secondary education, and learners who are not enrolled at a college or university but seek additional education opportunities outside of that system.

USDA should think about expanding internships and all educational experiences to reach those learners, or even develop a competitive grants program that is aimed at the K-80 crowd. Many applauded USDA Extension work and noted that more funding for Extension was needed, and that we should look to Extension to find best practices in adult and other non-traditional learning. It was also suggested that USDA should exert pressure on land-grant schools to develop better ways of recognizing Extension work as part of the tenure promotion.

Capacity for AFNR education needs to be built more generally in underserved regions and sectors. For example, there is a growing disconnect between farming and the science/conservation/climate-change communities. USDA and the agriculture education community should identify scientific research that impacts the agriculture community and address farmers' needs to have access to that information as it develops. Members of urban communities also need to be recruited to AFNR fields to promote a diversity of viewpoints.

One opportunity to enhance AFNR education is through partnerships with community colleges, which play a large education role in rural and urban settings and are able to respond to local workforce needs. Given proper motivation and support, community colleges can play a huge role in building capacity in many regions and sectors, both in urban and rural environments. As

the least expensive sector of higher education, community colleges often serve the most diverse student population, from historically underrepresented students, to first-generation college students, to recent immigrants, to older students seeking to enhance their career prospects.

Aside from working with community colleges to reach underserved populations, USDA should provide support to programs that work to help students in underserved and rural communities improve test scores on college entrance exams and pursue careers in the AFNR sciences. The ACT Supplemental Preparation in Rural Education (ASPIRE) program at North Carolina State University is a good example of such a program.

Finally, it was suggested that agriculture educators, including advocates at USDA, should work to get an agriculture curriculum in colleges of education, not just in colleges of agriculture. USDA could facilitate this by partnering with the National Science Foundation (NSF) and the U.S. Department of Education to encourage teaching grants in the field of agriculture. At the university level, this will happen when agriculture professors develop partnerships with faculty in the colleges of education. Alignment of agriculture education with resources from other disciplines will strengthen the approach. USDA could play an additional role by urging land-grant university leadership to promote these sorts of partnerships.

Improving Teacher Training

A theme surrounding better teacher training came out of the session. Both the Curriculum for Agricultural Science Education (CASE) itself, as well as other organizations, urged USDA to provide support to CASE and look to CASE's lessons learned for ways to improve teacher training in the agriculture, food, and natural resource (AFNR) sciences. Because it is an elective subject matter, teachers of agriculture are expected to develop their curricula with limited financial resources and time.

Core academics, such as science and math, have very prescriptive standards, whereas agriculture varies among States. Agriculture education is, like other disciplines, required to teach to standards and be held accountable for student performance on mandated tests, but it lacks the necessary teacher training that many other disciplines have. As it is, because of the variability in

training resources, the quality of agriculture education is variable among agricultural education institutions.

Traditional resources include volumes of traditional vocational skills and facts, which the agriculture teachers are expected to sort through and select whatever they feel they want to teach. As a result, the curriculum can become a patchwork of disjointed lessons that address a topic or standard. What the curriculum should be is a comprehensive plan including relevant agriculture content, related STEM topics, rigorous pedagogy, and lesson plans for teaching the content properly using the best instructional strategies for the specific content. Because this takes time to develop, intense professional development is necessary.

Trainers need to walk teachers through a curriculum resource and show them the entire content, where to find materials, how to teach it properly, and why it is a valuable part of the lesson. Teachers do not take the time to learn it all on their own and may use the resource completely or improperly. Teachers also tend to stay with material that they are the most comfortable teaching, and because agriculture teachers are typically not trained as science or math teachers, they may skip over a science or math concept that they are not comfortable with. If the agriculture education community wants to reach students with new and exciting technology and cutting-edge science, it needs to provide appropriate and sustained professional development opportunities for teachers and for college faculty so that they are comfortable with new information and ways of teaching.

USDA can support better teacher training through post-secondary education college grants. It would be helpful to leverage public-private partnerships to establish dedicated funding sources so that teachers would not have to rely on securing one-time funding for training. It was also suggested that USDA needs to fund professional development for educators with STEM curricula built around agriculture topics. Further, the burden should not just lie on USDA or the agriculture education community. Academic systems must support agriculture teachers by giving them sufficient time, money, and incentive to go out and get the training they need. The agriculture education community as a whole must encourage school systems to do this.

Finally, we should not forget about all of the vocational teachers who are important for the fields of AFNR education. For example, welders, mechanics, and home economics teachers are all important teachers for these fields, but they are often not included when we think about teacher training. USDA could help by including these types of educators in teacher training programs, and making sure these types of specialists know they are valuable professionals as well.

Supporting Colleges of Agriculture

There are also challenges for educators at the higher education level. Many comments dealt with the issues faced by colleges of agriculture. Currently, the majority of agricultural education departments in the United States have less than one research full-time equivalent (FTE) and fewer than five faculty members. This limits the ability of the department to lead interdisciplinary initiatives and to be a major long-term collaborator in teaching, research, and extension programs.

The STEM pipeline is very leaky, with a recent Georgetown University study showing that out of 100 high school students, only 25 pursue a STEM career, and only 3 are still in a STEM career after 10 years. Agricultural education secondary programs may be able to strengthen this pipeline. One way to do this is to establish regional research centers in agricultural education. This idea has been discussed by experts in the field for years, and USDA could play a role to help set these up.

A Center for Public Issues Education in Agriculture and Natural Resources was recently started at the University of Florida. This center explores novel approaches for connecting people and agriculture and should be replicated regionally in other areas of the country. Statewide teaching centers or regional teaching programs should also be expanded in many States to provide greater student access to agriculture, food, and natural resources (AFNR) programs.

Another issue for colleges of agriculture is hiring practices. There needs to be a cultural change in hiring practices and curriculum development in the colleges of agriculture. Faculty members need more agricultural experience and expertise in teaching extension methods. USDA could encourage this kind of training of new faculty members by putting an emphasis on these activities in their

research grants. And finally, as online learning expands, faculty in colleges of agriculture need to be able to teach extension faculty the practice of online learning; thus, technology experts are needed who can support faculty in online teaching. Using technology tools and other apps is going to be the way of the future, and if agricultural education at the college level is going to improve, it must utilize the latest communication technologies and online teamwork.

Increasing Outreach and Visibility

At the beginning of the listening sessions, USDA presented slides on all of its education programs and offerings from all of its agencies. Many participants commented that they were surprised at the breadth and extent of education offerings available throughout USDA. USDA education includes formal education programs, informal programs, grants, mobile labs, and online courses and activities. As a first step towards getting better visibility of its programs, many suggested that the USDA website needs to be better organized. The website should be structured based on content (i.e., those looking for food resources could head to one page, those looking for soil resources to another) and might also have sub-headings for various user communities (curricula for teachers, games for children, etc.). If USDA could make its relatively substantial education teaching and information materials more user-friendly for the public, this could go a long way in service of agriculture, food, and natural resource (AFNR) education. As it is now, many educators do not know where to turn for quality teaching materials, materials which USDA may have buried within a confusing Web infrastructure.

USDA also needs to more generally improve communication of its capabilities and resources. Students often do not know that USDA internships and scholarships exist. USDA needs to have a more directed marketing campaign for its resources. This could be part of a national strategy, as discussed further below, or it could simply be imbedded into current USDA practices. USDA Twitter, Facebook, and blogs could all be used in a concerted approach to better tout education resources. USDA may want to design some advertising materials, either print or electronic, that are systematically sent out to high schools and 2- and 4-year institutions that provide information about all scholarships and related opportunities. Further, where successful AFNR programs already exist, USDA branding could also increase visibility or credibility of those programs. Therefore, USDA might want to look to other curriculum developers and agricultural educators and find ways to partner with them.

Stakeholders should also be engaged with more regularity. A very simple form of engagement would be to establish electronic communications to inform stakeholders when new education resources are available. Many suggested that USDA regularly take part in meetings of professional societies, including participation in annual meetings of teachers associations and education groups. This could be done with display booths at conferences or by organizing special symposia dealing with issues surrounding AFNR education. These meetings are a great way to reach many stakeholders at once, get feedback from stakeholders, and advertise and disseminate USDA education programs and products.

Similarly, USDA should once again take a leading role in supporting urban agriculture schools. In the past, USDA did this through the Urban Ag Symposium, wherein the administrators from the various urban agriculture high schools would get together annually and discuss best practices and ideas for collaboration. Urban agriculture high schools are an entry point into the field of agriculture, and whatever support and capacity-building USDA can give them would be a benefit to the field. The Council of Greater City Schools meeting, though not specifically composed of agriculture schools, would be another useful meeting for USDA to attend to make connections that might bring agriculture to more urban populations.

Building and Sustaining Partnerships

Many participants encouraged partnerships at all levels and focused on the value they can bring to strengthening agricultural education. Several organizations noted that if USDA partnered with them or worked with them more frequently, they would play a role in disseminating USDA teaching materials to their members. USDA should also partner with professional societies to put on workshops and webinars that use USDA education materials. The Association for Biology Laboratory Education (ABLE) provided the specific suggestion that USDA could encourage its education grant recipients to present their research at the ABLE annual conference, and that ABLE could offer a peer-review process and advice for improvement of USDA-sponsored laboratory education products.

Partnerships are necessary to turn USDA information into usable education products to help train the next generation of agriculture, food, and natural resources (AFNR) and science, technology, engineering, and mathematics (STEM) students. While USDA has many talented staff, they don't necessarily have the expertise that universities, schools, or educational organizations do for producing curricula and other products useful to students. For example, USDA could do a better job of understanding and leveraging 4-H and youth curriculum-development tools. USDA could utilize the functioning and effective infrastructure within these groups to better effect. Other partnerships that may be worth leveraging are the Eat Local movement, Community Gardens, and the First Lady's nutrition efforts.

Community colleges and businesses should also develop stronger partnerships so that colleges can address local curriculum and staffing needs. For example, if there were a large horticulture industry in a region, community colleges could work with local businesses to develop courses that would train students who could address needs for horticultural skills. USDA could play a role in this relationship by connecting businesses and colleges and encourage these sorts of partnerships through memorandums of understanding (MOU). USDA could serve as a catalyst, through Rural Development or NIFA and in partnership with other Federal Agencies, to encourage technical schools that provide agriculture immersion programs as a career track. The Agricultural Career Network (AgCN) has already been engaged with USDA to inform young people of the career opportunities at USDA and in rural communities across the United States. Community colleges could make better use of this network.

USDA could also develop nationwide educational partnerships systems that enhance community college education, like the Student Transfer Enrollment Advising and Mentoring Program at North Carolina State. This program allows transfer students the opportunity to enroll at North Carolina State during summer school in preparation for an undergraduate degree in an agriculture-related field. Students may transfer from any regionally accredited college or university through STEAM. Due to the strong academic reputation and preparation available in the North Carolina Community College system, STEAM encourages students to study at a North Carolina community college of their choice. STEAM students will take courses at both institutions with the goal of earning a bachelor of science degree in agriculture-related fields

from NC State. This is a good model that encourages success of community college students, supports rural students and minorities, and could be implemented in all States.

Other comments about partnerships were focused on what was happening at the Federal level. As discussed earlier, USDA could partner more with the U.S. Department of Education to raise the profile of agriculture, especially since last year Secretary of Agriculture Tom Vilsack and Secretary of Education Arne Duncan came together to sign an important interagency agreement around school-based agricultural education. Their intent was to create a closer working relationship and shared responsibility around meeting the workforce development needs of agriculture. Because of this newly forged relationship and the prominence of this issue right now, this is the ideal time to make things happen in agricultural education. To this end, an interagency working group has been formed, but this group must be given greater resources and higher level involvement to enact the vision the two Secretaries had when they entered into this agreement. Similarly, there was a USDA/FFA/Agricultural Education MOU that was signed by Secretary Vilsack in 2011, which was intended to connect the work of USDA and its agencies with the agricultural education system and FFA. More progress needs to be made on this MOU.

Finally, many participants supported the formation of the USDA ECC and expressed a desire that this group continue to function and strengthen coordination of USDA on education efforts. The ECC may be able to help coordinate with all of the stakeholders who are interested in promoting agriculture education. At the Federal level, USDA needs to take a strong leadership role in agriculture education and not let others define the playing field. ECC can play a role in representing agricultural education in interagency efforts, as well as helping to strengthen the public/private relationship. The ECC can also help ensure that agriculture education remains a major consideration in Federal education activities. Many commentators oppose the proposed Federal STEM reorganization, and if it happens, the ECC needs to be ready to represent AFNR interests.

Recommended Reading

To inform USDA's education portfolio development as well as new education strategies, several reports were recommended as essential reading material. All of these reports and papers may be useful as USDA considers expanding its internship and mentorship opportunities, developing curricula, and offering new or modified higher education grants programs. These documents include:

- The American Association for Agricultural Education's "National Research Agenda," which includes six priorities: public and policymaker understanding of and engagement in agricultural, food, and natural resources (AFNR); the adoption of new practices and strategies; meaningful, engaged learning; effective educational programs; ensuring a sufficient scientific and professional workforce for AFNR; and vibrant resilient communities.
- The "Change in Undergraduate Biology Education Call to Action" and the "Next Generation Science Standards for K-12." These reports highlight much of the research around how people learn and how science "works." They call for a more authentic experience of scientific inquiry and active learning in our classrooms, and emphasize the need to enhance the appreciation of scientists for their relevance in solving societal challenges.
- The 2009 National Academy of Sciences' (NAS) report, "Transforming Agricultural Education for a Changing World" and the Association of Public and Land-Grant Universities (APLU) white paper titled "Human Capacity Development: The Road to Global Competitiveness and Leadership in Food, Agriculture, Natural Resources, and Related Sciences." The NAS report was the result of a 2006 National Academies Summit that kick-started an effort to reconsider how higher education should approach agricultural education. The APLU white paper expands on the recommendations offered by the NAS report, laying out specific action items higher education needs to accomplish. Additionally, it makes recommendations to enhance the partnership between higher education and NIFA. The APLU also conducted a soft skills survey in 2010 and produced a paper titled, "Comparative Analysis of Soft Skills: What is Important for New

Graduates?" Both pieces emphasize building data literacy skills as well as science communication skills, integrating a social dimension into scientific research.

- The National Governors Association series of guidelines on science, technology, engineering and mathematics (STEM) training.
- The 2012 National Academy of Sciences' report "Education for Life and Work: Developing Transferable Knowledge and Skills in the 21st Century." This report describes skills that support "deeper learning," allowing the learner to transfer skills and knowledge from one situation to another, and discusses the importance of experiential and inquiry-based learning to this skill set development.

NEXT STEPS

USDA was fortunate to receive a great amount of practical advice and input as a result of this listening session and intends to carefully review and follow up on recommendations in this report where possible. The ECC, as the main body that requested and participated in writing this report, will be working with USDA leadership over the coming year to define new strategic and investment goals for USDA education, as well as continuing to work with stakeholders to gather more input as needs in the community evolve. A few immediate next steps will include:

1. Thinking carefully about how to sustain and broaden stakeholder engagement. Because of strict travel limitations and funding cutbacks in the Federal Government, it may be difficult to impossible to have listening sessions around the country or to participate more broadly in meetings and conferences involving the education community. Creative approaches using electronic tools, however, may be possible. The ECC and other education staff within USDA will discuss ways to broaden stakeholder engagement.
2. Beginning the process of redefining the face of agriculture. ECC will take these recommendations to the Office of Communications within USDA to discuss new branding techniques and the need to use different images when advertising our capabilities. The ECC will also begin a dialogue with other partners to develop a strategy for a national campaign to raise awareness of agriculture, food, and natural resources (AFNR) as exciting career fields.
3. Leverage existing agricultural education resources to provide guidance and training for students interested in entering the AFNR workforce. The National Association of State Directors of Career Technical Education Consortium (NASDCTEc), representing the State and territory heads of secondary, postsecondary, and adult career technical education across the Nation has already developed a curriculum template/guideline for the agricultural sciences containing a nationwide assessment of required knowledge and skills (http://www.careertech.org/career-clusters/landing-pages/agriculture.html). USDA will consider ways of promoting this already

developed resource for secondary education and assisting in keeping it updated with the latest skill and training needs in AFNR.

4. Continue to streamline and improve the USDA education and outreach website. The ECC survey of education activities across agencies provided a foundation for organizing those resources on a central USDA education and outreach page. Listening session suggestions include organizing the material by user (teachers, students of different ages) and then by subject to make the website more user friendly and allow USDA to take stock of gaps in information for each user group on priority topics in AFNR.

Agricultural education weaves together many disciplines: from chemistry, to statistics, to economics, to history, to cell biology, and beyond. The interdisciplinary nature of agricultural education provides tremendous opportunities to promote continuing education for a diverse set of stakeholders in the agricultural community, as well as recruit new talent to the workforce. Through continued meetings of the ECC, USDA will investigate the potential to act on and address the broader suite of comments and suggestions that require new resources, infrastructure, collaborative relationships, and long-term investment.

Appendix 1. Federal Register Notice

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Notices

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This section of the FEDERAL REGISTER contains documents other than rules or proposed rules that are applicable to the public. Notices of hearings and investigations, committee meetings, agency decisions and rulings, delegations of authority, filing of petitions and applications and agency statements of organization and functions are examples of documents appearing in this section.

DEPARTMENT OF AGRICULTURE

Notice of an Education Listening Session Meeting

SUMMARY: The Education Coordinating Committee, a body of the United States Department of Agriculture (USDA) Science Council announces an Education Listening Session stakeholder meeting for all interested agricultural education stakeholders.

DATES: The Education Listening Session will be held August 1, 2013. The public may file written comments up to one week after the meeting with the Contact Person.

ADDRESSES: The meeting will take place at the Jamie L. Whitten Federal Building, 1400 Independence Avenue SW., Washington, DC 20250. Written comments from the public may be emailed to the Contact Person identified in this notice.

FOR FURTHER INFORMATION CONTACT: Jenna Jadin, Advisor, Office of the Chief Scientist; telephone: (202) 260–8318; or email: *Jenna.Jadin@osec.usda.gov*

SUPPLEMENTARY INFORMATION: The Under Secretary of Research, Education, and Economics, Dr. Catherine Woteki, and the Deputy Under Secretary of Research, Education, and Economics (REE), Ann Bartuska, have been invited to provide brief remarks and welcome stakeholders during the meeting.

On Thursday, August 1, 2013, the listening session will be held from 9:00 a.m.–5:30 p.m. in room 107–A of the Jamie L. Whitten building. Specific topics of discussion in the morning session will include an introduction to the education programs of all of USDA's mission areas, and information on how USDA is fitting in to the broader Federal Science, Technology, Engineering, and Mathematics (STEM) education rearrangement.

In the late morning, the audience will listen to 10 minute presentations from stakeholders that discuss their education programs and their perception of needs and potential improvements in the field of agricultural education. Following lunch, stakeholder presentations will continue, and will be followed by a breakout group session in which participants will be asked to discuss, in small groups, a set of questions posed by the organizers which are aimed at getting feedback on agricultural and related education needs. The meeting will adjourn by 5:30 p.m.

All stakeholders are welcome to apply for a 10-minute presentation slot, however, due to time constraints, a limited number will be selected on a first come, first served basis. To apply for a slot, please email the Contact Person listed above. All presentations may be simple oral presentations or given in PowerPoint, however, the organizers request that a written transcript of the talk be submitted no later than one week after the event. Written comments by attendees or other interested stakeholders will be welcomed before and up to one week following the listening session (by close of business Thursday, August 8, 2013). All statements will become a part of the official record of the Education Coordinating Committee of the USDA Science Council and will be kept on file in the Office of the Chief Scientist.

All parties interested in attending this event must RSVP no later than July 24, 2013 to the Contact Person listed above.

Due to size constraints in the meeting room, only the first 70 responders will be accepted.

Done at Washington, DC this 18th day of July 2013.

Catherine E. Woteki,

Under Secretary, REE, Chief Scientist, USDA.

[FR Doc. 2013–17888 Filed 7–24–13; 8:45 am]
BILLING CODE 3410–03–P

DEPARTMENT OF AGRICULTURE

Agricultural Marketing Service

[Doc. No. AMS–FV–12–0073; FV13–901–1]

Vegetable and Specialty Crop Marketing Orders; Notice of Request for Extension and Revision of a Currently Approved Information Collection

AGENCY: Agricultural Marketing Service, USDA.

ACTION: Notice and request for comments.

SUMMARY: In accordance with the Paperwork Reduction Act of 1995 (44 U.S.C. Chapter 35), this notice announces the Agricultural Marketing Service's (AMS) intention to request an extension for and revision to a currently approved generic information collection for vegetables and specialty crop marketing order programs.

DATES: Comments on this notice must be received by September 23, 2013 to be assured of consideration.

Additional Information or Comments: Contact Andrew Hatch, Supervisory Marketing Specialist, Marketing Order and Agreement Division, Fruit and Vegetable Program, AMS, USDA, 1400 Independence Avenue SW., STOP 0237, Room 1406–S, Washington, DC 20250–0237; Telephone: (202) 720–6862, Fax: (202) 720–8938, or Email: *andrew.hatch@ams.usda.gov.*

Small businesses may request information on this notice by contacting Jeffrey Smutny, Marketing Order and Agreement Division, Fruit and Vegetable Program, AMS, USDA, 1400 Independence Avenue SW., STOP 0237, Room 1406–S, Washington, DC 20250–0237; Telephone (202) 720–9914, Fax: (202) 720–8938, or Email: *jeffrey.smutny@ams.usda.gov.*

Comments: Comments should reference the document number and the date and page number of this issue of the **Federal Register**, and be mailed to the Docket Clerk, Fruit and Vegetable Program, AMS, USDA, 1400 Independence Avenue SW., Room 1406–S, Washington, DC 20250–0237; Fax: (202) 720–8938); or submitted through the Internet at *http://www.regulations.gov.*

SUPPLEMENTARY INFORMATION:

Title: Vegetable and Specialty Crop Marketing Orders.

OMB Number: 0581–0178.

Expiration Date of Approval: February 28, 2014.

Type of Request: Extension and revision of a currently approved information collection.

Abstract: Marketing order programs provide an opportunity for producers of fresh fruit, vegetables, and specialty crops, in specified production areas, to work together to solve marketing problems that cannot be solved individually. This notice covers the

Appendix 2. Final Agenda

USDA Education Listening Session

August 1, 2013, Room 107-A Whitten

8:30 AM Meet and greet/coffee/table display browsing

9:00 AM Welcome from REE Deputy Under Secretary Ann Bartuska

9:15 AM STEM in the USG and the USDA Education Portfolio Overview (Muquarrab Qureshi, NIFA)

10:15 AM Stakeholder Presentations (Jenna Jadin, moderator):

- American Indian Higher Education Consortium (Carrie Billy)
- Association for Biology Laboratory Education (Janice Bonner)
- Tri-Societies (Luther Smith)
- University of Florida Dept of Ag Education and Communication (Ed Osborne)

11:00 Break

11:15 Stakeholder Presentations

- National FFA Organization (Keith Schescke and Kalie Hall)
- National Science Teacher Association (Al Byers)
- Curriculum for Agricultural Science Education (Dan Jansen)
- Texas Tech Agricultural Education and Communications (Courtney Meyers)

12:00 Breakout Session 1: Agricultural/Food/Natural Resource Education Overview

- Brainstorm on the biggest needs for improving agriculture and related education

1:00 Lunch on Patio (Keynote from REE Under Secretary and Chief Scientist, Catherine Woteki)

2:00 Stakeholder Presentations

- Chicago High School for Agriculture (William Hook)
- National Education Association (Carrie Pugh)
- Association of Science and Technology Centers (Anthony "Bud" Rock)
- National Environmental Education Foundation (Carol Watson)
- Virginia Tech Research and Education Program (Eric Wong)
- Ecological Society of America (Teresa Mourad)

3:00 Breakout group II: Diversifying the System

- Discussion of specific questions on improving diversity in agriculture/food/natural resource education

4:00 Break

4:15 Report out from breakouts

4:55 Summary of Day and Closing Remarks (Muquarrab Qureshi, NIFA)

5:00 Adjourn

Appendix 3. Breakout Sessions

During the listening session, there were two separate breakout sessions, each divided into three groups that each focused on one of three different questions. The questions asked during each session are shown below.

Q1: What are the greatest needs in the fields of agriculture, food, and natural resource education? What do we have that is good, and what are the biggest things missing?

Q2: How can we improve connections between formal and informal environments?

Q3: How do we reach out to under-represented students?

Q4: What agricultural education offerings should be developed to meet stakeholder needs? How can we better track and evaluate the success of our offerings in food and agriculture sciences?

Q5: What are the entry points into agriculture sciences and how can we better impact those entry points?

Q6: What should be our national strategy for training an agriculture/food/natural resources workforce?

Appendix 4. Listening Session Attendees and Registrants

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Appendix 5. USDA Education Programs

Agency	*Program*	*Description*	*Website*
ARS	ARS and Forest Service Cooperative Agreements	Agreements with host universities which provide laboratory and other scientific assistantships to graduate students.	
ARS	Postdoctoral Researcher Employment	Approximately 50-60 each year in national laboratories.	
APHIS	AgDiscovery	AgDiscovery is an outreach program to help students learn about careers in animal science, veterinary medicine, agribusiness, and plant pathology. This 2-4 week program allows participants to live on a college campus and learn about agricultural science from university professors, practicing veterinarians, and professionals working for APHIS.	http://www.aphis.usda.gov/agdiscovery/
APHIS	Daniel E. Salmon Scholarship Program	Scholarship program for non-veterinary students who wish to pursue careers that have an impact on the health of U.S. animal agriculture.	http://www.aphis.usda.gov/publications/aphis_general/content/printable_version/salmon_brochure.pdf
APHIS	Claudia Cartwright Fellowship Program	Offers fellowships and career opportunities to academically qualified students who are enrolled in post-baccalaureate programs related to agriculture or the biological sciences. Fellowship recipients can receive up to $25,000 in financial assistance for the final 2 years they are enrolled in a master's or doctoral degree program. Students must maintain at least a 3.0 grade-point average during their fellowship enrollment. Students are offered paid summer employment.	http://www.aphis.usda.gov/publications/aphis_general/content/printable_version/ClaudiaCartwrightFellowship-PA2028-FINAL.pdf
APHIS	Saul T. Wilson	Scholarship program for undergrad students	http://www.aphis.usda.gov/

	Scholarship Program	studying biomedical sciences and grad students studying veterinary medicine. Provides funding toward tuition and summer employment with APHIS.	publications/aphis_general/content/printable_version/pub_ahwilson.pdf
APHIS	Washington Internships for Native Students	The Washington Internships for Native Students (WINS) offers students of sovereign American Indian, Alaska Native, and Native Hawaiian nations the opportunity to build leadership skills while living, studying, and interning in Washington, D.C. WINS students gain professional work experience through internships at a Federal agency or private firm, take courses focusing on Native American public policy concerns, and enjoy engaging social and cultural extracurricular activities.	http://www.american.edu/spexs/wins/
APHIS	1890 Land-Grant Institution Scholarships	The USDA/1890 National Scholars Program is a partnership between USDA and the eighteen 1890 Historically Black Land-Grant Universities. The program awards scholarships to students attending one of the 1890 Historically Black Land-Grant Universities, pursuing a bachelor's degree in agriculture, food, natural resource sciences, or related academic disciplines and willing to work full-time with the USDA upon graduation.	http://www.aphis.usda.gov/about_aphis/programs_offices/veterinary_services/downloads/1890_program.pdf
APHIS	Dr. Martin Luther King, Jr., Education Contest	Designed to inspire students to reflect on the life of Dr. Martin Luther King, Jr., and share their thoughts and insights in an essay or pictorial format. Students chosen are hired for summer employment with APHIS.	
APHIS	Hispanic Association of Colleges and Universities (HACU) National Internship Program	HACU internship program is a student employment program designed to encourage Federal Agencies to increase their outreach effort to Hispanic communities by recruiting students for paid summer and semester-long	http://www.hacu.net/hacu/HNIP.asp

		internships.	
APHIS	Hispanic Leaders in Agriculture and Environment	The goal of the Hispanic Leaders in Agriculture and the Environment program is to increase the number of Hispanic leaders in governmental and non-governmental organizations, colleges and universities, and private industries related to agriculture and the environment.	http://utsa.edu/crts/hlae/
APHIS/ NASS	Public Service Leaders Scholars Program	Provides undergraduate and graduate-level students with a challenging internship opportunity combined with a scholarship. The program is designed to promote public service and create access to higher education. Upon successful completion of program and degree requirements, participants become permanent employees of USDA.	http://www.hsi.usda.gov/Students/PSLS.htm
APHIS	Wildlife Initiative Student Career Education Internship Program	In 2011, APHIS invested in the Wildlife Initiative Student Career Education Internship Program at Lincoln University and Tuskegee University. The funds provided assisted two students with tuition and summer internship opportunities.	
APHIS	Plant Biosecurity Curriculum	Two courses on regulatory plant protection and risk analysis, offered annually via distance education to students at several universities.	
APHIS/ NASS	1994 Tribal Scholars Program	This program offers scholarships to U.S. citizens who are seeking a bachelor's degree at one of the 32 currently operating 1994 Land-Grant Institutions in a field of study in agriculture, food, and natural resources or other related disciplines.	http://www.outreach.usda.gov/education/1994tlgcu/tribalscholars.htm
APHIS	Thurgood Marshall Internships	The Thurgood Marshall College Fund-APHIS Internship Program is a 10-week summer program designed to employ selected scholarship recipients from the TMCF database who have an interest in agriculture-related	

		disciplines through hands-on experience with the selected program area.	
APHIS	Chicago High School for Agricultural Sciences Intern Project (CHAS)	APHIS partnered with the CHAS to hire two inner-city Chicago youth for the summer. CHAS is a Chicago Public School dedicated to making students aware of careers in the agricultural industry.	
APHIS	The William Helms Scholarship Program (WHSP)	APHIS offers tuition assistance, mentoring, and summer work to college students interested in pursuing a career in plant pathology, biology, virology, ecology, or entomology.	http://www.aphis.usda.gov/plant_health/helms/index.shtml
ERS	Internships	ERS hires students under the Pathways program. Applicants must be enrolled at least half-time at an accredited school (high school, technical or vocational school, 2- or 4- year college, university, graduate, or professional school) and be in good academic standing (2.7 GPA or better). Students may work full-time or part-time and appointment may be made at any time during the year. Employment ranges from summer jobs to positions that can last for as long as the student meets program requirements. Special programs target Hispanic (HACU) and Native American (WINS) programs.	http://www.ers.usda.gov/about-ers/careers-at-ers.aspx
ERS	Distance Learning Program	The ERS distance learning program that brings experts from the agency into the classrooms of minority-serving institutions via interactive real-time video seminars. Under the program, ERS staff makes 45-minute presentations via simultaneous Web broadcasts to classes at the participating schools, followed by a 15-minute question and answer period. In follow-up sessions, students from each class give presentations to ERS specialists, who offer comments and feedback.	http://www.ers.usda.gov/about-ers/distance-learning.aspx

ERS	ERS education-related research	ERS provides socioeconomic data and research on education and the relationship between education, economic activity, and household well-being with a particular emphasis on the rural economy. Research findings and data are provided on the ERS website and can be used by educators for course material.	http://www.ers.usda.gov/
FSA	FSA Outreach and Education	FSA offers workshops, outreach meetings, and field days through State and local offices, where FSA employees (State outreach coordinators, county office outreach coordinators, State executive directors, and others) make presentations on loans and other programs available through the agency. At county field days, producers learn about programs at a local farm where presentations are made at "learning stations."	http://www.fsa.usda.gov/programs-and-services/outreach-and-education/index
FSA	Youth Loans	Youth loans are made in conjunction with a supervised sponsor (4-H, FFA). FSA provides the financing, but the supervision is provided by the 4-H or FFA sponsor. This loan program teaches our youth financial responsibility as they learn to manage records and finances and as they learn to care for their animals, etc. This program helps educate youth about farm responsibilities, recordkeeping, and the lending process.	https://www.fsa.usda.gov/FSA/webapp?area=home&subject=paca&topic=you
Food and Nutrition Service (FNS)	Produce Safety University (PSU)	The course was developed jointly by USDA's Food and Nutrition Service (FNS) and USDA's Agricultural Marketing Service (AMS). PSU is a 1-week training course designed to help school foodservice staff identify and manage food safety risks associated with fresh produce. PSU addresses produce purchased from traditional suppliers, direct from farmers, and through the Department of Defense Fresh program.	http://www.fns.usda.gov/food-safety/produce-safety-university

FNS	Supplemental Nutrition Assistance Education Program (SNAP-Ed)	The goal of SNAP-Ed is to improve the likelihood that persons eligible for SNAP will make healthy choices within a limited budget and choose active lifestyles consistent with the current Dietary Guidelines for Americans and MyPlate.	http://www.fns.usda.gov/snap/supplemental-nutrition-assistance-program-education-snap-ed
FNS	Nutrition Education and Obesity Prevention Grant Program (SNAP-Ed)	Establishes Nutrition Education programs for SNAP participants and other low-income individuals under the Healthy Hunger-Free Kids Act Section 241. States are required to submit a SNAP-Ed plan for approval and request funds. Partnerships and collaborations using a public health approach are strongly encouraged.	https://snap.nal.usda.gov/national-snap-ed/nutrition-education-and-obesity-prevention-grant-program
FNS	Team Nutrition	Team Nutrition is an initiative of the USDA Food and Nutrition Service to support the Child Nutrition Programs through training and technical assistance for foodservice, nutrition education for children and their caregivers, and school and community support for healthy eating and physical activity.	http://www.fns.usda.gov/tn/team-nutrition
FNS	The CARE Connection Curriculum	The National Food Service Management Institute (NFSMI) developed this curriculum in conjunction with USDA Child and Adult Care Food Program (CACFP) to support family daycare homes, childcare centers, and institutions that provide nutritious meals for adults in the daycare setting through reimbursement for meals and snacks.	http://www.nfsmi.org/Templates/TemplateDivision.aspx?qs=cElEPTI0
FNS	National Food Service Management Institute (NFSMI) Education and Training Resources for School Nutrition Programs	NFSMI's research-based educational and training resources are designed to help district school nutrition directors/supervisors, managers, and nutrition assistants/technicians meet the challenges of the day-to-day operations of successful school nutrition programs.	http://www.nfsmi.org/Templates/TemplateDivision.aspx?qs=cElEPTU=
FSIS/	Food Safe Families	Developed by USDA, the U.S. Food and Drug	http://www.fsis.usda.gov/Ed

Office of Public Affairs and Consumer Education (OPACE)	(FSF) Campaign	Administration and the Center for Disease Control, in partnership with the Ad Council, FSF is a multimedia food safety campaign designed to create national publicity for food safety.	ucation/Check_Your_Steps/index.asp
FSIS/ OPACE	Cook It Safe Campaign	Developed to encourage consumers to fully cook pre-prepared foods and to follow all package cooking instructions.	http://www.fsis.usda.gov/News_&_events/NR_090111_01/index.asp
FSIS/ OPACE	Food Safety Ambassador Program/Outreach Task Force	A network of FSIS field employees organized to promote FSIS at outreach events based in district office locations.	
FSIS/OPACE	USDA Food Safety Discovery Zone (FSDZ)	The USDA FSDZ was launched on May 2010 as a "new and improved" USDA Food Safety Mobile. It is a 40-foot traveling showcase of USDA's Food Safe Families Campaign, designed to support local food safety efforts and to reach consumers where they live.	http://www.fsis.usda.gov/Education/Food_Safety_Mobile/index.asp
FSIS/OPACE	Food Safety Education Camp	FSIS' Food Safety Education Camp is an interactive learning experience that has become USDA's primary outreach mechanism for teaching children from elementary through high school ages about food safety. Camps are designed to increase student awareness of basic food safety practices: Clean, Separate, Cook and Chill and to teach students the science behind food safety.	https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CDcQFjAA&url=http%3A%2F%2Ffoodsafety.adcouncil.org%2Fassets%2F5%2FHow2Host_food-safety-campaign.pdf&ei=vF7rUP3YMYmN0QGBxoG4Ag&usg=AFQjCNHlR4jZZgxWjqAwXRpUqHNPKUI9bA&sig2=8R925FCZ3ZVEK2EAGZSupA&bvm=bv.1355534169,d.dmQ
FSIS/OP	Grill It Safe Campaign	Designed to promote safe food-handling	http://www.fsis.usda.gov/Fo

ACE		practices during summer grilling season.	od_Safety_Education/Grill_It_Safe/index.asp
FSIS/OP ACE	At-Risk Underserved	Designed to reach segments of the population that are most vulnerable to the consequences of food-borne illness. (for example, older adults and others with compromised immune systems).	
FSIS/OP ACE	Hispanic Outreach	FSIS provides Spanish materials as well as English to accompany each educational campaign. In addition, FSIS manages two outreach campaigns to raise awareness of food safety among Spanish-speaking communities in United States.	
FSIS/OP ACE	USDA Meat and Poultry Hotline	The USDA Meat and Poultry Hotline responds to food safety inquiries by phone, e-mail, and chat in both English and Spanish. In addition, the Hotline writes food safety fact sheets, housed on the FSIS website in English and Spanish.	
FSIS/OP ACE	FSIS Virtual Rep. Ask Karen	Launched in April 2004, "Ask Karen" is the FSIS Virtual Representative, an automated response system, available to answer food safety questions in English and Spanish, 24/7. "Karen" Live chat is also available.	http://www.fsis.usda.gov/wps/portal/informational/askkaren
FSIS/OP ACE	Foodsafety.gov	FoodSafety.gov, a consumer food safety website, is a joint collaboration between the Government agencies that serve a role in ensuring food safety in the United States, USDA, FDA and CDC.	www.foodsafety.gov
FS	Outdoor Nation	Signature, partnered event that reconnects millennials with the outdoors through summits, award grants, and outdoor projects. Specifically located in NY, CA, TX, MA, DC, CO, MN, and GA.	http://www.outdoornation.org/
FS	National Get Outdoors Day	Signature, partnered event that introduces and connects children/families with nature through recreation and ready access to public lands	http://www.nationalgetoutdoorsday.org/

		(National Forests and Grasslands). National.	
FS	International Migratory Bird Day	Signature, partnered event that promotes understanding and conservation of international migratory birds. 30 sites nationwide.	http://www.birdday.org/
FS	National Fishing Days	Signature event that introduces youth to fishing as a healthy outdoor activity and opportunity to connect with nature. 120 sites nationwide.	
FS	National Public Lands Day	Partnership-driven public lands stewardship, education, and outdoor recreation awareness. Nationwide.	http://www.publiclandsday.org/
FS	Get to Know your Wild Neighbors	Aims to connect youth with nature through art. Offers online connections, nationwide. Signature events in AK, CO, CA, WA, DC, GA and TN.	http://www.get-to-know.org/
FS	Forests, Oceans, Climate and US (FOCUS)	Partnered program that introduces youth to the watersheds they depend upon through art and education. Signature events in select Eastern States (to date).	http://www.wylandfoundation.org/education.php?subsection=FOCUS
FS	More Kids in the Woods	Internal, competitive funding opportunity for field units to expand and create meaningful and sustained outdoor experiences for youth. Nationwide.	http://www.fs.fed.us/news/2011/releases/04/mkiw-recipients.shtml#mkiw
FS	Children's Forests	Internal funding opportunity for field units to establish programs that connect children and families to the outdoors and high-quality learning environments. Hands-on engagement. Nationwide.	
FS	Job Corps	Job training for low-income youth. 28 centers located on forests in multiple regions.	http://www.jobcorps.gov/home.aspx
FS	Youth Conservation Corps/Public Lands Corps	Summer/seasonal employment and training for youth and young adults. Nationwide.	http://www.nps.gov/gettinginvolved/youthprograms/plc.htm http://www.nps.gov/gettinginvolved/youthprograms/ycc.htm
FS	Children & Nature	Program driven by partnerships with the health	http://www.neefusa.org/heal

		care community that trains and supports pediatric health care providers to write "nature prescriptions" that encourage children to go outside. Located on Children's Forests.	th/children_nature.htm
FS	Education Outreach Grants	Partnership with the National Fish and Wildlife Foundation and the National Environmental Education Foundation to integrate healthy outdoor recreation, conservation education, and environmental stewardship into work and projects. Nationwide.	
FS	Nature Watch	Hands-on fish, wildlife, and plant learning opportunities for public. Nationwide.	http://www.fs.fed.us/outdoors/naturewatch/resources.htm
FS	Discover the Forest	Online public service program to connect youth and families with nature through variety of social and traditional media outlets. Partnered with AdCouncil. National, largely online educational messaging.	http://www.discoverthefores t.org/ http://www.descubreelbosque.org
FS	Natural Inquirer and Investigator	Educational journal that shares results of research done by Forest Service scientists.	http://www.naturalinquirer.org/
FS	Junior Forest Ranger Program	Series of educational activities that supports the messaging of Smokey Bear and fire prevention campaign. Expanded to create dynamic learning opportunities to explore natural world. Adventure Guide. Nationwide.	http://www.fs.usda.gov/main/conservationeducation/smokey-woodsy/junior-rangers
FS	Hands on the Land	Multi-partner effort that provides a national network of field classrooms to provide hands-on student learning.	http://handsontheland.org/
FS	Forest for Every Classroom	Partnered effort (public land agencies, non-profits) that provides resource-based activities for kids. In-service teacher-training program that emphasizes place-based education theory and community service. New content for	http://www.nps.gov/mabi/forteachers/forest-for-every-classroom.htm

		classrooms, including curriculum, field exercises. Allows teachers to earn graduate credits from an accredited university.	
FS	Urban Connections	Engage and build relationship with urban centers--bridging gaps between rural communities and under-represented urban audiences.	http://www.fs.fed.us/research/urban-webinars/
FS	Distance Learning Opportunities	Distance learning efforts designed to meet national science standards and conservation action through education and awareness. Currently: ClimateChangeLIVE.	http://www.climatechangelive.org/
FS	National Symbols Program	Program uses the Congressionally mandated symbols, Smokey Bear and Woodsy Owl, to spread the conservation message using a variety of education methods and materials. Nationwide.	http://www.symbols.gov
FS	GreenSchools!	Program leads schools through energy audits of the school infrastructure and the development of projects to reduce the carbon footprint.	http://www.plt.org/greenschools
FS	Outdoor Explorers Mentoring Program	An outdoor education program providing monthly outdoor recreation and education experiences for Big Brothers/Big Sisters youth through local college outdoor organizations. Designed by the Arthur Carhart National Wilderness Training Center.	http://outdoorexplorers.wordpress.com/
FS	Forest Stewardship Program	Program provides funding to State forest agencies to carry out a variety of educational activities including workshops and field days, designed to educate landowners to better manage their forest properties to meet their own objectives while also returning public benefits, including clean water, wildlife habitat, recreation, and clean air.	http://www.dnr.wa.gov/BusinessPermits/Topics/SmallForestLandownerOffice/Pages/forest_stewardship_program.aspx
FS	Wilderness Investigations	Partnered workshop that introduces teachers to wilderness topics and activities. Emphasis on expanding classroom boundaries to include local	http://www.wilderness.net/NWPS/courseDetail?courseID=194

		places with wild elements and experience an integrated approach to place-based teaching using wilderness as the organizing concept. Credits are available for each workshop (graduate/undergraduate credits available in summer sessions). Correlated with national and State standards (for 5th – 8th grades) and Indian Education for All Essential Understandings.	
NASS	USDA 1890 Scholars Program	NASS provides scholarships and internships to 5 students in the USDA 1890 Scholars Program.	http://www.ars.usda.gov/sp2userfiles/subsite/careers/2009usda1890scholarsapp.pdf
NASS	NASS and FFA Census of Agriculture Instructional Materials	NASS partnered with the National FFA Organization to create Census of Agriculture instructional materials. The activities are designed to help increase awareness about the Census of Agriculture and to empower students to play an active role in the Census process.	https://www.ffa.org/FFAResources/ffalearn/agcensus/Pages/default.aspx
NASS	NASS, American Statistical Association (ASA) and Ag in the Classroom	NASS is partnering with ASA and the National Ag in the Classroom organization to expand Census at School, an existing international classroom statistical literacy program. With some additions, the existing program can also meet the educational/agricultural literacy goals of the Ag in the Classroom network, becoming a teaching tool for agriculture teachers grades 4-12.	http://www.amstat.org/censusatschool /
NASS	NASS partnership with the Joint Program for Statistical Methodology (JPSM)	NASS partners with JPSM. Contributes financially to the organization, and offers multiple intern opportunities to JPSM students each year.	
NIFA	Know Your Farmer, Know Your Food	USDA-wide; some Farmer's Market and Departmental Vegetable Garden activities typically supported by AMS; the former "Yearbook of Agriculture" series.	http://www.usda.gov/wps/portal/usda/knowyourfarmer?navid=KNOWYOURFARMER

NIFA	Rural health and Safety Educational Program	Assist rural communities in developing nutrition and health care services and facilities that will provide the maximum benefit for the resources invested and assist community leaders and public officials in understanding their roles and responsibilities relative to rural health services and facilities.	http://www.csrees.usda.gov/fo/ruralhealthandsafetyeducation.cfm
NIFA	Risk Management Education	Provides risk management education materials to producers covering the full gamut of risk management strategies in all 50 States and territories.	http://www.rma.usda.gov/aboutrma/who/aboutrme.html
NIFA	Master Gardener Program	Administered through Cooperative Extension Services (CES) in most States; 4-H of CES.	http://www.extension.org/mastergardener
NIFA	Youth and 4-H	Prepare youth for the challenges of the 21st century by engaging them in a process of discovery and exploration through inquiry-based opportunities that connect knowledge, skills, and resources to practical application across multiple settings.	http://www.4-h.org
NIFA	Children, Youth, and Families at Risk	Collect resources of the land-grant and cooperative extension systems to develop and deliver educational programs that equip limited-resource families and youth.	http://www.csrees.usda.gov/nea/family/cyfar/overview.html
NIFA	Expanded Food and Nutrition Education Program	Provided through CES, to assist limited resource audiences in acquiring the knowledge, skills, attitudes, and changed behavior necessary for nutritionally sound diets, and to contribute to their personal development and the improvement of the total family diet and	http://www.csrees.usda.gov/nea/food/efnep/efnep.html

		nutritional well-being.	
NIFA	Food Stamp Nutrition Education Program	Supported by FNS and delivered by State agencies and CES to train program recipients in nutrition; extension provided through CES.	Many. One example: http://cwh.berkeley.edu/resource/food-stamp-nutrition-education-program-fsnep
NIFA	Pesticide Applicator Training	Offered through CES with support from EPA and the States; agriculture, food, nutrition, natural resource, and community-development education are offered through CES.	http://ipcm.wisc.edu/pat/
NIFA	Sustainable Agriculture Research and Education	NIFA awards to farmers to develop and demonstrate innovative, sustainable practices.	http://www.csrees.usda.gov/fo/fundview.cfm?fonum=1130
NIFA	Future Farmers of America	Coordinated by the U.S. Department of Education and State departments of education, and agricultural and/or rural high schools throughout the country.	https://www.ffa.org/Pages/default.aspx
NIFA	Ag in the Classroom	National K-12 teachers and students network coordinated by NIFA with support from the Farm Bureau Federation, State departments of education, and other local and State-based organizations.	http://www.agclassroom.org
NIFA	Food, land, and people	K-12 curricular project emphasizing natural resource issues in agriculture, which has received support through NRCS.	http://www.agclassroom.org/ny/resources/flp.htm
NIFA	Farm to School	K -12 school-based program emphasizing fresh produce and understanding of farming practices, supported by the Agricultural Marketing Service and initially the Kellogg Foundation; school	http://www.farmtoschool.org/

		garden programs to teach both agricultural practices and encourage good nutrition, very prevalent in California.	
NIFA	AgriCulture program	To increase the number of American ethnic minorities entering math and science pipelines that lead to careers in agriculture, science, technology, engineering, and math by engaging urban minority youth in research into sustainable forms of agriculture.	
NIFA	Higher Education Challenge Grants Program	For curriculum development, recruitment, and innovation programs for undergraduate education.	http://www.csrees.usda.gov/fo/highereducationchallenge.cfm
NIFA	Multicultural Scholars Program	Support for minority-serving institutions' educational programs through NIFA including, Hispanic-serving, Tribal colleges, Native Alaskan and Hawaiian-serving institutions, and Insular Areas.	http://www.csrees.usda.gov/fo/multiculturalscholars.cfm
NIFA	Hispanic Serving Institutions (HSI) Education Grants Program	Promotes and strengthens the ability of HSIs to carry out higher education programs in the food and agricultural sciences.	http://www.csrees.usda.gov/fo/hispanicservinginstitutionseducation.cfm
NIFA	Secondary Education, Two-Year Postsecondary Education, and Agriculture in the K12 Classroom Challenge Grants Program	Increasing the number and diversity of students who will pursue and complete a 2- or 4-year postsecondary degree in the food and agricultural sciences, or other STEM fields.	http://www.csrees.usda.gov/fo/secondaryeducationchallenge.cfm
NIFA	Tribal Colleges Equity Grants Program	Provides funding to enhance educational opportunities for Native Americans in the food	http://www.csrees.usda.gov/nea/education/in_focus/triba

		and agricultural sciences.	l_if_tribal_equity.html
NIFA	1890 Capacity-building Teaching	Prepares academic faculty for sustainable change to address emerging student clientele, improving education competency, and developing student recruitment in emerging agricultural sciences field.	http://www.csrees.usda.gov/fo/1890capacity.cfm
NIFA	Alaska Native-Serving and Native Hawaiian Serving Institutions	Support for the academic and research training of faculty and students at institutions that serve native Alaskans and native Hawaiians in order to prepare the targeted student populations for the workforce needs in food and agriculture.	http://www.nifa.usda.gov/fo/alaskanativenativehawaiianinstitutions.cfm
NIFA	Distance Education and Resident Insular Instruction	To promote and strengthen the ability of Insular Area Institutions to carry out teaching and education programs within a broadly defined arena of food and agricultural sciences-related disciplines.	http://www.nifa.usda.gov/fo/distanceeducation.cfm
NIFA	Women and Minorities in STEM	Targets women and/or minorities in rural areas so they will gain access to opportunities and careers in STEM fields.	http://www.csrees.usda.gov/funding/wams/wams.html
NIFA	National Needs Fellowship Program	To support Master's and Ph.D. students in agriculture, natural resources, and nutrition.	http://www.csrees.usda.gov/fo/nationalneedsgraduatefellowships.cfm
NIFA	Agriculture and Food Research Initiative (AFRI) Fellowship Program	An AFRI program to support doctoral and post doctoral training related to high priority issues in agriculture.	http://www.csrees.usda.gov/fo/fellowshipsgrantprogramafri.cfm
NIFA	Graduate Research and Program Assistants	Supported through NIFA grant including former National Research Initiative, AFRI, 406,	

		mandatory-funded research and education (e.g., specialty crops, organic agriculture), Hatch and multistate projects, special grants, and administrative activities.	
NIFA	NIFA Fellows	AFRI sabbatical awards; Intergovernmental Personnel Act opportunities, USDA-wide.	http://www.csrees.usda.gov/fo/fellowshipsgrantprogramafri.cfm
NRCS	S.K. Worm	S.K. Worm, the official annelid, or worm, of the Natural Resources Conservation Service helps students explore and learn about soil.	http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/people/teachstudent/?cid=stelprdb1166383
NRCS	Soil Education	A hub of resources for teaching students about soil.	http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/edu/
NRCS	Your Hometown Clean Water Tour	Colorful drawings and cartoon characters make this a hit as you learn about the importance of keeping our hometown water clean and clear. This features characters like Major Mulcher and No-Till Bill and includes a 10-question water quiz.	http://nrcspad.sc.egov.usda.gov/DistributionCenter/product.aspx?ProductID=11
NRCS	For the Good of the People	This is a 32-page booklet aimed at a fifth grade audience and is full of fun facts about farmers and ranchers. It explains where food comes from, how it is produced, and the benefits of conservation. (2007)	http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1176623.pdf
NRCS	The Water Cycle: Nature's Recycling System	The newly designed poster shows the elements of the water cycle through a diverse landscape. The back of the poster includes a variety of information and activities that teachers can use to get students of all ages engaged in water conservation. There is also a YouTube video on the water cycle.	http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/people/teachstudent/?cid=stelprdb1046868
NRCS	WhoBuddies	The Whobuddies are six unique owl cartoon	http://www.nrcs.usda.gov/w

	Adventures	characters who really care about the environment. In "The Mystery of the Sick Stream" and "The Great Soil Discovery," you can read about their adventures with Connor and his classmates as they work with the Whobuddies to help protect the natural resources in their school's watershed.	ps/portal/nrcs/detail/ia/home/?cid=nrcs142p2_011809
NRCS	The Wonder of Discovery—Pollinators All Around	NRCS offers a variety of posters that spotlight pollinators, including its newest, The Wonder of Discovery—Pollinators All Around. Kids can take time to discover all the bees, hummingbirds, bats, butterflies, and more, showing why protecting pollinators is important.	http://nrcspad.sc.egov.usda.gov/DistributionCenter/product.aspx?ProductID=1008
NRCS	Backyard Conservation	Backyard Conservation shows you how conservation practices that help conserve and improve natural resources on agricultural land across the country can be adapted for use around your home. These practices help the environment and can make your yard more attractive and enjoyable. Most backyard conservation practices are easy to use. America's farmers and ranchers have been using these practices successfully for decades.	http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/newsroom/features/?&cid=nrcs143_023574
NRCS	Dig in! Hands-on Soil Investigations.	New Soil Education Publication. The National Science Teachers Association (NSTA) and the Natural Resources Conservation Service (NRCS) announce the release of Dig In! Hands-On Soil Investigations. This lively, 129-page softbound book, a bestseller when it debuted at the 2001 NSTA convention in St. Louis, will soon assist educators across the Nation in teaching scientifically accurate soil and soil conservation information in an enjoyable way. The book is available from NSTA by calling 1-800-277-5300.	

RD	AgMRC -Agricultural Marketing Resource Center	A national information resource center for value-added agriculture. The purpose and mission of the AgMRC is to provide producers and processors with critical information to build successful value-added agricultural enterprises. Partially supported through RD funding.	http://www.agmrc.org/
RD	ATTRA - National Sustainable Agriculture Information Service	Provides a comprehensive information and research services related to sustainable and organic agricultural production. The ATTRA website offers worldwide access to its publication and news information free of charge. Partially supported through RD funding.	https://attra.ncat.org/

Appendix 6. Acronyms

Acronym	Definition
ABLE	Association for Biology Laboratory Education
AFNR	Agriculture, Food, and Natural Resources
AFRI	Agriculture and Food Research Initiative
AgCN	Agricultural Career Network
AgMRC	Agricultural Marketing Resource Center
AMS	USDA Agricultural Marketing Service
APHIS	USDA Animal and Plant Health Inspection Service
APLU	Association of Public and Land-Grant Universities
ARS	USDA Agricultural Research Service
ASA	American Statistical Association
ASPIRE	ACT Supplemental Preparation in Rural Education
BAYOU	Beginning Agricultural Youth Opportunities Unlimited
CACFP	USDA Child and Adult Care Food Program
CAP	Coordinated Agricultural Project
CASE	Curriculum for Agricultural Science Education
CDC	U.S. Centers for Disease Control and Prevention
CES	Cooperative Extension Services
CHAS	Chicago High School for Agricultural Sciences
ECC	Education Coordinating Committee
EPA	U.S. Environmental Protection Agency
ERS	USDA Economic Research Service
FDA	U.S. Food and Drug Administration
FFA	Future Farmers of America
FNS	USDA Food and Nutrition Service
FOCUS	Forests, Oceans and Climate U.S.
FS	USDA Forest Service
FSA	USDA Farm Service Agency
FSDZ	Food Safety Discovery Zone
FSES	Food Safety Education Staff
FSF	Food Safe Families
FSIS	USDA Food Safety Inspection Service
FY	fiscal year
HACU	Hispanic Association of Colleges and Universities
JPSM	Joint Program for Statistical Methodology
MOU	memorandum of understanding
NAS	National Academy of Sciences
NASDCTEc	National Association of State Directors of Career Technical Education Consortium

NASS	USDA National Agricultural Statistics Service
NFSMI	National Food Service Management Institute
NGO	non-governmental organization
NIFA	USDA National Institute for Food and Agriculture
NRCS	USDA Natural Resources Conservation Service
NSF	National Science Foundation
NSTA	National Science Teachers Association
OPACE	USDA FSIS Office of Public Affairs and Consumer Education
OSHA	Occupational Safety and Health Administration
PCAST	President's Council of Advisors on Science and Technology
PREP	Post-baccalaureate Research and Education Program
PSU	Product Safety University
RD	USDA Rural Development
REE	USDA Research, Education and Economics Mission Area
SNAP-Ed	USDA Supplemental Nutrition Assistance Education Program
STEAM	Science, Technology, Engineering, Agriculture and Mathematics
STEM	Science, Technology, Engineering and Mathematics
TMCC	Turtle Mountain Community College
TMCF	Thurgood Marshall College Fund
USDA	United States Department of Agriculture
WHSP	William Helms Scholarship Program
WINS	Washington Internships for Native Students