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Institutional Information Request Form

Southern Region: Value of Extension Services and Experiment Stations

The Battelle Memorial Institute is working with the leadership of the *Association of Southern Region Extension Directors* and the *Southern Association of Agricultural Experiment Station Directors* in producing analysis and a high-profile report on the special value of extension and experiment stations in the development of the 21st Century agbioscience economy. Each of the land grant universities in the 13 state and 2 U.S. territory southern region is collaborating in performance of this important project.

For each of the land-grant institutions participating in this project, Battelle is requesting information, data, project examples, etc. that will help illustrate the value of experiment stations and extension services. Completion of this information request is an important step in the information gathering required for this project. We are requesting that at each institution, the Experiment Station Director and the Extension Director **jointly** complete each section to the best or your collective ability. Note that within this form, Agbiosciences includes all aspects of agricultural, environmental, and biological sciences; as well as forestry, fisheries, wildlife, agro-tourism, and recreation; which are within the purview of the experiment station and/or extension service. Also, if you have additional supporting documents, reports, statistical summaries, etc. that you believe would be helpful to this project please forward them to the consulting team at Battelle together with your completed form. The form is set-up using MS-Word tables so you can type directly into the table boxes.

Please return the completed form to Simon Tripp at Battelle via email to tripps@battelle.org If you have questions please direct them to Simon at:

Simon J. Tripp
Senior Director
Battelle Memorial Institute
Technology Partnership Practice
6 Jaycee Drive
Pittsburgh, PA 15243
412-276-1986
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Section 1: Institutional Profile

University Name	*Oklahoma State University*
Extension Service Director (name, phone, email)	*James Trapp -- 405-744-5398* *James.trapp@okstate.edu*
Experiment Station Director (name, phone, email)	*Jonathan Edelson -- 405-744-5398* *jonathan.edelson@okstate.edu*

Personnel

Number of Personnel in Extension (FTE)	698 (headcount) 581.92 (FTE)
Number of Personnel in Experiment Station (FTE)	505 (headcount) 360.28 (FTE)

** Please do not include student employees, graduate assistants or temporary personnel*

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Section 2: Income/Revenue Sources

Income Source	2011 $ Income Received by Extension	Funding Trend for Past 3 Years	2011 $ Income Received by Experiment Stations	Funding Trend for Past 3 Years
Federal Formula Funds	$5,538,698	__ *Increasing* _X *Stable* __ *Decreasing*	$4,219,115	__ *Increasing* _X *Stable* __ *Decreasing*
State Appropriations	$28,562,973	__ *Increasing* __ *Stable* _X *Decreasing*	$26,137,592	__ *Increasing* __ *Stable* _X *Decreasing*
Local Government Appropriations (Counties, etc.)	$4,030,023	__ *Increasing* _X *Stable* __ *Decreasing*	$0	__ *Increasing* _X *Stable* __ *Decreasing*
Federal Grants and Contracts	$1,992,342	_X *Increasing* __ *Stable* __ *Decreasing*	$11,119,230	_X *Increasing* __ *Stable* __ *Decreasing*
State Grants and Contracts	$1,185,142	__ *Increasing* __ *Stable* _X *Decreasing*	$2,545,230	__ *Increasing* __ *Stable* _X *Decreasing*
Local Grants and Contracts	$2,500	__ *Increasing* _X *Stable* __ *Decreasing*	$0	__ *Increasing* _X *Stable* __ *Decreasing*
Industrial Grants and Contracts, including grants and contracts from commodity groups	$0	__ *Increasing* _X *Stable* __ *Decreasing*	$1,288,961	__ *Increasing* _X *Stable* __ *Decreasing*
Foundation Grants and Contracts	$267,891	__ *Increasing* _X *Stable* __ *Decreasing*	$173,946	__ *Increasing* _X *Stable* __ *Decreasing*
All Other Grants and Contracts	$542,743	__ *Increasing* __ *Stable* _X *Decreasing*	$712,007	__ *Increasing* _X *Stable* __ *Decreasing*
Sales of Products and Services	$645,133	__ *Increasing* __ *Stable* _X *Decreasing*	$6,650,346	_X *Increasing* __ *Stable* __ *Decreasing*
Intellectual Property Revenues	$0	__ *Increasing* _X *Stable* __ *Decreasing*	$303,137	_X *Increasing* __ *Stable* __ *Decreasing*
Gifts	$0	__ *Increasing* _X *Stable* __ *Decreasing*	$0	__ *Increasing* _X *Stable* __ *Decreasing*
Other: American Recovery And Reinvestment Act (Temp Funding FY10 & FY11)	$2,065,947	__ *Increasing* __ *Stable* __ *Decreasing*	*$1,885,263*	__ *Increasing* __ *Stable* __ *Decreasing*
TOTAL	**$44,933,391**	__ ***Increasing*** __ ***Stable*** _X ***Decreasing***	**$55,108,827**	_X ***Increasing*** __ ***Stable*** __ ***Decreasing***

Are these income/revenue numbers based on a cash or accrual accounting basis? __CASH_____

Income Trends:

During the past five years, what trends have been observed in the funding for extension and experiment station activities? What are key funding challenges? Where have the most notable funding declines or increases occurred?

The most notable funding change has been in state appropriations to research and extension. Peak funding was achieved in 2009. Since then state funds to both extension and research have declined by approximately 10 percent, which amounts to about $2.5 million for each agency. Over the same period grant funding has increased by 51% or about $8.4 million.

Section 3: Research and Extension Activities

Key Initiatives, Institutes and Programs:

Please provide a description of FIVE key centers, institutes, programs or initiatives that are true signatures of experiment station and extension work at your institution. Here we are looking for descriptions of initiatives, centers, programs, etc. for which your university is internationally or nationally well-recognized as a leader.

1 .Food and Agricultural Product Center (FAPC) -- The Robert M. Kerr Food & Agricultural Products Center is a State of Oklahoma designated Center supported by State funding and with a mission to discover, develop and deliver technical and business information to stimulate and support the growth of value-added food and agricultural products and processing in Oklahoma. This is an economic development Center for the State of Oklahoma, with a focus on value-added food and agri-business sales revenue and created jobs. This Center has an Industry Advisory oversight Committee established by State Statute and appointed by executives of the State representing business leaders from many business sectors in Oklahoma including food transportation, food marketing, agricultural production, industrial/pharmaceutical, national food processing, state food processing, Made-In-Oklahoma processor, textiles, and economic development.

2. The Oklahoma Water Resources Center

The Division's investment in water research, education and public service—more than any other entity in the state—led to formation of the Center in August 2008. The Center aims to provide unbiased research-based information to Oklahoma agricultural producers, agricultural processors, value-added industries, community leaders and county and state officials. This information is tailored to assist citizens with water use and water management decisions under rapidly increasing demand for water from multiple users and interest groups.

The Center consists of faculty members from all nine academic departments in the Division, Area Extension Specialists and County Educators, District Extension Directors, and department and unit leaders. Expertise of these research and extension faculty and staff include plants, soils, and ecosystems; water conservation; hydrology; land use and water quality; and economics and policy. Water-related programs at the county and state levels enhance the cost-effectiveness and sustainable use of water resources within Oklahoma.

The Oklahoma Water Resources Research Institute (OWRRI), with its 46-year commitment to scientific inquiry and outreach on behalf of Oklahoma citizens, merged with the Water Center in August 2011.

3. Biobased Products and Energy Center -- The mission of the faculty associated with this Center is to conduct research and provide educational programs in environmentally-sound biobased product and energy development leading to the establishment of sustainable bioenergy and biorefinery industries in Oklahoma. Primary goals of the Center are:

- Maintain an active feedstock development program providing improved perennial grass varieties
- Develop sustainable feedstock production systems utilizing and/or enhancing existing biomass resources, dedicated crops, and processing waste streams
- Develop energy efficient and cost effective biomass logistics and supply systems
- Enhance existing, while exploring and developing new, bioconversion technologies addressing biofuels, bioenergy, and bioproducts
- Determine sustainability of establishing biorefineries through systems and economic analyses, energy balances, and integrated models to quantify the environmental, economic, and social impacts

For additional information please see the following website; http://bioenergycenter.okstate.edu/

4. NATIONAL INSTITUTE FOR MICROBIAL FORENSICS & FOOD AND AGRICULTURAL BIOSECURITY (NIMFFAB) --*NIMFFAB will build on, connect and enhance existing programs that support and address issues of crop and food security.* NIMFFAB's mission is to identify, assess, prioritize, facilitate and conduct research, education and outreach related to national needs in microbial forensic science with respect to pathogens of crops, forests, rangelands and fresh produce.

RESEARCH --OSU's NIMFFAB provides expertise and research support to federal agencies in agricultural biosecurity, forensic plant pathology and produce safety. Current research goals include developing and optimizing sampling, detection and characterization methods for plant pathogens of high consequence. These technologies will enhance our nation's capabilities in protecting and defending our agricultural resources.

EDUCATION --NIMFFAB faculty members are committed to all phases of graduate student education, training, and professional development. In addition to providing educational programs that prepare young scientists to meet national staffing needs in emerging areas of homeland security, we also create opportunities for "pipelining" them into these fields through interactive experiences such as internships, visits, community events and seminars.

OUTREACH -- NIMFFAB's educational and research activities and accomplishments will be justified and relevant only after they are transferred to those who will use them in the field, on the ground or in the courtroom. Our work targets diverse communities and stakeholders including law enforcement, regulatory officials, security agencies, crop producers, plant disease diagnosticians, Cooperative Extension agents, and researchers. It is important that these groups become familiar with one another and that they understand their respective roles in the event of a crop event investigation.

5. Oklahoma Wheat Improvement Team -- The OSU Wheat Improvement Team creates and transfers genetic solutions that ultimately stimulate growth in Oklahoma's rural economy. Nine OSU faculty from three DASNR academic units form a dynamic team that combines fundamental and applied components of wheat research. Skill sets are academically diverse, including agronomy, molecular genetics, plant pathology, entomology, cereal chemistry, and plant breeding. Underlying objectives are to i) create unparalleled research capacity to meet Oklahoma's challenges, and ii) broadcast timely information and know-how through multimedia extension that empowers Oklahoma farmers and

ranchers to effectively utilize improved varieties. Education hinges on creating formal and informal learning opportunities that incorporate research and extension efforts into educational programs. Expected outcomes of these activities are i) greater diversity in wheat varieties, ii) early adoption of improved wheat varieties, and iii) higher understanding of variety development and wheat management by student and non-student learners. Almost one-half of the wheat acres planted in Oklahoma in 2011-2012 was planted with varieties produced by the current WIT. Considering the vast alternatives available from neighboring land-grant universities and several major private companies, that percentage provides striking testimony of the academic and economic connection OSU makes with its rural communities. Team accomplishments are published each year in DASNR's *Partners in Progress (Wheat) Report*. Other than 17 wheat varieties released since 2000, a few examples include the ***Graze***n***Grain*** breeding system custom developed and scientifically validated for Oklahoma; relegation of the notorious Hessian fly pest to sub-economic levels in Oklahoma thanks to WIT deployment of genetic resistance; critical discovery of genes and subsequent sequencing of those genes responsible for resistance to the common cold of wheat (leaf rust) and for reproductive development; and the website *wheat.okstate.edu*, which generates a page view every 15 minutes and puts OSU in the agricultural spotlight as an unbiased, authoritative resource.
Program support is administered by the Oklahoma Agricultural Experiment Station (OAES) through the Department of Plant and Soil Sciences. Funding is derived from a partnership between the OAES, the Oklahoma Cooperative Extension Service, the Oklahoma Wheat Commission, and the Oklahoma Wheat Research Foundation. This partnership ensures linkage of the Wheat Improvement Program to the collective needs of Oklahoma's wheat industry. Scientists located at the USDA-ARS Plant Science and Water Conservation Research Laboratory conduct genetic investigations critical to the program. Examples of the teams recent efforts include - Oklahoma is the nation's **fourth largest wheat-producing state, with a projected 2011-2012 crop value of $1 billion**. Varieties released by OSU's Wheat Improvement Team now account for 47% of the total acreage in Oklahoma, nearly a 10-fold increase over the level held just five years ago. Three of the top four wheat varieties planted in Oklahoma in fall 2011 were products of the OSU Wheat Improvement Team (WIT). As a real example of variety displacement and the effect it can have on pest pressure, WIT scientists have documented reduced populations of Hessian flies in the central wheat growing regions of Oklahoma which correspond with increased use of resistant cultivars developed by the WIT. Statewide losses from leaf rust have also been held to minimal levels due to the replacement of the susceptible cultivar, Jagger, with OSU resistant cultivars Endurance and Duster.

Special Research and Extension Infrastructure

Please provide a description of FIVE special assets or infrastructure investments that support agbioscience and related development at your institution. Examples might include pilot plant facilities, unique scientific research infrastructure, biosecurity facilities, camps, etc.

1. **Food and Agricultural Product Center (FAPC**) – The Robert M. Kerr Food & Agricultural Products Center is not a virtual center but an excellent state-of-the-art Center of bricks and mortar for support of the mission of the Center, including raw products storage, animal harvesting, food processing and manufacturing, ingredients and food storage, chilling and freezing, and product testing totaling approximately 30,000 square feet of actual working space. In addition, the FAPC has over 600 sq. ft. of controlled environment retail display applied research facilities, more than 800 sq. ft. of processing space completely allocated to enology and

to product development for the grape and wine industry in Oklahoma, more than 1,900 sq. ft. dedicated to milling, baking, applied cereal chemistry and wheat quality improvement for the cereal grain and grain products industry in Oklahoma, more than 400 sq. ft. of applied research and processing space dedicated to food by-products and value-added agro-products bio-diesel investigations, more than 350 sq. ft. of BSL-2 food safety/pathogen intervention applications facilities adjacent and accessible to the more than 4,000 sq. ft. of USDA Inspected animal harvest facilities, more than 14,000 sq. ft. of state-of-the-art food and food by-products research labs, more than 1,100 sq. ft. of kitchen, food preparation, and sensory laboratory facilities, more than 700 sq. ft. of wood products applied technology and product development facilities, and more than 3,000 sq. ft. of conference, training and workshop facilities.

2. **Weekly Television Programs – Sunup and Oklahoma Gardening** – Agricultural Communications Services at Oklahoma State University produces two weekly half-hour television programs, SUNUP and Oklahoma Gardening, for broadcast on the Oklahoma Educational Television Authority (OETA) network.
Oklahoma Gardening, continuing in its 38th season, provides Extension information on gardening, home, property and food topics to over 175,000 viewers each week. The program utilizes the expertise of county, area and state Extension personnel as well as additional experts from the university and other state entities. Traveling segments showcase gardens and gardeners from around the state and region, but most segments are shot at our Studio Gardens which are housed within The Botanic Garden at Oklahoma State University. Oklahoma Gardening has a website and YouTube channel as well as a Facebook presence. For more information, please refer to: http://www.oklahomagardening.okstate.edu and http://youtube.com/oklahomagardening.
SUNUP is a production agriculture television program that targets crop and livestock producers, and those with ties to Oklahoma agriculture. Regular segments feature OSU Extension crop, livestock, marketing, natural resources and agricultural engineering specialists, along with a meteorologist and climatologist from the Oklahoma Mesonet. SUNUP has a website and YouTube channel with more than 900 videos accessible on a wide range of agriculture topics covering research and Extension efforts. Programming is routinely promoted through Facebook and Twitter. The SUNUP production team travels throughout the state as needed to cover stories. More information is available at http://www.sunup.okstate.edu and http://youtube.com/sunuptv.

3. **The Institute of Agricultural Biosciences** – Oklahoma State University's Institute for Agricultural Biosciences (IAB) is new research initiative based in Ardmore. Oklahoma. This site was chosen to optimize opportunities for collaboration with The Samuel Roberts Noble Foundation. Research at the 33,000 square foot facility is focused on both basic and applied aspects of crop improvement through molecular biology, genetics, plant breeding and crop management. This effort enables OSU to more effectively assist producers through the development of new or improved crops and crop production systems. Research is focused on forage species that may be used for biofuels and other products and to enhance livestock production. Scientists at the institute also work to develop viable alternatives for rural economies with an emphasis on economic development and technology transfer. The IAB advances Oklahoma's research capacity in the fields of plant science and biomass development.

In addition to research laboratories and plant growth facilities, the IAB includes an auditorium and conference rooms equipped with state-of-the-art telecommunications systems for worldwide

conferencing and long-distance education programs.

Construction of the Institute conforms to Leadership in Energy and Environmental Design (LEED) standards. It adheres to the principles of sustainability through energy efficiency, water conservation, and environmental quality.

3. *S*wine Research Facility

The Swine Center was dedicated in 2004 as a new, total confinement facility that features modern waste and odor management technologies as well as an indoor facility for swine judging. It consists of duplicate rearing/holding units suitable for replicate units in conduct of research. It is located on approximately 80 acres of land southwest of the campus, and it houses 130 sows of which half are commercial sows for nutrition research, and half are purebred Yorkshire and Hampshire sows.

5. Biosecure Greenhouse –

The Noble Research Center Greenhouse Facility is the most technically advanced greenhouse of its kind on the OSU campus. It has three bays which are designed specifically for BSL2 biosecure research. Designed and built by Controlled Environments Limited (Conviron), it features precision temperature, humidity and light control, negative pressure systems and controlled access for biosecure research. The greenhouse has multiple security systems to isolate plants, pathogens and insects and to limit access to certified personnel. The facility was constructed to support biosecurity related research for state and federal agency support and needs.

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Most Notable Assets, Centers, Programs or Initiatives by Category

For each of the areas of focus listed below, please provide what you consider to be the top TWO most notable strengths (programs, assets and infrastructure, centers, etc.) of your institution **:**

Plant Sciences, Crop Science, Plant Genetics and Agronomy

1. Precision Agriculture: OSU researchers have developed and improved groundbreaking precision agriculture technology that has saved producers millions of dollars, not just in Oklahoma but worldwide. Sensing technology at OSU has advanced from passive sensors that could not be calibrated to active sensors that work day or night and that are now used around the world. The GreenSeeker sensor and the algorithms that have been developed for wheat, corn, rice, bermudagrass, and cotton, continues to set the standard for how these technologies are used in the world. A recent off-shoot of this work includes the development of a highly affordable "pocket sensor" that produces the exact same NDVI (normalized difference vegetative index) values as the GreenSeeker. These sensors have been targeted for US producers and extension agents in the third world. Commercial production of these new sensors that were developed 100% by OSU are forthcoming.

2. Wheat Improvement: Oklahoma is the nation's **fourth largest wheat-producing state, with a projected 2011-2012 crop value of $1 billion**. Varieties released by OSU's Wheat Improvement Team now account for 47% of the total acreage in Oklahoma, nearly a 10-fold increase over the level held just five years ago. Three of the top four wheat varieties planted in Oklahoma in fall 2011 were products of the OSU Wheat Improvement Team (WIT). As a real example of variety displacement and the effect it can have on pest pressure, WIT scientists have documented reduced populations of Hessian flies in the central wheat growing regions of Oklahoma which correspond with increased use of resistant cultivars developed by the WIT. Statewide losses from leaf rust have also been held to minimal levels due to the replacement of the susceptible cultivar, Jagger, with OSU resistant cultivars Endurance and Duster. Scientists on the WIT lend a high degree of visibility and credibility to OSU through research and extension activities critical to the wheat industry in the Great Plains, and they provide key educational opportunities, through traditional classroom exposure and employment, to undergraduate and graduate students in the areas of plant physiology and management, plant breeding, plant breeding and genetics, entomology, and plant pathology.

Animal Sciences, Animal Health, Livestock

1. Oklahoma is a leading beef cattle production state, uniquely positioned as a leader in every segment of the beef cattle industry. We are literally at the Crossroads of U.S. beef production with major resources and activity in the cow-calf, stocker, feeder, and purebred seed-stock sectors. Overall, livestock sales account for 80% of the value of Oklahoma's total cash farm receipts and beef cattle account for the largest proportion of livestock sales. Oklahoma's 2.073 million beef cows are the second largest in the U.S. Oklahoma State University (OSU) is located in close geographic proximity to major centers of the industry and OSU scientists have a long history of distinguished leadership and contributions to the livestock industry in North America. We have the infrastructure and resources to continue this legacy. We maintain significant numbers of animals in order to provide teaching and research opportunities for our students and industry, and our scientists have national and international connections with the industry. We currently have active research in molecular genetics and biology, meats and food science, nutrition and management of beef cows, stocker and feedlot cattle, environmental sustainability of beef cattle grazing programs, bovine

respiratory viral infections, virus-bacteria interactions in disease induction, tick-borne diseases, immune responses in the pulmonary and central nervous systems, cytokine networking, and immuno-pathogenesis of viral infection. Laboratories across these related disciplines actively collaborate and train students at all academic levels, and are consistently among the top departments within their respective colleges in terms of federally-funded research. Infrastructure includes native range and improved forages resources in support of the cow-calf and stocker sectors of the industry plus our feedlot finishing facility (Willard Sparks Beef Research Center), the Robert Kerr Food and Agricultural Products Center, and a nationally recognized Animal Disease Diagnostic Laboratory. Additional information about the Department and its programs is available at: http://www.ansi.okstate.edu/.
2. The OSU Swine Research and Education Center (SREC) is a state-of-the-art facility and one of the few facilities in the U.S. in which excretion of nutrients and gaseous emissions from group-housed pigs can be measured. Current research is focused on mitigating the environmental footprint of swine production. The SREC had 4,881 visitors in 2011 which included students with judging teams from across the US, students from OSU classes, and individuals from tours.

Food Science, Food Product Development, Advanced Nutrition and Health Products

1. The Robert M. Kerr Food & Agricultural Products Center is a comprehensive bricks & mortar facility with state-of-the-art animal harvest and raw agricultural commodity receiving and storage capabilities, and extending to a complete processing, cooking, chilling, freezing and storage (ambient temperature and cold storage). Total processing space for product development and applied research exceed 30,000 sq. ft. The Robert M. Kerr Food & Agricultural Products Center has extensive state-of-the-art research laboratories for food science research, nutrition and health research, and sensory profiling and consumer evaluations of food products. Total research and sensory investigative space exceeds 16,000 sq. ft.
2.

Food Safety and Biosecurity

1. The Robert M. Kerr Food & Agricultural Products Center has state-of-the-art food safety and microbiology laboratories exceeding 3,600 sq. ft. including 4 conventional BSL-2 food safety and microbiological laboratories and a food processing applications BSL-2 laboratory. Additionally, there is a food pathogen BSL-2 investigative and challenge laboratory adjacent and accessible to the USDA Inspected animal harvest laboratory exceeding 350 sq. ft. The Robert M. Kerr Food & Agricultural Products Center has a state-of-the-art animal holding, harvest, fabrication and processing facility, exceeding 25,000 sq. ft., with the working capability to electronically track all incoming livestock through processing to ensure animal-based food chain traceability.
2. NATIONAL INSTITUTE FOR MICROBIAL FORENSICS & FOOD AND AGRICULTURAL BIOSECURITY (NIMFFAB) --NIMFFAB will build on, connect and enhance existing programs that support and address issues of crop and food security. NIMFFAB's mission is to identify, assess, prioritize, facilitate and conduct research, education and outreach related to national needs in microbial forensic science with respect to pathogens of crops, forests, rangelands and fresh produce. RESEARCH --OSU's NIMFFAB provides expertise and research support to federal agencies in agricultural biosecurity, forensic plant pathology and produce safety. Current research goals include developing and optimizing sampling, detection and characterization methods for plant pathogens of

high consequence. These technologies will enhance our nation's capabilities in protecting and defending our agricultural resources. EDUCATION --NIMFFAB faculty members are committed to all phases of graduate student education, training, and professional development. In addition to providing educational programs that prepare young scientists to meet national staffing needs in emerging areas of homeland security, we also create opportunities for "pipelining" them into these fields through interactive experiences such as internships, visits, community events and seminars. OUTREACH -- NIMFFAB's educational and research activities and accomplishments will be justified and relevant only after they are transferred to those who will use them in the field, on the ground or in the courtroom. Our work targets diverse communities and stakeholders including law enforcement, regulatory officials, security agencies, crop producers, plant disease diagnosticians, Cooperative Extension agents, and researchers. It is important that these groups become familiar with one another and that they understand their respective roles in the event of a crop event investigation.

Industrial Bioeconomy, Biofuels, Biobased Chemicals, Biobased Materials and Fibers

1. The Biobased Products and Energy Center with its mission to conduct research and provide educational programs in environmentally-sound biobased product and energy development leading to the establishment of sustainable bioenergy and biorefinery industries in Oklahoma. Scientists and engineers are taking a holistic approach in developing biofuels, bioenergy and bioproducts – from basic research in plant genetics to the conversion of feedstocks through biochemical and/or thermochemical technologies while addressing environmental and sustainability issues.
2.

Environmental Sciences, Natural Resources, Sustainability

1.
2.

Agritourism and Recreational Hunting and Fishing

1.
2.

Family Development

1. There are FCS Educator positions in all 77 counties but one. They provide a very solid infrastructure for FCS programming. Partnerships with: Center for Family Resilience, College of Human Sciences and sustained funding for family and nutrition special projects for FCS Extension.
2.

Youth Development

1. The Oklahoma 4-H Foundation provides private support to the 4-H program through annual gifts and endowments with net assets of approximately $ 6.3 Million
2. The Oklahoma 4-H Youth Program is placing priority on STEM and Health programs by securing grants that help support county programming related to Robotics, Water Quality, Nutrition and Fitness.

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Community and Economic Development

1. The Robert M. Kerr Food & Agricultural Products Center has demonstrated significant community and economic impact through direct support to the Oklahoma Food industry in its 'advanced incubator model' product development and processing area exceeding 30,000 sq. ft. with manufacturing-capable equipment available to the Oklahoma food industry for formulation, preparation, processing, fermenting, cooking, retorting, filling and bottling, packaging, chilling and freezing, and storage of all foods under USDA or FDA jurisdiction for shipping, selling and consuming. Economic impacts are documented to be more than $6 billion in annual sales revenue and a cumulative effect of more than 50,000 jobs. The Robert M. Kerr Food & Agricultural Products Center aggressively supports the Oklahoma food industry with technical and business teams that address specific customer-focused and general- needs topics in industry facilities so that work completed at the FAPC is made process-capable through the use of these teams.
2. E-Commerce Program - Small businesses in rural areas tend to struggle to establish a market presence and compete in today's economy. During 2011, the Oklahoma State University e-commerce program provided training to over 230 small businesses on how to plan, effectively set up, and promote their websites, which can help address these issues. Of the 2011 participants, ratings for all relevant e-commerce workshops were quite high. Our most popular workshop changed this year. As more small business owners are becoming familiar with setting up a website, their focus has turned to Search Engine Optimization (SEO), or getting their website found on the web. We conducted 13 workshops on SEO during 2011 to a total of 154 participants. Response to the SEO workshops has been incredible. About ¾ of all participants had a website before this workshop. After the training, 95% of respondents planned on increasing their web efforts, and 93% indicated that they would be changing the way they marketed their website. We also offered 6 workshops more geared to those business owners without websites, and our "Websites 101" class was attended by 53 different people. These half-day, hands-on sessions are positively impacting rural businesses as evidenced by success stories of former attendees. These include those who used simple template-based software programs used in the workshops to set up their own websites (such as the drive-in in Lawton – www.waynesdriveinn.com), incorporated new techniques such as Facebook ads to draw traffic to their site (such as the jewelry saleswoman in Shawnee – visit Designs By Robbie Girl on Facebook), or made successful changes to their own site (such as the lodge owner in Idabel who learned several techniques to attract more visitors – www.blackbearcabinok.com). Further, anecdotal evidence suggests that the improved advertising offered by a website can increase small business sales anywhere from 20% to over 200%. With average sales of $150,000 (which was the average displayed in a small business report by Mississippi State in 2007) this implies that the e-commerce program increased the revenue of small businesses in Oklahoma by between $7.1M and $71.0M during 2011.

Other, including multi-focus:

1. ***Botanic Gardens*** – The Botanic Garden at Oklahoma State University: This unique multi-dimensional facility's mission is focused on research and educational programming for the consumer and commercial horticulture, landscape, and environmental engineering industries. Multiple programs on a variety of plant, landscape and environmental topics are offered annually. Programming includes on-going research activities and educational workshops, tours and displays exposing people of all ages to cutting edge technology. The garden has a broad based environmental theme featuring landscape sustainability, conservation, habitat preservation, and

water related applications. Collaborative efforts among scientist from horticulture, landscape architecture, plant and soil sciences, agriculture and civil engineering, range management, entomology and plant pathology are actively involved in extension, instruction and research activities. A core focus within the botanic garden is the Integrated Environmental Research and Education Site (IERES, pronounced Iris). The IERES is comprised of a wide variety of environmental research studies and demonstration areas including but not limited to low impact development and storm water management, water capture and reuse, rain and xeriscape gardens, wind and solar applications, steam rehabilitation and stream bank stabilization, irrigation technology and delivery systems, pollinator habitat, integrated pest management, prairie restoration, etc. The Botanic Garden is also home to the popular extension based television show Oklahoma Gardening which provides weekly educational broadcasts featuring many of the on-going environmental, horticulture, engineering and landscape research activities and educational display areas. The Botanic Garden and the award winning Oklahoma Gardening television show are a unique combination of assets serving to communicate to viewers and visitors how the land-grant university is meeting critical current and future societal needs. More information can be found at: botanicgarden.okstate.edu
2.

Intellectual Property

	2009	2010	2011
# of Invention Disclosures	14	*14*	*11*
# of Patents Applied For	*7*	*4*	*6*
# of Patents Awarded	*2*	*2*	*1*
# of Licenses Executed	*11*	*4*	*5*
# of Business Start-Ups	*0*	*0*	*0*
# of Plant Variety Protection Certificates Applied For	*1*	*2*	*2*
# of Plant Variety Protection Certificates Awarded	*0*	*3*	*0*
$ Value of Income received from Plant Variety/Germplasm Development	*$134,863*	*$94,813*	*$135,878*
$ Value of Income received from all other Intellectual Property	*$148,984*	*$142,051*	*$167,259*

Company Spin-Offs and Commercialization

Please provide examples of any start-up companies located in your state or the southern region that resulted from research discoveries, innovations or technologies developed at your institution in the past 10 years:

The Robert M. Kerr Food & Agricultural Products Center has been very active in assisting entrepreneurial food processors and commercial food processors develop their ideas and successfully bring new products to market. Two businesses have been developed and launched through innovations at the

Center, to include Kennedy Foods and PetSci, LLC. Kennedy Foods was launched to commercialize the peanut butter slice, but this business was not successful because of marketing failures and packaging equipment IP infringement. PerSci, LLC was launched to develop the logic and the science of the 'Citizen Scientist' program at the Center. This business continues to operate profitably as a contract research facilitator for pet food and pet health and care projects.

Coskata Inc., a biology-based renewable energy company that uses patented biotechnology developed by and owned by Oklahoma State University, was incorporated in July 2006. The company headquarters is in Warrenville, IL, and Coskata plans to build its first commercial ethanol production facility in Boligee, AL

Oklahoma Genetics Inc. Established in collaboration with wheat producers and the industry to serve as a marketing agent for new wheat cultivars developed by OSU and then licensed to the company. The company currently has six cultivars under license and was awarded two new licenses in 2012. http://www.okgenetics.com/varieties.html

High Impact Innovations and Technology Development

Please provide FIVE examples of innovations or technology developments that have had a substantial impact on the field of agbioscience and/or associated agbio industries in the past 10 years. Examples might include crop varieties with enhanced yield characteristics, new processes or technologies introduced that significantly enhance productivity in industry, etc.

1. **Wheat Variety Development (WHEAT TEAM) --** In 2006 over half (54%) of all wheat acres were sown to the cultivar Jagger or the Jagger-by-Abilene cross Jagalene. In addition, many newer wheat cultivars have offered increased yield as compared to Jagger and Jagalene, but have relied on Jagger resistance genes to fight the problematic foliar diseases leaf and stripe rust. Shifts in disease races over the past four years have made these genes largely ineffective, presenting an unnecessary production risk for farmers and grain merchandisers. Since 2006, the Oklahoma State University Wheat Improvement Team has developed and released ten wheat cultivars with disease resistance and agronomic performance superior to that of Jagger and Jagalene in targeted environments. In addition, our newest releases and advanced experimental lines contain insect and disease resistance genes different from those in Jagger. A comprehensive educational campaign has made farmers and ranchers aware of improved cultivars released by land-grant institutions and private breeding companies in the region.

In 2011 acreage of Jagger and Jagalene had fallen to 10% and 1%, respectively. Acreage of the disease and Hessian fly resistant cultivar "Duster" increased from 0.3% of acreage in 2007 to 16.4% in 2011 and improved cultivars now occupy 47% of Oklahoma wheat acres. Unfortunately, the disease resistance of Jagger-derived lines such as OK Bullet and Fuller are no longer highly effective at preventing foliar disease and future efforts will focus on displacing these varieties with superior genetics of newer lines such as Ruby Lee and Garrison. Acreage of the pest-resistant variety 'Duster', for example grew by 8% in 2011 and offered an average 5 bu/ac increase over older, more disease-prone varieties. This was particularly impressive given the record-setting drought conditions of 2011. This shift in acreage generated approximately $15 million (8% x 5.4 million

acres x 5 bu/ac x $7 bu) for the Oklahoma rural economy. This also means additional wheat could be made available to foreign markets as Oklahoma is a major provider of hard red winter wheat in international markets.

2. Sensor based nitrogen fertilizer application – The Greenseeker sensor system developed by Oklahoma State University and Trimble Navigation (formerly NTech Industries and purchased by Trimble) is now used all over the world. This system combines advanced active sensors that work in the red and near infrared wavelengths, with sound agronomic approaches for adjusting mid-season fertilizer nitrogen applications in a range of cereal crops. The normalized difference vegetative index (NDVI) that is used is now a common parameter used in precision agriculture circles. This approach includes maize, wheat, bermudagrass, cotton, sorghum, and rice. A total of 29 algorithms are currently available on-line where NDVI values can be entered and where a fertilizer N rate recommendation is made based on nutritional-based agronomic estimates. A continuation of the Greenseeker system is now evidenced in Greenseeker-2 sensors being built by Trimble, and an advance Pocket Sensor that is more affordable and that can be used both in the developed and developing world. The current Greenseeker system that is being using can improve Nitrogen Use Efficiency from the world average of 33% to more than 50%.

http://www.soiltesting.okstate.edu/SBNRC/SBNRC.php

More specific results in Oklahoma have shown that From 2005 to 2012, 25,000 N Rich Strips were placed in farmer fields and that are used for making the in-season sensor based N recommendations. This represented an application area of roughly 1,973,000 acres. Using the published average profit of $10.00/ac for producers using the GreenSeeker N Rate recommendation, this represents a total positive economic impact of $19,730,400. The proven benefits of N Rich Strips in cereal crops in Oklahoma, requires that we sustain the extension of this N fertilization approach.

3. Oklahoma Mesonet -- The Oklahoma Mesonet is an automated statewide weather network with 120 stations. The system is jointly managed by Oklahoma State University and the University of Oklahoma. In the past ten years, Mesonet has introduced a number of weather-based decision support tools for agriculture and natural resource management, including: OK-FIRE, a desktop website for prescribed burning and wildfire control weather information and decision support; Fire Prescription Planner, forecast product that identifies windows for conducting safe prescribed burns; Cattle Comfort Advisor, incorporates air temperature, solar radiation, wind speed and relative humidity into a year-round cattle stress index; Grape Black Rot Advisor, assesses daily black rot disease risk, formatted for both desktop and mobile platform access; evapotranspiration irrigation scheduling for 8 agronomic crops and 6 horticultural crops. Mesonet advisor products are updated hourly. Mesonet weather data is updated every five minutes. Mobile devices are supported through Mesonet iPhone app and mobile website. For more information, go to http://mesonet.org.

Additional comments or items of note regarding experiment station and extension impacts:

4. A particulate matter abatement device evaluation system has been designed, developed, and constructed and has been used to evaluate baffle type pre-separators, series cyclones, and the scalability of cyclones. This research can be utilized by industry and regulatory agencies to predict the effectiveness of a given abatement technology or technologies to reduce particulate matter emissions from a source with defined characteristics. The device can be used in prescription technologies for multi-point facilities. Example of recent industry application: a feed supplement company was given a notice of violation for excessive emissions. This company was facing closure due to the quantity of particulate matter being emitted from the facility. In addition, the company had a market for the material been emitted so it was missing out on potential sales. The company invested about $80,000 and installed new cyclones based on the criteria from this research and prior to the existing abatement devices. This system enhancement improved the facilities abatement system efficiency by 98%, increased average annual revenues by $470,423, and kept the plant from closure.

5. Okanola Project - Winter canola acreage has exploded in Oklahoma since 2008 with growth of 147%. The 2011-12 growing season saw over 150,000 acres planted to canola. We anticipate continued growth in the next five years could reach as much as 500,000 acres. This rapid increase in Oklahoma is a direct result of an intense effort, the *OKANOLA project*, to introduce winter canola as a profitable alternative crop in the continuous winter wheat systems of Western Oklahoma. The OKANOLA project was initiated in 2003 (when no canola was grown in the state) "To provide research, education, and demonstration to stimulate the development of winter canola as a major profitable rotational crop with winter wheat". The OKANOLA project started as a movement to use canola as a rotational crop in an effort to clean up grassy wheat fields. The project has evolved since the start in 2003 and has been a collaboration that includes researchers, extension personnel, industry professionals, and growers from the Southern Plains who are committed to evaluating all aspects of canola production and its potential as an alternative crop. The project has had several important partners including Producers Cottonseed Oil Mill, Monsanto, IPM, Kansas State University, and others.

Canola seed yields in this part of the country have been excellent, averaging over 1600 lbs/acre, and with recent prices ranging from 11-27 cents per pound, this crop provides great potential for significant economic returns (Neuens, personal comm.). According to researchers and extension professionals in the Southern Plains, rotations between winter wheat and winter hardy adapted cultivars of canola will allow for selective management of troublesome grassy and broadleaf weeds, decrease disease pressure common in continuous wheat, and increase water-use efficiency which will aid stabilizing and/or increasing farm profits (Peterson and Westfall 1994, Blackshaw et al. 1994, Sauerborn et al. 2000, Blackshaw et al. 2001, Peeper et al. 2009). Researchers also suggest that a wheat-canola rotation would conserve insect predators/parasites and maintain low insect populations in both crops (Parajulee and Slosser 1999, Slosser et al. 2000, French et al. 2001).

In the early years of the OKANOLA project, we struggled to find cultivars (both varieties and hybrids) that were winter hardy and high yielding. Over the last 5 years, we have seen an amazing improvement in winter hardiness and yield potential from commercial companies (Godsey et al., 2010). Producers are planting these commercial glyphosate resistant cultivars on >95% of canola acres in the Southern Plains.

In the Southern Plains (Oklahoma and Texas) we continue to see the development of a perfect storm for canola expansion (need for a viable rotational crop and increasing canola price). Producers continue to have difficulty controlling grassy weeds in winter wheat, and as a result, we see the dockage continue to increase on much of the wheat being sold. The resulting loss in wheat

price due to this dockage is one of the primary reasons for a rapid increase in winter canola acres in the Southern Plains.

Expanding the acres of winter canola in the region has not been easy. In hindsight, it is obvious that every facet of a complete crop production and marketing system had to be set in place and functioning effectively before major acreage expansion could occur. The pieces of the puzzle are coming together, as we have seen farmers gain substantial knowledge on winter canola production, local grain elevators are increasingly capable of grading and accepting canola at harvest, and regional crushing (Producers Cottonseed Oil Mill) capability is in place. Another recent benefit is that we now have competition (ADM) for the commodity in the market place. We are primed and ready for continued acreage expansion in fall 2012. For acres to continue to increase additional grower skills must be developed and training must occur. More agronomic research and assisting in all phases of canola agronomics are a necessity.

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Section 4: Extension Service Programs

Statistics: please provide basic metrics and statistical information for extension:

Metric	Number
Number of county/parish offices	*77*
Number of multi-county/multi-parish regional offices	*4*
Number of major 4H camps	*0*
Number of 4H participants	*163,648*
Number of contacts with clients recorded by extension for the most recently completed year (include professional and volunteer contacts)	1,750,000
Number of volunteers for the most recently completed year and number of hours volunteered	Master Gardeners 1,243 Volunteers 71,167 hours 4-H Programs 4,454 Adult Volunteers 1,209 Youth Volunteers 350,000 hours

Please provide selected examples of notable/high impact projects or programs of extension that you would like considered for inclusion within the Battelle report. Please give consideration to including both rural and urban programs.

Business Development Programs/ Impacts

1. Applications Engineering / Manufacturing Consulting -- Of the over 5000 manufacturers in Oklahoma, approximately half are located in rural areas and are extremely important to their local economies. The loss or downsizing of even one of these wealth-generating small or mid-sized companies can have devastating consequences for the host and surrounding communities. These rural firms face particular difficulty in getting relevant and usable information and technical assistance that will keep them abreast of the rapid changes in manufacturing technology.

To address the difficulties faced by our small rural manufacturers, the College of Engineering, Architecture and Technology and the Division of Agricultural Sciences and Natural Resources at Oklahoma State University work in partnership to provide technical assistance through the Applications Engineering program. Since 1997, Applications Engineers have been deployed in the state in collaboration with the Oklahoma Cooperative Extension Service and the Oklahoma Manufacturing Alliance to provide on-site engineering assistance.

In order to receive engineering assistance the client must agree to a post-project impact assessment. This impact assessment is done using procedures developed by the National Institute for Standards and Technology for the Manufacturing Extension Partnership. The client is contacted some months after the completion of an activity and is asked a series of questions designed to assess the impact of the effort.

The impact of this program is measured in several ways. One is the economic value of the service to the company as reported by the client. Another measure is the number of jobs created or retained. Both impacts are measured by an independent survey of the client. Number of jobs created or retained is translated into economic impact using an income multiplier to compute the direct, indirect, and induced effects due to a change in the number of jobs in the manufacturing sector.

The multiplier was developed from data collected from two different sources. First, the average salary for manufacturing in Oklahoma ($34,323) was taken from the U.S. Bureau of Labor Statistics published information for 2001. Secondly, the income multiplier of 2.2 was obtained from IMPLAN data for Oklahoma. The total economic impact can be computed by multiplying the average annual salary times the income multiplier to arrive at $75,511 for each new or retained job in the manufacturing sector.

In 2011, the Applications Engineers client projects resulted in increased sales of more than $18.4M, while retaining an additional $15.0M in sales that would have otherwise been lost. Further, the expertise provided by our engineers created cost savings of $4.4M, and avoided additional costs estimated at $3.1M. With 110 new jobs created and 68 jobs retained, our projects provided an additional $13.4M to the state's economy. Finally, we invested over $10.8M in new plant facilities and equipment, for a total economic impact of $65.3M.

Since its inception in 1997, the program has had an economic impact of over one billion dollars based on third party surveys of its clients and over 3400 jobs have been created or retained in Oklahoma as a result of projects completed by the Applications Engineers.

2. The Robert M. Kerr Food & Agricultural Products Center -- This center is a high-impact food industry outreach Center serving the Oklahoma food industry in urban and rural areas with technical and business programs to support and grow the Oklahoma food and value-added agri-products industries with focused programs including product development, food safety and security, business planning and marketing, manufacturing efficiency, human resource training, product and process quality improvement, manufacturing lay-out and design evaluations, 3rd-party audits for the retail, food service, and hospitality trades, and Better Process Training and Process Authority Letter creation for all food industry retail shelf-stable products.

3. E-commerce -- Small businesses in rural areas tend to struggle to establish a market presence and compete in today's economy. During 2011, the Oklahoma State University e-commerce program provided training to over 230 small businesses on how to plan, effectively set up, and promote their websites, which can help address these issues. Of the 2011 participants, ratings for all relevant e-commerce workshops were quite high. Our most popular workshop changed this year. As more small business owners are becoming familiar with setting up a website, their focus has turned to Search Engine Optimization (SEO), or getting their website found on the web. We conducted 13 workshops on SEO during 2011 to a total of 154 participants. Response to the SEO workshops has been incredible. About ¾ of all participants had a website before this workshop. After the training, 95% of respondents planned on increasing their web efforts, and 93% indicated that they would be changing the way they marketed their website. We also offered 6 workshops more geared to those business owners without websites, and our "Websites 101" class was attended by 53 different people. These half-day, hands-on sessions are positively impacting rural businesses as evidenced by success stories of former attendees. These include those who

used simple template-based software programs used in the workshops to set up their own websites (such as the drive-in in Lawton – www.waynesdriveinn.com), incorporated new techniques such as Facebook ads to draw traffic to their site (such as the jewelry saleswoman in Shawnee – visit Designs By Robbie Girl on Facebook), or made successful changes to their own site (such as the lodge owner in Idabel who learned several techniques to attract more visitors – www.blackbearcabinok.com). Further, anecdotal evidence suggests that the improved advertising offered by a website can increase small business sales anywhere from 20% to over 200%. With average sales of $150,000 (which was the average displayed in a small business report by Mississippi State in 2007) this implies that the e-commerce program increased the revenue of small businesses in Oklahoma by between $7.1M and $71.0M during 2011.

Community Development Programs/ Impacts

1. Community and Economic Development (CED) -- Several extension programs comprise the CED effort, including retail trade and economic impact analysis, strategic planning processes; and infrastructure-oriented programs such as the Community Health Needs Assessment, broadband access improvement, and solid waste management. Each program has its own individual requirements but typically involves providing unbiased analysis to assist rural leaders and citizens in making decisions associated with economic development opportunities. Programs are generally funded by OCES but several partnerships exist with state and national entities (State Office of Rural Health, USDA Rural Development). More information on each of these programs can be found at www.rd.okstate.edu

2. Agritourism, Recreational Hunting/Fishing -- OSU has conducted surveys and analysis to inform policies for recreational fishing. Drs. Boyer, Woods and Shideler have surveyed recreational fishermen to understand their preferences for fishing regulations and environmental quality on the Illinois and Mountain Fork Rivers in Oklahoma. These studies have provided necessary information for the Oklahoma Department of Wildlife Conservation to change existing fishing license regulations to better serve the ecological and recreational uses of these rivers. In addition, economic impact analysis has been conducted to highlight the economic development potential of these two rivers and to justify investments/improvements of these rivers by state and federal agencies. For more information about these projects, contact David Shideler (dave.shideler@okstate.edu; 405-744-6170).

Family and Consumer Science Programs/ Impacts

In 2011 three statewide impact teams ended their cycle and reported the following: Youth participants in the **Healthy Oklahoma Impact Team** school classroom nutrition education efforts showed a 39% increase in using nutrition facts labels to make food and beverage choices and a 36% increase in eating foods from 2 or 3 MyPyramid food groups for breakfast. Forty-six percent of participants in the **Family Economic Well Being Impact Team** financial management programs said they intend to make changes to their financial management practices and 32% have reduced their debt levels. The **Family Risk and Resilience Impact Team** found that of the teachers, child care providers and youth workers with

classrooms or groups that received or utilized the *I Can Problem Solve* curriculum 71-86% reported their children increased positive behaviors such as: thinks before acting, accepts responsibility for actions, and resolves peer problems on their own.

4-H and Other Youth Development Programs/ Impacts

1.) Oklahoma's main vehicle for educating youth about science, technology, engineering, and math has been the 4-H STEM Institute. For 2011, this program was expanded from just geospatial technologies to include, digital media, robotics, iGreen (Environmental Projects, and Alternative Energy. The STEM Institute was designed to train teams of youth and adult in the use and application of technology. These teams were then charged with the tasks of applying their technology specialty to a community service project or the development of a special project club. Once their project is established or complete the team was then expected to go teach other youth about their program and their technology. *(we have many examples of the things done back in the counties if needed)*

2.) Oklahoma ranks as the 47th least healthy state with factors such as obesity, smoking, substance use, and related risk factors. Using grants from National 4-H Council and the Wal-Mart Foundation, training related to curricula was provided for educators, volunteers and members in: Food Showdown, Health Rocks, Bullying, Fuel-up to Play 60, Farm to You, Kids Cows and More, and Hobbies and Collectables.

Follow-up surveys have shown that 88% of youth surveyed indicated an increase in knowledge related to healthy decision making related to food choices. Youth are joining 4-H just to participate in the Food Showdown.

Other high impact/notable Extension programs

Additional comments or items of note regarding extension:

CANOLA Production Growth. (See more in prior section) The OKANOLA Project was conceived by OSU research and extension faculty in 2003 as a vehicle to introduce winter-hardy canola as a profitable rotational crop for Oklahoma wheat growers to aid in pest management, improve wheat yields and quality, and facilitate adoption of notill crop production methods by wheat growers. As with any new crop, we had much to learn and we have all been learning quickly. OK farmers can now feel confident about growing a crop of winter canola, and we are working vigorously to make the crop even more profitable. Over the past nine years, OSU research/extension faculty members and collaborators have worked together to accomplish the following. Basic production technologies have been developed through research and on-farm trials.

Multiperil crop insurance has become available as a result of demonstrating successful production.

OSU production research, variety improvement, and educational efforts are positioned to continue vigorously to support the anticipated major increase in canola acreage. This will ensure long term success of winter canola as a profitable rotational crop for OK wheat growers thereby improving their

economic viability and ability to compete in world markets.

Introducing a new crop requires changes in farming and business operations throughout the system. OSU research and extension specialists lead the efforts to make certain Oklahoma wheat growers are quickly learning how to grow canola and local elevators have learned how grade and handle canola as it crosses the scales.

First Hollow Stem Criterion for Removing Cattle from Wheat Pasture

Issue: Wheat fields utilized for livestock grazing during the fall/winter and then harvested for grain by early summer are termed 'dual-purpose' wheat fields. Proper timing of livestock grazing termination at the ¼ inch First Hollow Stem (FHS) stage of growth is critical in avoiding large grain yield losses caused by overgrazing wheat pastures. Because grazing termination dates can vary greatly on a field-by-field basis due to planting date and the particular variety planted, FHS is the single best way for stocker cattle producers to determine exact times for grazing termination. Oklahoma has about 5.7 million acres of wheat planted annually, of which, about 2.5 million acres are utilized by farmers as 'dual-purpose' wheat acres.

What has been done? Research indicates overgrazing wheat pasture by just one week can result in a decreased grain yield of up to 25% at harvest and mistiming grazing termination by two weeks will reduce the bushels of wheat at harvest by up to 60%! Given average yield, this equates into a 19 bu/ac loss. At current prices, this amounts to a **$150 + per acre** potential loss of income for 'dual-purpose' wheat producers or a $380,000,000 potential annual loss for the state of Oklahoma. To help prevent these losses, we monitor first hollow stem, conduct in-service trainings, and hold grower workshops on methodology and benefits of scouting for first hollow stem.

Results: It is estimated that at least 75% of dual-purpose wheat producers in Oklahoma use first hollow stem as a criterion for removal of cattle from wheat pasture, saving producers over $280 million in a typical year. http://wheat.okstate.edu/wheat-management/grazing

Introduction of New Turfgrass Varieties to the Oklahoma Sod Industry:

Issue: The ability to survive harsh winters is one of the primary factors limiting bermudagrass (*Cynodon* sp.) use across wide geographic areas. Consequently, improved stress tolerance has been a goal for programs breeding bermudagrasses.

What was done: Research and develop at Oklahoma State University during the last 11 years resulted in the breeding, initial selection, testing in the 2007-2012 National Turfgrass Evaluation Program bermudagrass trial, commercial release, submission for plant patent and licensing of OKC1119 and OKC1134 bermudagrasses. These two varieties have improved color, texture, density, cold hardiness, and injury recovery rates. These two products were licensed to Sod Solutions, Inc. during 2011. The two varieties were trade marked by Sod Solutions as Latitude 36 (OKC1119) and NorthBridge (OKC1134). In a cooperate effort with OSU, Sod Solutions has sublicensed 6 producers of each of these varies in 2011. One of the sublicensees was located in Oklahoma. The first sod of the two products will begin to be available for commercial purchase by consumers from a Maryland producer in spring 2012 and may be available from the Oklahoma producer in fall of 2012.

Results: Latitude 36 (OKC1119) and NorthBridge (OKC1134) hybrid bermudagrasses were licensed to

Sod Solutions, Inc. Sod Solutions, Inc., in cooperation with OSU, located and sublicensed six (6) sod producers in the US to produce the two new varieties. Foundation sprigs of the two new bermudagrass were planted in pedigree stock production and area being produced by the growers. Latitude 36 (OKC1119) and NorthBridge (OKC1134) hybrid bermudagrasses when purchased and installed by end users will be less likely to sustain winterkill than Tifway in areas that frequently experience low winter temperatures. These two new varieties have a faster recovery rate from traffic on intensively used athletic fields resulting in safer playing conditions that using variety not specified or older bermudagrass varieties.

Oklahoma Quality Beef Network

Cattle sickness costs the industry millions of dollars each year. These losses negatively impact producer profitability and they impact each and every level of the beef production chain. In order to facilitate the adoption of best management practices that should result in reduced sickness and associated adverse effects, the Oklahoma Quality Beef Network (OQBN) was initially developed in 2001 and redefined in 2009. The objective is to add value to Oklahoma's calf crop and capture at least part of the added value. In 2011, 103 Oklahoma beef producers enrolled 4,493 calves in the OQBN program. Nine regional OQBN Vac-45 calf sales were conducted in seven livestock markets. OQBN cattle received a premium of $6.54/cwt, based on the weighted average price of all lots, over non-preconditioned cattle. The average price premium is an additional $39.24 per head, while the added value of weight gain during the preconditioning period averaged $71 per head for a gross increase in revenue of $110 per calf. Average cost to participate in the program was about $50 per head, resulting in a net increase in income of $60 per head or total net increase in income of $269,580 for the calves enrolled in the program in 2011. However, the educational program and example given by the OQBN is stimulating growth in adoption of these management, certification and marketing practices throughout the state. Therefore, the impact is much higher than can be measured by direct participation in the program.
http://oklahomabeefquality.com/index.php

Master Cattleman Program

Beef production accounts for approximately one-third of Oklahoma's agricultural production in most years. Moreover, seventy percent of the state's 86,000 farms have some cattle and over fifty percent of the land area in Oklahoma is pasture or rangeland. Most of the cattle operations are small in size, with seventy-eight percent of the beef cow inventory in herds of fifty head or less. Smaller cattle operations have higher cost of production and are less likely to incorporate best management practices. The Master Cattleman Program is conducted by an interdisciplinary team resulting in a variety of educational products and programs, including the Beef Cattle Manual, benchmarking of cow/calf and stocker producer practices, Master Cattleman programs delivered at the local level and in-service training for Extension educators. An interdisciplinary Beef Cattle Manual was updated and published. The manual contains 41 chapters addressing various business, production, and natural resource topics. Approximately 312 manuals were distributed in 2011 and a total of about 9,000 have been distributed since program inception through local Extension offices, area and state meetings and from the Master Cattleman website. Requests have been filled to 25 states and 5 foreign countries. The manual is being used as a textbook in 8 universities and community colleges. To become a Master Cattleman, a producer completes twenty eight hours of instruction from the Beef Cattle Manual and associated quizzes. The program has enjoyed wide adoption in the state and it continues to be a popular staple in educational programming. Approximately 655 students have graduated with 71 having graduated during 2011. Currently, 119 students are enrolled from 22 Oklahoma Counties. Graduates average response to

their estimate of annual improvement in their cattle operation's profitability is $3,500 for a total annual impact of $2.3 million. On average, graduates indicate that they use the Beef Cattle Manual at least once monthly and that they have referred 5 additional people to the Beef Cattle Manual and three people to the Master Cattleman program. http://agecon.okstate.edu/cattleman/

Oklahoma Cow-Calf Boot Camp and Oklahoma Meat Goat Boot Camp are intended for all producers from beginning to experienced. These are hands-on, intensive multi-day camps designed to help producers raise the bar on their management expertise. Camps are attended by participants from all over the country. http://oklagoats.okstate.edu/ http://osucowcamp.okstate.edu/

What diagnostic or other service facilities are operated by extension? What is the annual volume of business in number of clients and dollars?

Soil and Water Testing Laboratory – 60,279 samples/year with fees of $494,279

Plant Disease & Insect Diagnostic Laboratory – 2,888 samples/year with fees of $56,037

Turf Grass Disease and Diagnostic Laboratory – 70 samples/year with fees of $9,000

Section 5: Off-Campus Experiment and Extension Stations, Research and Extension Farms, and Outlying Research and Extension Centers

Please provide a listing of your off-campus agricultural experiment and extension station locations, including those near the main campus but not on campus, and other key research and extension locations across the state where faculty conduct research and/or extension activities, together with key characteristics or focus areas of each. *Note: please cut and paste table as needed to create enough entry places for all of your experiment station sites.*

Station 1

Station name	Agronomy Research Station
Location (zip code)	*74078*
Size (acres), including owned and long-term leased land	*185 acres*
Key focus area(s) (e.g. poultry, crop demonstration, etc.)	*Agronomic crops and pasture research and demonstration.*
Notable or unique characteristics or assets	*This station is located adjacent to campus and serves as a high visibility research and demonstration site.*
Number of personnel (FTEs)	*Five*

Station 2

Station name	*Cimarron Valley Research Station*

Location (zip code)	*74059*
Size (acres), including owned and long-term leased land	*640 acres*
Key focus area(s) (e.g. poultry, crop demonstration, etc.)	*Agronomic crops, small fruit crops, fruit and nut tree crops.*
Notable or unique characteristics or assets	*Close proximity to campus and located on major highway and serves as a high visibility, high use, research and demonstration unit.*
Number of personnel (FTEs)	*Five*

Station 3

Station name	*Central Oklahoma Research Station Complex – two units*
Location (zip code)	*73018 and 73038*
Size (acres), including owned and long-term leased land	*437 and 110 acres*
Key focus area(s) (e.g. poultry, crop demonstration, etc.)	*The Caddo sub station is an irrigated site with sandy soils located within the main peanut production region and focuses on peanut research. The Chickasha headquarter station is a non irrigated, dry land cropping facility focusing on agronomic crops and crops for bioenergy use.*
Notable or unique characteristics or assets	*These facilities are operated as a unit with a shared administration due to their close proximity to one another.*
Number of personnel (FTEs)	*Total of 6 at both locations.*

Station 4

Station name	*Eastern Research Station*
Location (zip code)	*74436*
Size (acres), including owned and long-term leased land	*298 acres*
Key focus area(s) (e.g. poultry, crop demonstration, etc.)	*Small grains, soybeans and improved pasture with cow/calf operation.*
Notable or unique characteristics or assets	*Upland soil type typical of the region.*
Number of personnel (FTEs)	*Three*

Station 5

Station name	*Plant Pathology Farm*
Location (zip code)	*74078*
Size (acres), including owned and long-term leased land	*28 acres*
Key focus area(s) (e.g. poultry, crop demonstration, etc.)	*Research and demonstration trials with various crops with a major focus on managing insect pests and plant diseases.*
Notable or unique	*Close proximity to campus provides ease of access for training and*

characteristics or assets	*education programs and/or intensive research projects.*
Number of personnel (FTEs)	*Three*

Station 6

Station name	*Kiamichi Forestry Station*
Location (zip code)	*74745*
Size (acres), including owned and long-term leased land	*160 acres*
Key focus area(s) (e.g. poultry, crop demonstration, etc.)	*Forestry research and demonstration plots and a facility equipped with labs and to house students for summer education camps.*
Notable or unique characteristics or assets	*Located in the extreme southeast region of the state in the main area of pine forest production.*
Number of personnel (FTEs)	*Seven*

Station 7

Station name	*Lindley Research and Demonstration Farm*
Location (zip code)	*74775*
Size (acres), including owned and long-term leased land	*2500 acres*
Key focus area(s) (e.g. poultry, crop demonstration, etc.)	*Forest research and demonstration and improved pasture with cow/calf herd for research and demonstration.*
Notable or unique characteristics or assets	*Located in southeast Oklahoma within the forest production region. The newest station with land donated in 2006.*
Number of personnel (FTEs)	*Three*

Station 8

Station name	*Klemme Range Station*
Location (zip code)	*73622*
Size (acres), including owned and long-term leased land	*1,560 acres*
Key focus area(s) (e.g. poultry, crop demonstration, etc.)	*Cow/calf and stocker cattle production on managed range lands.*
Notable or unique characteristics or assets	*Located in southwestern Oklahoma within the low rainfall short grass range region. A major site for managed fire as landscape management tool research and demonstration work.*
Number of personnel (FTEs)	*Two*

Station 9

Station name	*North Central Research Station*
Location (zip code)	*73754*
Size (acres), including owned and long-term leased land	*143 acres*

Key focus area(s) (e.g. poultry, crop demonstration, etc.)	*Wheat research and demonstration.*
Notable or unique characteristics or assets	*Located in the center of the key wheat production region and on a major highway providing high visibility for programs.*
Number of personnel (FTEs)	*Three*

Station 10

Station name	*Panhandle Research and Extension Center*
Location (zip code)	*73939*
Size (acres), including owned and long-term leased land	*550 acres*
Key focus area(s) (e.g. poultry, crop demonstration, etc.)	*Irrigated agronomic crops primarily wheat, corn and sorghum. A sub unit of this facility is the newly donated McCaull property to be developed for additional irrigated and dry land research studies.*
Notable or unique characteristics or assets	*Located in extreme northwest Oklahoma in the center of the key irrigated crop production region of the state.*
Number of personnel (FTEs)	*Four*

Station 11

Station name	*OK Botanic Garden and Turf Center*
Location (zip code)	*74078*
Size (acres), including owned and long-term leased land	*100 acres*
Key focus area(s) (e.g. poultry, crop demonstration, etc.)	*Horticulture crops, education facilities.*
Notable or unique characteristics or assets	*Close proximity to campus and located on major highway and serves as a high visibility, high use, research and demonstration unit. Unit includes education buildings, TV studio and turf research and demonstration plots. Is a major public access unit with public access gardens.*
Number of personnel (FTEs)	*Six*

Station 12

Station name	*Vegetable Research Station*
Location (zip code)	*74008*
Size (acres), including owned and long-term leased land	*110 acres*
Key focus area(s) (e.g. poultry, crop demonstration, etc.)	*Vegetable and small fruit crops.*
Notable or unique characteristics or assets	*Located in the center of the historic vegetable production region near Tulsa. Serves as a high visibility garden and vegetable production unit.*
Number of personnel (FTEs)	*Three*

Station 13

Station name	*Range Research Station*
Location (zip code)	*74074*
Size (acres), including owned and long-term leased land	*9 units covering 5000 acres*
Key focus area(s) (e.g. poultry, crop demonstration, etc.)	*Non improved pasture/range with cow/calf herds for grass management, red cedar control and managed fire as a tool research and demonstration. Conservation and wildlife research and management study areas intermixed with range.*
Notable or unique characteristics or assets	*Centrally located and used for wildlife and fire management tools demonstations.*
Number of personnel (FTEs)	*Three*

Station 14

Station name	*Southwest Research and Extension Center*
Location (zip code)	*73521*
Size (acres), including owned and long-term leased land	*Three units with headquarters located near Altus – 245 acres, 80 acres and 320 acres.*
Key focus area(s) (e.g. poultry, crop demonstration, etc.)	*Located in extreme southwest Oklahoma with a focus on irrigated and dry land cotton production.*
Notable or unique characteristics or assets	*Headquarters located in the center of the key irrigated cotton production region on a major highway with high visibility for research and demonstration projects. Sandyland station located to the north of Altus and used in conduct of managing sandy soils in low rainfall regions. Tipton station is located to the south of Altus and serves for research on dry land production crops in the region.*
Number of personnel (FTEs)	*Six*

Additional comments or items of note regarding off-campus experiment and extension stations, county offices, etc.:

County Extension offices are present in all 77 counties of Oklahoma. They are administered/supported by four District Offices which in total have approximately 30 budgeted area specialist who work in support of the county programs in their district.

Section 6: Industry Partnerships

Please provide a description of FIVE notable partnerships that your experiment station and/or extension service has with industry. Examples might include a joint engineering center with an agricultural equipment manufacturer, plant breeding or transgenics programs with seed companies, bioprocess

development with chemical or biofuels companies, food product development with food manufacturing companies, etc.

Provide details on companies, groups of companies, commodity groups etc. worked with, key results achieved and thoughts on benefits provided.

1. **Monsanto and Producer's Cotton Seed Oil Mill in the development of the canola industry in Oklahoma** (see other section for more)

ATV Safety Program for Youth ATV Youth Safety Program – Safety principles are taught to youth with regard to ATV operation. Hands on training is provided by certified instructors using donated ATVs.

2.

House of Kawasaki, Oklahoma City, OK
Sehorn Yamaha, Shawnee, OK
Morris Motorsports, Chickasha, OK
Tidelands Geophysical Co. Inc,, Plano, TX
Mid American Cycle, Guthrie, OK
Maxey's Cycles, Oklahoma City, OK

3. Oklahoma Genetics Inc. Established in collaboration with wheat producers and the industry to serve as a marketing agent for new wheat cultivars developed by OSU and then licensed to the company. Currently has six cultivars under license and was awarded two new licenses in 2012. Under agreement through license, royalties tied to sales of wheat seed are returned to OSU in support of continued research and development of new wheat cultivars. http://www.okgenetics.com/varieties.html

4. **The Stored Products Research and Education Center (SPREC)** at Oklahoma State University is a facility dedicated to use by faculty, staff and collaborators for generation and dissemination of new information about protection, management or marketing of a wide variety of postharvest agricultural bulk commodities and value added products. SPREC and its team have gained world recognition in the area of grain bin safety research and extension and closed loop fumigation system design.

The following list is an example of the investors and partners.

AgrEvo
Archer-Daniels Midland Foundation
Batman Grain, Inc.
Bayer Corporation
Brock Manufacturing, Inc.
Cherokee Strip GEAPS Chapter
ConAgra Foundation
DICKEY-john
Dow Agro Sciences
Enid Fire Department
Farmers Cooperative Association-Tonkawa, OK
Farmers Cooperative Elevator Company of Douglas
Farmers Cooperative Exchange-Weatherford, OK
Farmers Elevator, Inc.- Goodwell, OK

Farmers Grain Company-Pond Creek, OK
General Mills, Inc.
Grain Watch Inc.
Gustafson LLC
Hansen-Mueller Grain
Hooker Equity Exchange
Insects Limited, Inc.
Noble Foundation
Oklahoma Wheat Commission
Oklahoma Wheat Research Foundation
OPIsystems Inc.
Orkin Pest Control
Panhandle Chapter of GEAPS
PathTracer
Producers Cooperative Oil Mill
Plains Oilseed Products Cooperative
Poag Grain Company
Richard and Nancy Giles
Sam Fisher
Shawnee Milling Company
Sukup Manufacturing Company
Tri State Chapter of GEAPS
Triangle Insurance Co.
Unibridge Systems, Inc.
W. B. Johnston Grain Company
Wheeler Brothers Grain Company

Oklahoma Agricultural Experiment Station
USDA Cooperative State Research, Education, and Extension Service

Examples of Key Results:

Research in the area of insect infestation and pesticide use has helped industry launch several new products and determine insect resistance to pesticides.

Canola storage research has enabled producers and PCOM Oil Mill to successfully store and market canola seed in the hot humid Oklahoma environment.

Partnership with Cherokee Strip GEAPS, W. B. Johnston Grain Company, Enid Fire Department and OSU SPREC has produced a training DVD on grain bin safety and rescue. This DVD has been distributed to every grain facility and supporting fire department in Oklahoma and is available for out of state entity purchase.

Partnership with Hansen Mueller Grain has provided industry with significant improvements in the use of closed loop fumigation systems to control insects and reduce pesticide applications.

Training through the OSU Extension has certified every fumigant applicator licensee in the state of Oklahoma and is providing training to producers, elevator personnel and fire departments in grain bin accidents and rescue procedures.

5. Biobased Products and Energy Center – Utilizing several federal grants, Oklahoma State University has established collaboration with AGCO to address issues associated with biomass supply logistics.

What areas of R&D at your institution do you believe hold the most promise for increasing industry engagement in the next five years?

Crop production efficiency and productivity increases based on intensive traditional breeding and new biotechnologies with a key focus on grain and forage plant species.

Meat and plant commodity developments in food science that increase efficiencies and safety with a focus on beef products and reduction of human pathogens in the food chain to improve human health and safety.

Hardware and software development for agricultural production on farms and food processing post harvest including increasing efficiencies in farming practices and post harvest handling of products.

What agriculture, forestry, fisheries or wildlife and natural resource-related industries do you expect to see grow in the southern region during the next five years?

Agriculture Industries.
Grain and livestock production units will merge and increase in size and sophistication requiring new and increasingly sophisticated support industries – seed, equipment, knowledge management.

Crop and livestock production units in close proximity to urban areas will decline in size and increase in diversity and intensity of production of high value crops and livestock. This will result in a change in allied support industries very different from the traditional seed and equipment dealerships.

Sensor guided hardware utilizing large detailed data bases linked with sophisticated software will be used to monitor equipment operations to increase efficiencies, monitor soils and irrigation and track plant growth and development. Inputs for crop and animal production will be closely monitored and applied using these same technologies. The fundamental features of these systems will be imagined within universities, developed in collaboration with industry and then developed by the new and evolving industries in agriculture. Equipment and hardware manufacturers will focus on tools and software and biotechnology firms (many previous 'seed' and pesticide companies) will develop plants and animals and associated products.

Forestry. Similar to above.

Natural resources.

Large farms and ranches will increasingly develop hunting/fishing/tourism sectors along with crop and livestock production sectors. Support industries in the tourism arena will increasing be involved with production units. Allied support industries will also develop.

The increasing petroleum based and biofuel based industries will require new allied industries. Production units will have to deal with increasing industrial impacts on rural lands.

Additional comments or items of note regarding industry partnerships:

Section 7: Regional Cross-Institutional & Governmental Partnerships

Please provide a description of FIVE projects, initiatives, centers or programs, etc. that your experiment station and/or extension service is engaged in together with other institutions in the southern region. Examples might include joint initiatives in biofuels development, food safely, biosecurity, rural economic development, etc.

1. **Oklahoma/Texas Commodity Outlook Publication --** For several decades, the Agricultural Economics Departments for Oklahoma State University and Texas A&M University have collaborated to provide an annual agricultural outlook section to the regional edition of *The Farmer Stockman* magazine. Each year, faculty from the two departments join to co-author a variety of issue and commodity specific articles that provide market outlook information to producers and agribusinesses in Oklahoma and Texas. The outlook section is published in the January edition and read by thousands in the agricultural sector. Typically, articles are written on the general economy, international trade, agricultural commodity policy such as the farm bill, energy, finance, tax situation, wheat, feed grains, cotton, livestock, dairy, sheep, and soybeans, OSU and TAMU annually alternate coordination leadership of the process, and the magazine provides the final editorial activity. In addition, OSU leads an Oklahoma-focused follow-up series on Sunup or Horizons TV for the thousands of viewers and internet followers who want more detailed outlook for the state's agricultural sector. The multi-media distribution through the magazine, television and internet has helped thousands of managers develop business strategies that improve opportunities for profit on farms, ranches and agribusinesses. Further information may be obtained from larry.sanders@okstate.edu.

2. National Center for Rural Health Works - One objective of the National Center is to train other state professionals (Office of Rural Health, Extension, State Hospital Association, Area Health Educators, etc.) to be able to conduct the health impact model, community engagement process, and health budgets. This is accomplished by workshops, presentations at meetings, conference displays, etc. In 2011 we conducted four national workshops, two national webinars, made presentations at 18 national or regional meetings, and participated in four national conferences. We also provided leadership of hands-on projects in Florida, Washington, Texas, Mississippi, Louisiana, and Nevada in 2011.
3. **A multi-state Warm-Season Turfgrass Breeding and Development team** was in effect in 2011. This effort was funded in part by the USDA/NIFA Specialty Crops Research Initiative.

The team includes turfgrass breeders, research scientists and turfgrass extension specialists from Oklahoma State University, Texas A&M University (TAMU), the University of Georgia, North Carolina State University and the University of Florida. The team is lead by a member from TAMU. The team submitted for and was successful in being granted a 5 year grant for development of and education on warm-season turfgrasses with improved drought and salinity tolerance. The planning process for education delivery started in late 2010 but will not be conducted until late in the 5 year process as new products containing the desired features must first be developed. In approximately 2012 the team will begin extension news releases. The education will be to golf course superintendents, homeowners, sports field managers, sod farmers and legislative decision makers. It will focus on the importance of varietal selection for improved features such as drought tolerance, the importance of buying Certified pedigree stock and goal oriented management practiced targeted at reducing fresh water inputs and guarding against over application of management practices that can have a high environmental impact. These goals are key in improving the sustainability of turfgrass management systems.

4. **Multi-state Biocontrol project** – This multi-institutional project, with 11 participating states (FL, AL, AR, GA, KY, NJ, OK, SC, TN, TX, and VA), seeks to implement, evaluate, and enhance biological control, evaluate the benefits and risks of natural enemies, and meet annually to refine research activities and coordinate their efforts. They evaluate the effects of indigenous natural enemies on pest organisms and provide information to regional data bases to support meaningful risk assessment protocols for future biological control programs and biologically-based IPM programs. In Oklahoma, studies are directed at documenting the abundance, movement, and impact of indigenous predators and parasitoids within “simple” (wheat monocultures) and “diverse” (wheat rotated with 1 or more crops) cropping systems that utilize either conventional or conservation tillage practices.

What federal agencies do you partner with on major joint projects and programs? Please list the top 3 federal initiatives you are engaged with.

US Environmental Protection Agency -- OSU PSEP works with the United States Environmental Protection Agency in cooperation with ODAFF to assist Oklahoma businesses that have Worker Protection Standard (WPS) lack-of-compliance issues. OSU PSEP meets with willing business representatives to advise and assist personnel in achieving WPS compliance. ODAFF then follows-up with re-inspections to ensure and facilitate compliance with WPS.

Department of Transportation, Department of Energy and USDA – Sun Grant Southern Region Center

NIH, USDA, AFRI -- Many projects throughout the Division

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What state agencies do you partner with on major joint projects and programs? Please list the top 3 state agency initiatives you are engaged with.

Oklahoma Department of Agriculture, Food and Forestry (ODAFF) -- The **Oklahoma State University Pesticide Safety Education Program** provides pesticide applicator certification training in cooperation with the Oklahoma Department of Agriculture, Food and Forestry (ODAFF), concentrating on the General Pest, Structural, and Fumigation categories using hands-on training coupled with classroom practical sessions. Six General Pest, five Structural, and two Fumigation practical sessions are conducted annually resulting in initial certification of 250 applicators.

Oklahoma Poultry Waste Management Education Program - The 1998 Oklahoma Registered Poultry Feeding Operations Act and the Poultry Waste Applicators Certification Act were established in response to concerns about phosphorus from poultry litter polluting important water resources. Specifically, the Eucha-Spavinaw and Illinois River watersheds have been the focus of regional and national attention in regards to litigation and regulation over water quality concerns. As set forth in the Acts, all poultry production operators and poultry waste applicators must complete an initial nine-hour series of Oklahoma Cooperative Extension Service (OCES) Poultry Waste Management (PWM) educational sessions followed by continuing education. In 2011, the OCES PWM Education Program continued to provide the required training, addressing water quality concerns associated with improper or excessive land application of poultry litter. Over 1,000 people participated in the program during 2011. A report of 2010 and 2011 poultry waste production and movement, prepared by the ODAFF, indicates some dramatic positive changes. Due in no small part to the PWM Education Program and the efforts of OCES Educators and Specialists, this is a tremendous example of the impact we have had.

Okla. Illinois River Watershed: 88% of poultry waste exported out in 2010
Eucha-Spavinaw Watershed: 90% of poultry waste exported out in 2011

The Association of County Commissioners of Oklahoma (ACCO) --

Oklahoma County Training Program's purpose is to help county government officers and their employees execute their duties more effectively, efficiently and professionally. To achieve this mission, the County Training Program provides several resources including short-courses, handbooks, and technical assistance. County elected officers and their deputies are partners in these efforts. They serve on advisory boards, help create published materials, and sometimes participate directly in instruction.

The County Training Program also benefits from the oversight and direction provided by the Commission on County Government Personnel Education and Training. Commission members consist of the President of OSU, the State Auditor and Inspector, the President of the County Officers and Deputies Association, the Director of the Department of Transportation, and the Chairman of the Tax Commission. This commission was established in 1982 by the Oklahoma Legislature in Title 19, Section 130.1 of the Oklahoma Statutes.

Certification programs have been established for each elected office. Certification programs range from three-level programs for County Commissioners, County Clerks, and County Treasurers to a single level of certification for Court Clerks and County Sheriffs. Handbooks have been created for

each elected office except the County Sheriff. Most handbooks are now available in compact disk format. The disk also includes the Purchasing Handbook plus the prescribed forms used by County Clerks and County Treasurers. These electronic handbooks contain statutory references, which are hyperlinks that provide easy access to the text of all of the referenced statutes.
http://agecon.okstate.edu/ctp/

Department of Human Services – Nutrition Education

Community Nutrition Education Programs (CNEP)

In FY 11, Community Nutrition Education Programs (CNEP) & OCES leveraged state monies to bring 3.8 million in federal nutrition education program funds to the state which created 108 job opportunities. Through partnerships with Oklahoma Department of Human Services, SNAP-Ed, EFNEP, OU Health Sciences, Blue Cross & Blue Shield of Oklahoma, OETA, and 50+ public school districts, CNEP provided long-term nutrition education to 4,785 low-income families and 23,332 youth, affecting the lives of more than 100,000 Oklahomans. Working through Oklahoma Cooperative Extension Service (OCES) county offices, teaching paraprofessionals known as Nutrition Education Assistants (NEAs) coach participants during regularly scheduled lessons to build skills that enable them to stretch their family food dollars, plan and prepare more nutritious meals and increase physical activity. In addition, approximately 11,088 volunteers contributed to the CNEP program in 2011. Data indicates nearly 96 percent of adult program participants demonstrated improvements in diet-related behavior, and 39 percent of adult program participants reported they less often ran out of food before the end of the month. Both of these indicators are associated with improvements in food security status, and decreased risk for chronic diseases, such as obesity, heart disease and type 2 diabetes which help reduce health care costs.

Department of Education – Ag in the Classroom

School Meal Pattern Training (OK Department of Education)

Revised federal nutrition standards for school meals, released January 2012 by USDA, go into effect July 1, 2012. To meet the urgent need of training school food authorities, the Oklahoma State Department of Education (OSDE) Child Nutrition Services saw value in contracting with OCES to conduct the training statewide. OCES state specialists developed peer-reviewed training curriculum and conducted a train-the-trainer with 28 FCS educators and 19 OSDE school nutrition consultants and administrators March 3, 2012. Subsequently, the trained FCS educators conducted 28, 1½ day trainings across the state during April and May 2012, reaching approximately 2,276 school nutrition professionals representing 548 public school districts, charter schools, residential child care institutes and private industry. Preliminary analysis of the evaluations indicate the participants felt better prepared to plan, prepare and serve meals to the approximately 660,000 school-age Oklahoma youth. These meals increase access to healthy, affordable foods to youth across the state and create opportunity to improve consumption of fruits, vegetables, whole grains, low-fat/fat-free milk and lean protein.

Department of Health

Tobacco Settlement Endowment Trust Communities of Excellence in Nutrition and Fitness (OK Department of Health?) -- Increasing health behaviors associated with lower rates of obesity is facilitated when healthy choices are the easy choices in the environments where people live, work and learn. The TSET Communities of Excellence in Nutrition and Fitness aims to work with local coalitions, many of which include the active participation of OCES county extension educators, to pass policies and

ordinances that increase access to healthy affordable foods and opportunities for physical activity in schools, worksites and communities. The OSU Department of Nutritional Sciences engages in community outreach by serving as the external evaluator for the statewide project. Initial needs assessment found that the targeted communities are at low levels of readiness to address these issues. Of the three priority sectors (schools, worksites and communities) schools were more likely to have nutrition and physical activity policies and worksites were least likely to have related policies. The continued partnerships between OCES university faculty, county OCES educators, TSET and local coalitions in these efforts is consistent with the OCES community indicator of increased access to healthy affordable foods and safe opportunities for physical activity.

ATV Youth Safety Program – Safety principles are taught to youth with regard to ATV operation. Hands on training is provided by certified instructors using donated ATVs.

Oklahoma Department of Transportation (ODOT) -- **Oklahoma State University Roadside Vegetation Management Research, Training and Consultation Program** has served Oklahoma and the nation since 1963. The program is supported by the Oklahoma Dept of Transportation (ODOT) through use of state and Federal Highway Administration yearly support. The program originally developed to research and train ODOT employees concerning selection and establishment of proper vegetation types along the Interstate Transportation System. By the 1970s the program evolved into researching proper mowing, fertilization and pesticide use for long-term maintenance of vegetation on roadsides. Today the program continues research on reduced environmental risk herbicides, herbicide/adjuvant tank-mix compatibility, weed control efficacy trials, how to control noxious and invasive plant materials and providing "as needed" problem solving consultation focusing on vegetation management. The program conducts pesticide applicator Certification schools for between 50 to 100 would-be pesticide applicators and over 660 Certified herbicide applicators each year, as well as herbicide applicator equipment calibration workshops for 30 applicators. ODOT maintains over 100,000 highly visible roadside safety zone acres which provide safe sight distance for motorists, a fire break from wild fires and erosion control for the road surface. Implemented roadside research results save ODOT managers conservatively over $100,000 per year by guiding them to cost-effective products, equipment and services backed by research from the Land-grant System. For further information contact Dr. Dennis Martin, Professor and Turfgrass Extension Specialist at dennis.martin@okstate.edu or 405.744.5419.

What do you believe are some of the unique assets of the southern region that make it particularly well-suited to leadership in the 21st Century agbioscience economy?

Additional comments or items of note regarding potential or existing partnerships with other institutions across the southern region:

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Texas A&M University / Texas AgriLife Extension Activities -- OSU PSEP partners with TAMU and Texas AgriLife Extension to jointly provide pesticide use and safety information to the Southern Region IPM Center.

Southern Region Forester

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Section 8: Education and Human Capital Development

Student Population

Number of students graduated in most recent year with Bachelor's degrees in related field of study	446
Number of students graduated in most recent year with Master's degrees in related field of study	99
Number of students graduated in most recent year with Doctorate degrees in related field of study	25
Number of students graduated in most recent year with Associates or other less than baccalaureate qualifications in related field of study	0

Education and Training Programs

In a science and knowledge-driven economy, skilled human capital is a critically important asset for our states. Please provide details pertaining to education and skills development in the sections below:

New or innovative education programs or degree programs developed (for example: bioprocessing or biorefinery operator training, biosecurity training, education programs in new fields such as functional foods, nutraceuticals, etc.)

OSU Farm and Business Tax Institutes -- In 2011, over 1,960 tax preparers attended the nine fall institutes and the two summer clinics. High quality, professional instruction is provided to make continuing education credit available for Certified Public Accountants, Enrolled Agents, and Tax Attorneys as well as provide technical education for all tax return preparers. Most of the tax preparers that attend are from Oklahoma however there have been preparers from Kansas, Texas, New Mexico, Arkansas, Florida, and California attending the program in order to maintain their Oklahoma accreditation. Participants in these schools have indicated on the evaluation form that they file approximately 1.5 million Federal income tax returns which include about 40,000 Federal farm returns. This is roughly 65 percent of the total farm returns filed in Oklahoma. A recently added question asked the participants to place a subjective value on the education received which they then use to assist their clients with tax planning advice to reduce Federal and Oklahoma income taxes, to increase return filing accuracy, to provide retirement planning assistance, and/or to educate their clients of important estate planning tools. The participants were asked specify a value per return they filed which averaged just slightly greater than $80.00 per return. Therefore using the number of participants willing to provide this information (roughly 25% of the participants) and the average number of returns completed by this group annually (250 returns) the value of the tax schools is over $8,000,000 for 2011. Additional information on the OSU Farm and Business Tax Institute is available at http://osutaxschools.okstate.edu

Wild Game Food Safety -- Two surveys gathered input from 1,800 consumers of wild game (venison & fish) regarding food safety practices, providing assessment and data. Two DVDs and companion materials were produced and posted via the internet, free of charge and are used to train professionals and volunteers of 24 agencies/organizations. Based on information provided by cooperating organizations and agencies, and via direct delivery of Extension staff and volunteers, it is estimated the "Wild Game Food Safety—Venison & Fish" program directly reached an average of 16,200 youth and adults per year, (48,600/3 years) and general awareness of venison, goat, and fish food safety increased among an additional 120,000 people over 3 years. The program was used at venues ranging from the US Army National

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Ag In The Classroom (AITC) –AITC provides a one day teacher workshop in the summer for about 600 classroom teachers which not only introduces AITC lessons but also provides contact with specialists and industry leaders in agriculture so they can learn more about ag issues and topics. One of more multiple day workshops and tours are also conducted for an average of 80 teachers each summer.

State 4-H Parent and Volunteer Conference – This conference is held annually for about 200 state volunteers. In addition to continuing education for volunteers, their contributions as volunteer leaders are celebrated.

Financial Education --CES-FCS conducted its first organized tax credit outreach during the 2012 tax reporting season. Across all four districts, educators distributed written information (1652 contacts) at public libraries, county health and human services departments, county nutrition programs, courthouses, community meetings, leader lessons, tribal head start programs, and one-on-one visits. Information was also disseminated through the media (825 contacts) via news releases, county newsletters, and Facebook. In an effort to forge future partnerships, educators visited five VITA sites; other stakeholder partners were identified.

Bioforensics, Premedical and Preveterinary option in Entomology -- The Bioforensics, premedical and preveterinary option in Entomology prepares students for a wide range of professional and technical careers in medical, veterinary, public health, forensic or related fields. This academic program equips students with the technical skills needed to succeed in post-graduate professional school or to pursue new disciplinary niches and career opportunities related to food safety, invasive species, forensic investigation, and emerging diseases that have increased over the past decade as a result of economic globalization and national security issues.

Pest Management Minor in Entomology and Plant Pathology -- The minor in pest management provides students with exposure to both issues and sustainable management solutions for insects, plant pathogens, weeds and other organisms considered to be in conflict with human activity; agriculture, stored products, structural/urban settings, horticulture, and public health. With a growing human population and globalization, pests are continuously emerging and adapting thus creating an expanding need for specialists who can address these issues. This minor supplements any major in College of Agricultural Sciences and Natural Resources with a very marketable and applicable skill set.

Bioenergy Production Option in Plant and Soil Sciences -- Students enrolled in the bioenergy production option focus their coursework in basic and applied sciences that help them understand how crops are managed. Specific courses include Bioenergy Feedstock Production, Cropland Ecosystems, Plant-Environment Interactions, Principles of Weed Science, and Introduction to Entomology. In addition to coursework, students have numerous opportunities to be involved in faculty-led research projects investigating bioenergy feedstock selection, improvement, and production.

Environmental Economics and Policy Minor in Agricultural Economics -- Understanding and tackling environmental problems involves an understanding of multiple disciplines in both the physical and social sciences. The Environmental Economics and Policy minor is intended to provide students with a broad understanding of social science tools for understanding how human behavior and policies affect the environment. The minor was the first collaborative minor between college departments. It has required courses in two departments and then a selection of courses within campus. It attracts students within the college and outside the college.

Biotechnology Option -- The Department of Animal Science offers an Animal Biotechnology option for students who are interested in the rapidly growing areas of science and technology. Students acquire a strong science foundation and learn how innovative technologies are used to improve animal health and the efficiency and sustainability of animal agriculture. Graduates find career opportunities in human and animal health sciences, food production and safety, research and application of genomic technologies to improve efficiency of animal production.

Continuing education programs or training for producers or industry

Professional Certification Programs

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Pesticide Applicator Certification

1. Oklahoma State University (OSU) Pesticide Safety Education Program (PSEP) provides certification, recertification, and educational programs to approximately 3,000 commercial and non-commercial applicators annually, and reviews over 150 educational programs for Continuing Education Unit (CEU) requests. Generally, OSU PSEP personnel provide over 90 educational programs and contact over 3,500 persons for pesticide education annually. OSU PSEP develops and maintains the certification manuals (20) needed for initial certification of the 27,734 commercial and non-commercial applicators and the 11,449 service technicians in Oklahoma.

2. OSU PSEP works on pesticide applicator certification in cooperation with the Oklahoma Department of Agriculture, Food and Forestry (ODAFF) on the General Pest, Structural, and Fumigation category practical training sessions. Six General Pest, five Structural, and two Fumigation practical training sessions are held annually, resulting in initial certification for 250 applicators.

3. OSU PSEP continues to provide pesticide education programs targeted for lawn care operators. Currently the PSEP program schedules four lawn care CEU programs for Ornamental and Turf category applicators in Oklahoma.

4. OSU PSEP works with the Oklahoma Pest Control Association (OPCA), Oklahoma Agribusiness Retailers Association (OARA), Oklahoma Agricultural Aviation Association (OAAA), and Oklahoma Vegetation Management Association (OKVMA) to develop educational programs as well as provide initial and recertification training.

5. OSU PSEP provides education and initial pesticide certification to employees of the City of Oklahoma City in Ornamental and Turf, Right-of-Way, and Aquatic categories. OSU PSEP also provides Right-of-Way training programs to employees of several different Counties and Cities, as

well as State government employees.

6. OSU PSEP annually provides certification manuals for the 9,233 private applicators in Oklahoma. OSU PSEP also provides training information (handouts; power-point presentations) for Agricultural Educators in all 77 Oklahoma counties to facilitate conducting private applicator training within their respective counties. OSU PSEP continues to work with private applicators on herbicide drift management issues in southwest Oklahoma.

7. OSU PSEP instructs pesticide applicators in proper pesticide container rinsing and disposal, and coordinates public pesticide container collection programs in cooperation with US Ag Recycling company, and encourages businesses to participate in private collection programs. In cooperation with ODAFF, OSU PSEP continues the statewide unwanted pesticide collection program that is funded by ODAFF. There is no charge to agricultural producers or pesticide applicators for disposing of their unwanted pesticides. Since 1999, the container recycling program has collected and disposed of 883,735 pounds of used plastic pesticide containers. Additionally, since 2006, the unwanted pesticide disposal program has collected and disposed of 659,757 pounds of unwanted pesticides, thereby reducing risk of environmental contamination by waste pesticides across Oklahoma.

8. OSU PSEP personnel present numerous programs for commercial pesticide applicator education and training. Examples include: *Cockroach Bait Aversion*; *Use of Monitoring Systems in Food Warehouses; Herbicide Spray Drift Management; Pesticide & Fertilizer Containment*; and *Wood Destroying Organisms control*. These continuing programs provide applicator-specific information that can be utilized the same day the information is provided. Regional and invited national speakers who are the experts on the topics covered help provide this training.

9. OSU PSEP provides programming for Oklahoma applicators in complying with state pesticide regulations. Examples include: *Wood Infestation Reports*; National Pest Management Association Form *NPCA-1; and delineation of Herbicide Restricted Areas*. These programs provided applicators with information on regulatory changes and how to comply. OSU PSEP personnel also provide information to applicators on identifying pesticides that can or cannot be used in specific situations. For example: pesticides labeled for canola production, and which herbicides are regulated in the herbicide restricted areas.

Farm and Business Tax Institutes

Frequent changes in Federal and Oklahoma State Tax Laws create a need to keep tax preparers informed of the impact of the changes and how to best help their clients utilize the tax planning and management opportunities available in the current tax laws. These tax schools are designed to update tax preparers about new laws and regulations covering farm, non-farm business and individual taxpayer issues.

This program has been conducted for the past 46 years. It has grown from a one-day seminar to its present form of two days per location for the fall Farm and Business Tax Institutes and the summer Tax Clinic. The combination of all the schools allows a preparer to get the full 40 hours of CPE/CLE as required by state. Topics covered range from presentation of new tax laws and their implications, agricultural issues, business issues, tax planning opportunities, professional ethics,

retirement, and social security to name a few. Twelve two day sessions are conducted each year with two of these in the summer and ten in the fall and two one day special topics courses. Total 2011 attendance for the schools was approximately 1,960 tax preparers in 11 workshops. Certified public accountants make up 46 percent of the attendance, 27 percent are tax preparers and bookkeepers, 10 percent are enrolled agents, 2 percent are attorneys, and the remaining 15 percent come from a variety of backgrounds. These tax preparers file roughly 80 percent of the farm returns for taxpayers in the state of Oklahoma.

High quality, professional instruction is provided to make continuing education credit available for Certified Public Accountants, Enrolled Agents, and Tax Attorneys. Many of those attending have stated that they have been coming to these programs since they began. Participants filed more than 37,645 Federal farm tax returns and 255,428 Federal non-farm tax returns as reported by the participants in the most recent program evaluations. Most of the tax preparers that attend are from Oklahoma however there have been preparers from Kansas, Texas, New Mexico, Arkansas, Florida, and California attending the program in order to maintain their Oklahoma accreditation.

Leadership training, including civic, commodity, government, youth, etc.

Oklahoma Agricultural Leadership Program (OALP) -- This program was originally funded by the Kellogg Foundation and now is self funded private contribution and the Oklahoma Cooperative Extension Service. It is a two-year program open to men and women between the ages of 20 to 45 who are engaged in production agriculture or a business related to agriculture. The overall objective of OALP is to further the development of future leaders for Oklahoma Agriculture. The curriculum includes study of leadership development; communication; government operations and institutions; economics; marketing and religious and cultural diversity. The program features travel within Oklahoma to learn about Oklahoma agriculture plus study tours to Washington D.C and an international country or region.

Entrepreneur training and other special training or education initiatives

Child Care provider Industry -- Extension, Department of Human Services and 10 Indian Tribes provide an annual Child Care Conference that offers 6 hours of Tier 1 training for child care providers in 4 counties.

> *High quality child care does more than benefit children; it can create positive results for entire families and for the community as a whole. Counties in the Oklahoma panhandle have the largest number of children needing care for every child care slot." Source: Child Care Finders 2006 Annual Report.*

The state of Oklahoma has strong regulations that require child care facilities to be licensed and inspected and the personnel trained annually. For licensing, 6 or more hours must be formal training from specific sources and Cooperative Extension programs qualify. To provide training to the childcare providers in the Panhandle, a seminar held annually utilizes OCES State Specialists, OCES County Staff, and other quality speakers. State Specialists have traveled 226 miles one-way from Stillwater to Beaver

to ensure quality training. Their topics from the last 4 years included: Pollito: Chicken, Gallina: Hen; I Don't Speak English But I Can Learn, The Importance of Active Play and Physical Activity in Preventing Childhood Obesity, Handling Difficult Behaviors, Creating Kids that Cook, Learning to Relate with Others, Social Development in Young Children, Parenting Styles—What Does It Have to Do with the Way My Child Eats?", Positive Guidance & Discipline, and Toddler Nutrition.

The outcome of the seminar is 6 hours of quality training that is affordable and local. Funding comes in part from an Endowment Award for Home and Micro-Businesses honoring a retired OCES Home Based Business Specialist. A registration fee of $10 includes meals, snacks, handouts, and all workshop supplies. The driving distance is within 2 hours for most participants. Each year approximately 50% of the participants are 1st time participants so new audiences are being reached. In the last three years, 107 women from Oklahoma and Texas have received training required for licensing. Being licensed entitles Oklahoma centers to care for state-subsidized children, which means they can receive regular payments directly from the Oklahoma Department of Human Services. A license also opens the door to Oklahoma's "Reaching for the Stars" program, which can improve a center's quality and income

National defense, including National Guard, training or educational initiatives

Military Support via OHCE -- Through OCES educational partner Oklahoma Home and Community Education, Inc. (*OHCE) efforts over the last three years, U.S. military service men/women, spouses and their children in Oklahoma increased awareness, understanding/knowledge and coping skills regarding *deployments/separation, homecomings, changes* such as relocation, managing finances amidst change, or permanently disabled soldier returning home, *double duty, growth & development of children,* and *coaching kids toward healthy habits* through distribution of age appropriate DVDs (5 topics), books (2 topics), fliers (3 topics), brochure (1 topic), wheel chart (1 topic), and a fact sheet (1 topic) with conservatively estimated outreach of 1,315. Soldiers were taught in group sessions (with spouse when available) *"Budget Friendly Meals for the Wounded Soldier," "Single Soldier & Spouse Easy Holiday Entertaining,"* and *"Budgeting & Using Coupons*" reaching 175 soldiers/spouses. Fifty OHCE members and Extension Educators receiving training on the *grief process/experience of military families.* At *12 district conferences* (4/year) and three state conferences (1/year) 470 volunteers received continuing education and updates toward supporting military families. DVDs were places in all 77 counties, as were public news articles, to generate awareness and provide resources. Gold Star Mothers, Militaryonesource and other resources were introduced and accessed.

*OHCE is a non-profit 501(c)(3) organization with nearly 4,400 members across Oklahoma.

Additional notes:

- "Thousands" of coupons for foods, personal hygiene and household items were sent to soldiers in Germany and Japan for commissary use 4-6 months after coupons expire in the U.S.
- When BRACS caused loss of family support monies due to *"sudden transfer"* 121 families received donations of money, toys and gifts to brighten holidays.

Operation Military Kids – Oklahoma is one of a number of states that has obtained grants from

the National Institute for Food and Agriculture (NIFA) to conduct programs in support of youth in military families. This program is conducted through our 4-H Youth Programming unit.

K-12 specific educational programs and initiatives

Farm to You: A Traveling Nutrition Education Program (Department of Health-WIC Services provided start-up funding) -- Approximately 33% of Oklahoma youth, compared to 28% nationwide, are overweight or obese. Further, the excessive body fat has been associated with increased risk for type 2 diabetes. The per capita medical spending for obese individuals has been estimated at an additional $1,429 compared to individuals of normal weight, and $6,600 for people with diabetes compared to those without diabetes. The risk excessive weight can be reduced by increasing knowledge, skills, attitudes and behaviors related to food and physical activity. OCES programs targeting youth populations joined efforts with State agencies and agricultural commodity organizations to offer an interactive educational exhibit linking agriculture as the source of nutrient dense foods and role of these foods to health. The collaborating programs and agencies included Oklahoma State Department of Health WIC Service and Southwest Dairy Farmers. FCS, Ag and 4-H educators coordinate efforts with local elementary schools and other educational venues. Since September 2008, the Farm to You exhibit was experienced by approximately 56,944 youth and 2,230 community volunteers in 56 counties. The average number of students reached per site visit over the 3 year period was 312 students and 12 community volunteers. In a case/controlled evaluation, the exhibit was found to enhance food consumption patterns in students who were exposed to both classroom nutrition education lessons and the exhibit compared to those exposed solely to the classroom lessons. The project received national attention by being featured in Weighing the Options: How Can We Encourage Healthy Weights among America's Youth, a publication of the National Issues Forum Network, West Virginia Center for Civic Life. In 2010, it received the Dr. Rodney Huey Memorial Champion of Oklahoma Health Award.

Kids, Cows and More -- Teaching children in grades 3-5 the importance of agriculture, this program brings a real-life awareness and understanding of our food production system, and how agriculture impacts their lives every day. Through the generosity of sponsors like the Texas AgriLife Extension, Southwest Dairy Farmers, Oklahoma State Extension Service and New Mexico Cooperative Extension Service, Kids & Kows & More has been helping to teach the values of dairy and agriculture for more than seventeen years. The program is managed by full time Extension professionals and is strongly supported by the cooperating sponsors in the way of funding, equipment, and leadership.

Insect Adventure – This program features a live arthropod petting zoo containing a variety of insects, spiders, and their relatives. The opportunity to observe, study, and directly interact with these animals can have a life-long impact on patrons including: 1) increasing awareness of the vital roles all animals play in the environment and ecological cycles on Earth, 2) breaking down irrational myths and fears commonly held regarding these animals, and 3) fostering a feelings of stewardship, influence, and personal responsibility that will make them better citizens and more caring people.

Nearly 200 individual presentations were given by the Insect Adventure last year ranging in size from 3 persons to 19,000. Each year through the Insect Adventure program, more than 300,000 Oklahomans have live interactions with the largest group of animals on the planet fostering a respect for this group and those scientists that work on them.

School based ATV Safety – in addition to the hands-on workshops facilitated by trained staff, youth at home or in the classroom can complete the All-Terrain Vehicle Safety Institute[SM] (ASI) e-course. ASI is a not-for-profit division of the Specialty Vehicle Institute of America[SM] (SVIA), formed in 1988 to implement an expanded national program of all-terrain vehicle (ATV) safety education and awareness. ASI's primary goal is to promote the safe and responsible use of ATV's, thereby reducing accidents and injuries that may result from improper ATV operation by the rider. After completing the e-course additional hands-on instruction is given in the school setting.

Mentoring Programs – Oklahoma currently has five formal mentoring programs in place to reach high-risk and underserved audiences. Working with tribal youth in Hughes, Tulsa, and Cherokee Counties and with the Latino Service Agency and Tinker Air Force Based in OKC, youth are matched with mentors with a goal of helping the youth improve academic success and motive them to set and achieve goals of completing their common education and seeking higher education.

Youth Leadership Development -- For 91 years youth from across the state have gathered for State 4-H Roundup, a three day event that introduces the youth the OSU campus and its resources. They attend educational workshops, compete in state contests, and have fun. The event involves about 900 youth annually. Seventy Oklahoma teens gather for 3 days for intensive training in leadership and organization management. These youth are District and State Officers, Council Members and State Ambassadors. Additional training is done during the year.

Behavioral Economics In School Nutrition Program -- National nutrition surveillance data indicate that approximately 85% of Oklahomans fail to meet recommendations for fruit and vegetable consumption, and consumption is especially low during the adolescent years. While schools offer servings of fruits and vegetables daily to students, the foods do not provide health benefits unless they are selected and consumed. To address the issue the Oklahoma Cooperative Extension Service conducted a USDA funded feasibility study which identified 14 strategies appropriate for impacting students' fruit and vegetable selections, verified use of school nutrition records for data collection to measure changes in students' selections, and confirmed acceptance of and interest in use of utilizing the principles by school nutrition personnel. A follow-up project, funded by USDA pass through funds, will be conducted, beginning June 1, 2012, to expand the use of the principles across the state. A train-the-trainer format will be used with a cadre of FCS educators to assist approximately 100 middle-schools in conducting a self-assessment, identify strategies appropriate for the local situation, and measure impact on students food choices. The potential outcome of the project is increased consumption of fruits and vegetables by middle-school age students.

Camp TURF (Tomorrow's Undergraduates Realizing the Future) -- This program is funded by the Oklahoma State Regents for Higher Education Summer Academy Program. It is an annual, two-week residential program, currently in its third year, open to 25 Oklahoma high school students

each summer. The overall objective of Camp TURF is to expose first-generation students to a university setting while exploring career areas in horticulture and landscape architecture. The curriculum includes hands-on activities alongside professors and professionals in the field—activities such as African violet tissue culture, vegetable plant grafting, landscape design, installation of irrigation systems, and filming a television segment for "Oklahoma Gardening". The program features travel within Oklahoma to visit botanic gardens, organic farms, field research stations, greenhouses and nurseries, horticulture therapy programs at assisted-care facilities, and community gardens. Evening and weekend activities include visiting museums, attending live theater, recreational activities (disc golf, bowling, miniature golf, swimming, volleyball, canoeing, sailing, geocaching), and a visit to the OSU Insect Adventure. The program culminates with student presentations and a banquet for parents, students, and teachers. For additional information please see the following website: http://www.hortla.okstate.edu, or contact Shelley Mitchell: shelley.mitchell@okstate.edu.

Camp JMG (Junior Master Gardener) -- This program is self-funded by camp fees. It is a one-week, full-day, summer day camp, currently in its second year. It is open to children ages 9-12, and held at The Botanic Garden (at OSU). The overall objective of Camp JMG is to engage youth in activities related to gardening, nature, and healthy eating. The curriculum includes activities regarding plant development, insects, fruits and vegetables, ecology, biodiversity, soils, and water conservation. For additional information please see the following website: http://www.hortla.okstate.edu, or contact Shelley Mitchell: shelley.mitchell@okstate.edu.

Grandparent University -- This program is funded by the Oklahoma State University Alumni Association, through private contributions and program fees. It is an annual three-day program open to graduates of Oklahoma State University and their grandchildren, ages 7-14. The overall objective of Grandparent University is to expose youth to the university as well as some of the different majors available. The OSU Department of Horticulture and Landscape Architecture has hosted a horticulture major as well as a landscape design major in recent years. The program features visits to The Botanic Garden's theme gardens and demonstration areas and the OSU Teaching Greenhouses, and provides experiences in dish garden design, landscape symbol drawing, flower arranging, and other hands-on activities. For additional information please see the following website: http://orangeconnection.org/gpu, or contact Shelley Mitchell: shelley.mitchell@okstate.edu.

Additional comments or items of note regarding education and training:

Master Gardner Program – The Master Gardner (MG) Program trains approximately 300 new MG Volunteers each year, which are a huge asset to the county office in reaching clientele and offering education programming. They are trained in a variety of topics in horticulture and related fields (plant nutrition and soil science, entomology, plant pathology, turf grass management, IPM, pesticide safety and management, water conservation, fruit and vegetable management, landscaping, etc.).

Online Delivery of Soils 5813 -- OSU, like so many other land grant universities has actively engaged in on-line instruction. This past semester PASS taught SOIL 5813 (Soil Plant Nutrient Cycling and Environmental Quality) both in-class and on-line and that included off campus students from the Noble Foundation and Louisiana State University. Students taking this class on-line were highly

complementary of this kind of delivery for an ever changing world in higher education.

Section 9: Into the Future

What key challenges does your institution face in the future:

Top 5 key challenges for the Experiment Station in your state

1. *Declining state and federal financial support for research in general and agriculture and natural resources specifically.*
2. *Increasing cost of conduct of science as equipment and tools become more sophisticated and expensive.*
3. *The proportion of college educated population with STEM background is declining and finding and hiring well educated and productive young scientists is becoming more difficult.*
4. *Private commercial for profit industries have become more invested in developing agricultural products, knowledge and facilities and displacing previous functions of the state supported enterprise. State supported research will need to evolve to meet new challenges.*
5. *As the proportion of the general population with STEM background increases, there is a growing lack of interest, understanding and concern for science in general. Education enterprises will have to focus on education to provide an understanding of the need and processes of science.*

Top 5 key challenges for the Extension Service in your state

1. Maintaining quality service levels in the face of declining budgets
2.The need for growing our urban programming due to population shifts leading to an increasingly urban oriented state legislature that is less familiar with Extension and thus less supportive of Extension
3.Recruiting qualified and motivated county educators, particularly Family and Consumer Science Educators
4.Marketing our programs to new clientele
5.Broadening the communications methods used to serve our clientele to make better use of the electronic media and social media

What emerging opportunities or trends do you see impacting your institution:

Top 5 emerging opportunities and trends for the Experiment Station

1.Grain and livestock operations are increasing in size and intensity of use of sophisticated equipment, data bases and software.
2.Farm and ranches in proximity to urban areas are decreasing in size and diversifying towards niche markets and research based information will be needed by the producers.
3.Developing new sensors, data bases and knowledge software for increasingly sophisticated production units.
4.Discovering plant and animal traits to be used in improving crops and livestock using biotechnology tools.
5.Monitoring and managing climate change effects on plants and animals.

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Top 5 emerging opportunities and trends for the Extension Service

1.An increasing interest in various forms of consumer education, particularly in nutrition and energy conservation
2.A growing "green acres" clientele – people seeking a rural life styles but not engaged in agriculture for a living or even as a part-time farmer
3.Increased use of social media and "smart phone" technology thus enabling new methods of delivering extension based educational materials
4.Water is becoming an increasing important resource that will receive greatly increased emphasis in regard to developing public policy on water use
5.A number of social issues that FCS and 4-H programs are well equipped to address are receiving high levels of attention. Most notably obesity and bullying.

For the southern region overall, what do you see as the top five challenges/issues moving forward

1. Continuing funding support from Federal, State and County sources plus growing funding from private donations and competitive grants.
2. Finding better ways to share specialists and expertise between states
3. Continued changing demographics among our populations
4. Water usage (quantity and distribution) and quality issues in and among states and watersheds
5.Climate variability, including drought, and an array of natural disasters (floods, hurricanes, ice storms, tornadoes, etc.)

What are the top five differentiating factors of the southern region in agriculture, agbiosciences, community/family/youth development, etc. What makes the region unique or provides key comparative advantages.

1.The region has longer growing seasons and/or higher rainfall than the rest of the US
2. Including off-shore production the area has above average levels of fossil fuel production
3. Region has a significant proportion of cattle production cycle - from cow-calf to stocker to feedlot
4. Region has a very significant portion of chicken and pork production
5. Present and future export possibilities due to Kerr McClellan-Mississippi-Gulf-Atlantic waterways

Section 10: Interview Suggestions

Battelle would like to interview some key stakeholders (outside of the land-grant institutions) across the southern region to discuss their perspective on the importance of extension and agricultural research. Please provide the names and contact information for three individuals who you would suggest for interviewing in your state:

Name	*Title*	*Organization*	*Telephone*	*Email*
Terry Detrick	President	American Farmers and Ranchers	405-218-5551	tdetrick@afrmic.com
Ron Justice	State Senator	Oklahoma Legislature	405-521-5537	justice@oksenate.gov
Rodd Moesel	President and Owner	American Plant Products and Services	405-787-4833	rmoesel@americanplant.com
Scott Dewald	Executive Vice President	Oklahoma Cattlemen's Association	405-235-4391	sdewald@okcattlemen.org

Section 11: Additional Comments

Please provide any additional comments, information, data, case-studies, impact assessment results, etc. that you feel may be useful or relevant for inclusion in this project and resulting report:
