

## 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 21<sup>st</sup> 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 of 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](mailto: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  
Cell: 412-523-6895  
[tripps@battelle.org](mailto:tripps@battelle.org)

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## Section 1: Institutional Profile

University Name	Mississippi State University
Extension Service Director (name, phone, email)	Gary Jackson, (662)325-3036, <a href="mailto:gary@ext.msstate.edu">gary@ext.msstate.edu</a>
Experiment Station Director (name, phone, email)	George Hopper, (662)325-2953, <a href="mailto:ghopper@cfr.msstate.edu">ghopper@cfr.msstate.edu</a>

### Personnel

Number of Personnel in Extension (FTE)	698.214
Number of Personnel in Experiment Station (FTE)	472.805

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

## 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	\$8,733,836	__ Increasing _X Stable __ Decreasing	\$4,429,123	__ Increasing _X Stable __ Decreasing
State Appropriations	\$27,257,728	__ Increasing _X Stable __ Decreasing	\$21,351,266	__ Increasing _X Stable __ Decreasing
Local Government Appropriations (Counties, etc.)	\$2,938,743	__ Increasing _X Stable __ Decreasing	\$0	__ Increasing __ Stable __ Decreasing
Federal Grants and Contracts	\$11,114,553	_X Increasing __ Stable __ Decreasing	\$18,938,589	_X Increasing __ Stable __ Decreasing
State Grants and Contracts	\$388,308	__ Increasing __ Stable _X Decreasing	\$406,211	__ Increasing __ Stable _X Decreasing
Local Grants and Contracts	\$73,367	__ Increasing _X Stable __ Decreasing	\$394,312	_X Increasing __ Stable __ Decreasing
Industrial Grants and Contracts, including grants and contracts from commodity groups	\$2,292,436	__ Increasing __ Stable _X Decreasing	\$4,283,042	_X Increasing __ Stable __ Decreasing
Foundation Grants and Contracts	\$	__ Increasing __ Stable __ Decreasing	\$0	__ Increasing __ Stable __ Decreasing
All Other Grants and	\$	__ Increasing	\$4,076,157	__ Increasing

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Contracts		<input type="checkbox"/> Stable <input type="checkbox"/> Decreasing		<input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing
Sales of Products and Services	\$263,188	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$5,464,263	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing
Intellectual Property Revenues	\$	<input type="checkbox"/> Increasing <input type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$73,529	<input checked="" type="checkbox"/> Increasing <input type="checkbox"/> Stable <input type="checkbox"/> Decreasing
Gifts (Note: this is mainly from unrestricted gifts from industry provided under a General Memorandum of Agreement (GMOA), and is accounted for in our restricted funds series of numbers, similar to G & C. This could just as easily be added to the "All other G & C" – it needs to be wherever we think others have put their GMOAs OR where we feel most comfortable.)	\$	<input type="checkbox"/> Increasing <input type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$890,696	<input type="checkbox"/> Increasing <input type="checkbox"/> Stable <input checked="" type="checkbox"/> Decreasing
Other (PLANT FUNDS, which are not general operating funds, but are expenditures of the ExSta)	\$601,111	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$2,984,258	<input type="checkbox"/> Increasing <input type="checkbox"/> Stable <input type="checkbox"/> Decreasing
<b>TOTAL</b>	<b>\$53,663,270</b>	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing	<b>\$63,291,450</b>	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> 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?

Overall funding levels have been stable to increasing, however, the distribution of fund sources has changed considerably. State appropriations have been declining relative to 2008, but stable over the past 2 years. State grants and contracts have declined. Federal appropriations have been level in recent years. Loss of federal earmarks resulted in a loss of funds 2010 – 2012, but increasing effort and success in competitive grants and contracts has offset these losses, contributing to a net increase in federal grants and contracts. Sponsored research awards to Experiment Station increased 28% from FY2011 - 2012 despite a 19% decline in University-wide grants and contracts awards. Sponsored awards to MSU Extension Service increased 47% in FY11.

## Section 3: Research and Extension Activities

### Key Initiatives, Institutes and Programs:

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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.IGBB – *The Mission of Institute for Genomics, Biocomputing & Biotechnology (IGBB) is to increase the ability of Mississippi scientists to lead high-throughput, multi-disciplinary projects focused on understanding the biomolecular interactions underlying the diversity, value, and sustainability of species of agricultural, medical, bioenergy, and/or ecological importance. The IGBB provides researchers access to a team of highly-skilled professionals trained in cutting edge genomics, proteomics, and high performance computing principles and techniques.*

2.NWAC/SRAC – *More than 60 % of the domestic production of catfish is grown in Mississippi. The Thad Cochran National Warmwater Aquaculture Center (NWAC) is among the world’s largest aquaculture research facilities, host the Southern Regional Aquaculture Center(SRAC) and supports this important industry through research and extension. The Mission of the NWAC is to provide solutions to the most pressing problems of the aquaculture industry through basic and applied research, extension, and diagnostic services. NWAC scientists conduct research to solve problems that can be solved in the short-term, as well as those that threaten the long-term viability of the industry. NWAC Extension activities focus on the dissemination of research-based information to the aquaculture industry. The USDA-NIFA Southern Regional Aquaculture Center. Mississippi State University serves as the host institution for the USDA-NIFA Southern Regional Aquaculture Center (Center). Since its inception in 1987, the Center has become the most important regional aquaculture activity in the southeastern United States. In its 24 years of operation, the Center has disbursed more than \$16 million to fund multi-state research and extension projects. Research and extension problem areas for the southern region are identified each year by the Industry Advisory Council (IAC), which is composed of representatives of state and regional aquaculture associations, federal, territorial and state agencies, aquaculture producers, aquaculture marketing and processing firms, financial institutions, and other interests or organizations. The IAC provides an open forum wherein maximum input from private and public sectors can be gained and incorporated into annual and ongoing plans for the Center. A recent example of a project’s impact on regional industry can be taken from a current project “Using National Retail Databases to Determine Market Trends for Southern Aquaculture Products.” Summaries of market trends in 52 cities across the U.S. for the past 5 years have been sent to 19 catfish processing companies. Customized reports have been sent to six catfish processing companies. The total value of these reports provided to industry is more than \$5 million.*

3.SSRC - *The mission of the Social Science Research Center is to conduct research on social, economic, political, human resource and social-environmental problems facing the state, nation and world; to provide a support system for the university to plan, develop, secure funding for and conduct social research on problems of interest to the scientific community and to consumers of research findings; to provide a mechanism whereby existing social science research capabilities in the university can be matched with funding sources; to contribute to the university’s graduate and undergraduate program by involving students in research projects through assistantships and other work arrangements; and to provide a vehicle for unique social research and public service programs that do not fit more traditional academic structures. The SSRC brings modern survey methodology to studies of human behavior, attitudes, beliefs, and actions, informing education and policy development.*

4. SRDC - *The Southern Rural Development Center seeks to strengthen the capacity of the region's 29 land-grant institutions to address critical contemporary rural development issues impacting the well-*

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being of people and communities in the rural South. The SRDC accomplishes this mission by: stimulating the formation of multi-state research teams, coordinating the development and revision of educational materials and maintenance of a centralized repository of educational resources, organizing and delivering high priority rural development research and educational workshops/conferences, providing leadership for the preparation of science-based rural development policy reports, and building partnerships that link the South's land-grant university system with other key entities committed to rural development activities in the region.

5. DREC - The Delta Research and Extension Center, located in Stoneville, is the largest of MSU's 16 branch experiment stations and research units located throughout the state. DREC is co-located with nearly a dozen regional and federal agencies on its Stoneville campus to foster interagency collaboration. Collectively, the Stoneville complex houses more than 120 Ph.D.-level scientists. DREC research and extension activities are focused on cotton, rice, soybean, corn, peanuts, and catfish production. Scientists and Extension Specialists work cooperatively to solve crop and aquaculture production problems and transfer new information and technology to area producers. The major goal of the DREC is to increase the yields of commercial agriculture and aquaculture producers, while at the same time preserving the Mississippi Delta's environment and natural resources. Founded in 1904, DREC now covers more than 4800 ac, with nearly 2000 acres of row crop research plots. Additionally, 400 surface acres of catfish ponds support aquaculture research. The Delta Experimental Forest covers close to 2,600 acres of state land. The DREC has a staff of 32 Research and Extension scientists/specialists and over 100 support personnel. The network of laboratories, offices, greenhouses, research, engineering, and maintenance shops, as well as its comprehensive library, create an integrated work environment among state and federal partners in support of agricultural Research and Extension.

## 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. SPAR - Soil-Plant-Atmosphere-Research (SPAR) Facility is a controlled-environment , ambient light research facility located on the Mississippi State University's campus. SPAR has a set of ten outdoor naturally-lit chambers, with computer control of the environmental factors such as temperature, CO2 level, humidity, and soil moisture. This facility, one of only 2 in the world, was established in 1977 and has since been used for determining plant responses to a variety of environmental factors. Its ability to simulate plant performance under a range of temperature, moisture, and CO2 levels makes it uniquely equipped for crop physiology/climate science.

2. Social Science Research Center/Wolfgang Frese Survey Research Lab – Housed within the Social Science Research Center (SSRC), The Wolfgang Frese Survey Research Laboratory (SRL) supports social science research by conducting telephone, online, mail, and multi-mode surveys. Since 1982, the laboratory has collected data for over 350 surveys using local, state, national, and international samples. These surveys have covered a broad range of research topics including healthcare, vocational rehabilitation, children's well-being, alcohol and tobacco use, land management, and political climate. In cooperation with the Political Science Department at Mississippi State University, the SRL also conducts The Mississippi Poll, which is considered the only scientifically-based public issues survey in the state of Mississippi. For telephone-based surveys, the SRL utilizes a state-of-the-art call center with 18 call stations, each equipped with the latest computer hardware and survey software. The call center employs

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the PASW Data Collection Platform by SPSS, a leading developer of statistical analysis and survey research software. The SRL is staffed by two research scientists, several research assistants, and over 40 telephone interviewers. All the telephone interviewers are trained in survey interviewing and certified by Mississippi State University's Institutional Review Board for the Protection of Human Subjects in Research (IRB). At maximum capacity, the SRL can collect data for over 5,000 completed telephone based surveys per month. Quality control of the data collected by the survey interviewers is maintained through targeted video and audio monitoring of each call station. For web based surveys, the laboratory's dedicated HP Blade™ server can easily process over 10,000 completed surveys per day.

3. Insect Rearing Facility- MSU maintains an internationally recognized insect rearing center at the Clay-Lyle Building. Scientists associated with this center sponsor a yearly workshop, train scientists from around the world in the principles of insect rearing, conduct insect rearing research, and rear insects for research. The main facility of approximately 3,100 ft<sup>2</sup> (290 m<sup>2</sup>) is located in the basement of the Lyle Entomology Building and consists of four rooms where staff and students conduct general rearing tasks and six state-of-the-art, walk-in, environment controlled rearing rooms. An additional small building adjacent to Lyle Entomology was designed and built to house adult lepidoptera and to provide additional rearing space. These temperature and humidity controlled facilities provide the infrastructure for large-scale rearing of insects for research. In 2000, the Department of Entomology & Plant Pathology initiated formal education for those who rear insects under laboratory conditions. This intensive five-day workshop titled "Principles and Procedures for Rearing High Quality Insects" designed to cover all the major areas of laboratory rearing of insects. Since 2000, 14<sup>th</sup> workshops have been held, training a total of 317. Participants have traveled to the MSU from 39 states and 25 countries to attend these workshops.

4. Biophotonics Lab- Established in 2001, the Facility for Organismal and Cellular Imaging, or FOCl, is using biophotonics imaging technology to look at livestock from the single-cell level all the way up to the entire animal. Biophotonics is the science of generating and harnessing light to image, detect and manipulate biological materials. The Biophotonics lab supports biophotonics and fluorescence microscopy which takes advantage of molecular reporters that allow researchers to easily examine functions and structures within living cells, tissues or organs. Biophotonics captures the glow from cells that have received the firefly gene luciferase to reveal chemical reactions within biological systems. A gene from the jellyfish *Aequorea victoria* imparts vivid colors of green, yellow or bluegreen to "transformed" cells that can be detected with a fluorescence microscope. The Biophotonics lab also supports Infrared thermal imaging and ultrasound imaging used as noninvasive examination and diagnostic tools in medical and veterinary settings.

5. HPC<sup>2</sup> - The High Performance Computing Collaboratory (HPC<sup>2</sup>), at Mississippi State University is a coalition of member centers and groups that share a common core objective of advancing the state-of-the-art in computational science and engineering using high performance computing; a common approach to research that embraces a multi-disciplinary, team-oriented concept; and a commitment to a full partnership between education, research, and service. The mission of the HPC<sup>2</sup> is to serve the University, State, and Nation through excellence in computational science and engineering. The HPC<sup>2</sup> provides substantial high performance computing resources for use by its member centers, including a 34 teraFLOPS 3072 processor Intel Westmere cluster with quad data-rate InfiniBand, a 10 teraFLOPS 2048 processor AMD Opteron cluster, a 384 processor Intel Xeon cluster with InfiniBand interconnect, a 512 processor SGI ORIGIN 3900, and numerous additional special purpose machines. Data storage capabilities include a 600 terabyte high performance disk system and a 9 petabyte near-line storage system. The HPC<sup>2</sup>'s high-end visualization needs are met by an immersive reconfigurable CAVE virtual reality environment driven by a 4 node visualization cluster. An access grid node allows for state-of-the-

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*art video teleconferencing and remote collaboration. The HPC<sup>2</sup> network infrastructure backbone consists of both 10-Gigabit Ethernet and Gigabit Ethernet, with an extensive Gigabit Ethernet network for desktop connectivity. External network connectivity to the commodity Internet, Internet2, and the National LambdaRail is provided through a 10 Gigabit/sec connection to Southern LightRail in Atlanta, GA and a 1 Gigabit/sec connection to the Louisiana Optical Network Initiative (LONI) point-of-presence in Jackson, MS. MAFES scientists and MSU Extension specialists utilize the HPC<sup>2</sup> through participation in the Geosystems Research Institute and the Institute for Genomics, Biocomputing, and Biotenchnology.*

## **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. Crop Physiology/SPAR - Soil-Plant-Atmosphere-Research (SPAR) Facility is a controlled-environment , ambient light research facility located on the Mississippi State University's campus. SPAR has a set of ten outdoor naturally-lit chambers, with computer control of the environmental factors such as temperature, CO2 level, humidity, and soil moisture. This facility, one of only 2 in the world, was established in 1977 and has since been used for determining plant responses to a variety of environmental factors. Its ability to simulate plant performance under a range of temperature, moisture, and CO2 levels makes it uniquely equipped for crop physiology/climate science.*

*2. CROP Blog- A new service to agriculture was initiated during 2011 by Extension crop specialists/faculty. The weekly Mississippi Crop Situation Blog generates almost 10,000 contacts per month with producers by providing up-to-date information on cotton, corn, soybeans, rice, peanuts, grain sorghum, wheat and other row crops.*

### *Animal Sciences, Animal Health, Livestock*

*1. Biophotonics Lab - The Blophotonics lab supports biophotonics and fluorescence microscopy, infrared thermal imaging and ultrasound imaging for animal health research and diagnostics. Biophotonics is the science of generating and harnessing light to image, detect and manipulate biological material.*

*2. Internet Video conference board sales – Another example of innovative service actives has been the work of MSU Extension livestock specialists and agents, in cooperation with beef cattle commodity groups, in developing video board sales of truckload lots of animals. Since the sales began in 2008, Mississippi producers have received premiums above average market prices for almost 14,000 animals.*

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

*1. Garrison Food Sensory Lab - The Garrison Sensory Evaluation Laboratory facilitates research programs that M.S. and PhD students use to conduct different types of sensory tests to understand consumer acceptability and sensory descriptive attributes. Examples of this research encompass the relationships between meat quality measurements and sensory quality, the relationships between the concentration of aroma compounds and product acceptability, and the relationships between instrumental texture measurements and product acceptability. In addition, research activities include the evaluation of sensory shelf life, and evaluating the overall quality of foods with sensory acceptability included as a portion of the total research project. Specific examples include evaluation of dry cured ham quality and the effects of low-atmospheric stunning on rigor mortis and sensory quality. This research also consists*

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*of contract sensory testing that is requested by companies within the food industry. In addition, the sensory laboratory offers support for other researchers in the areas of food science, animal science, poultry science, and human nutrition. This research includes sensory difference testing, consumer testing and trained sensory analyses and is used to examine how nutrition, genetics, food processing, ingredient technology, and nutritional enhancement impacts sensory properties and sensory acceptability.*

*2. Body Walk – Body Walk is a unique health Extension education program designed to educate elementary school students across the state of Mississippi on the importance of being physically active and making good nutrition choices. The Body Walk program provides education and activities that enable youth to learn skills needed in making good nutrition choices and developing a healthy lifestyle. Body Walk consists of: a 40-foot by 40-foot walk-through exhibit representing the human body, Classroom activities for use prior to and following the students' walk through the exhibit, A take-home activity book for students to read with their families, A list of additional nutrition education resources, Information to help publicize the event and communicate with the media, A School Health Kit, A parent information sheet. The Body Walk exhibit was also set up at 88 public schools in Mississippi (74 schools qualified for >50% free/reduced lunch program), allowing 12,618 students in kindergarten through 5<sup>th</sup> grade to participate. Students received short lessons in each area of the exhibit to learn how to take care of their bodies such as choosing to participate in physical activity and to make healthy food choices.*

## *Food Safety and Biosecurity*

*1. ServSafe - Mississippi State University Extension Service (MSU-ES), in partnership with the Mississippi Restaurant and Hospitality Association, the National Restaurant Association, and the Mississippi State Department of Health, provides the primary food safety management certification course used in Mississippi. The ServSafe program is an 8 to 16 hour face-to-face training with a national certification offered by the National Restaurant Association Educational Foundation. This course educates foodservice managers, owners, and foodservice employees from a variety of foodservice settings, including commercial restaurants, hospitals, school foodservice, childcare centers, and other locations where food safety policies and procedures are required and necessary to protect public health.*

*2. The Experimental Seafood Processing Lab is located in Pascagoula, MS and serves the seafood industry and regulatory agencies in ensuring food safety. The mission of the ESPL includes: a) providing scientific and technical guidance to the seafood industry in the state of Mississippi to maintain compliance with state and federal regulations and assisting the seafood industry in Mississippi to become more economically competitive with others industries. These programs focus on safety and quality issues associated with seafood products. ESPL is only the lab in Mississippi that conducts PHP verification for the oyster industry in MS and surrounding Gulf Coast States. The current research programs at ESPL focus on using non-thermal technologies; especially the novel X-ray technology, the only lab in the USA that uses a 2400 X-ray machine, and natural additives to improve the safety and quality of different foods including seafood, fresh produce, dairy products, poultry and eggs. Modern molecular techniques (RT-PCR) and traditional methods are used to detect pathogens (especially Listeria, Salmonella, E. coli and Shigella) in these foods. Extension activities include technical guidance for the food industry in the form of workshops such as Hazard Analysis Critical Control Point (HACCP) classes.*



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

1. *Biomass Pyrolysis Pilot Plant – Scientists in the Forest and Wildlife Research Center working through the MSU Sustainable Energy Research Center and the Energy Institute, have developed and licensed auger pyrolysis reactor technology to produce bio-oil as a feedstock that could be upgraded to biofuels. This bio-oil is used in upgrading experiments to produce boiler and transportation fuels. In 2010 ground was broken on a pilot-scale reactor plant located in the MSU Thad Cochran research Park. This facility includes a 4-ton-per-day auger reactor. The increased production capabilities will satisfy the need to produce large quantities of bio-oil and upgrade fuels from bio-oil to allow large-scale boiler and engine testing. The boiler fuel will be produced in a 100-gallon, continuously stirred reactor, and the transportation fuel hydrocarbons will be produced with a hydrotreater similar to that used at petroleum refineries to produce hydrocarbons from petroleum crude oil. A variety of feedstocks, including pine chips, switchgrass, giant miscanthus, sorghum, corn stover, energy cane, and even logging-harvest residue, can be converted to bio-oil by the MSU auger reactors.*

2. *Development of advanced biofeedstocks – Scientists in the Department of Plant and Soil science are developing and enhancing advanced biofeedstocks that produce high biomass, high yield, and work well in sustainable bioenergy production. MSU has released and licensed Freedom giant miscanthus, ( a warm season Asian grass). In trials Freedom has consistently produced 16 – 22 tons/ac biomass and yields 60-70% in pyrolytic conversion to advanced biofuels. Kior, an advanced renewable fuels corporation, is building 5 conversion facilities in the state of Mississippi, designed to operate on an 80% woody and 20% miscanthus feedstock. Additional work on cultivars of lowland switchgrass have produced an imazapic-resistant variety and a high-yield, high germination cultivar.*

*Environmental Sciences, Natural Resources, Sustainability*

1. *REACH - REACH is an innovative, grass-roots collaborative program between Mississippi State University Extension Service, Mississippi Agricultural Forestry Experiment Station, Forest and Wildlife Research Center and Delta F.A.R.M. (Farmers Advocating Resource Management). REACH is a producer led program designed to help agricultural producers improve environmental stewardship , reduce environmental impacts, and document costs and benefits of conservation programs and practices. The goal of REACH is to create a network of cooperative farms in Mississippi, with variable agricultural systems, degrees of conservation initiatives and ecosystem monitoring to illustrate the success of conservation practice implementation on landscape stewardship. These farms will provide producers, conservationists, educators and policy maker's key information to better implement and advocate management practices orientated around various local and regional objectives (i.e., targeted nutrient reductions, or habitat restoration).*

2. *Forestry Inventory System - Mississippi has been a leader in the development of forest inventory decision support systems for spatially-explicit volume/biomass/carbon estimates, mill location, and transportation networks. The Mississippi Institute for Forest Inventory (MIFI) and the Forest and Wildlife Research Center (FWRC) at Mississippi State University (MSU) developed and implemented a Web-based forest inventory analysis system that has been used in monitoring, planning, extension outreach and biofuel industry recruitment. MIFI has a proven track record for developing relationships and bringing biofuel industry to the state (for example, BHT Hickory, Bluefire Ethanol, Interchem, and Kior). Extension applications have allowed Mississippi counties to assess the economic potential derived from its forestlands, form appropriate policies, and plan accordingly. The highly successful approach developed for Mississippi is designed to be scalable and readily expandable to other states for optimizing regional biomass value chains. The MIFI system serves as the database/knowledge base driver for many other*

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*important energy and environmental applications such as 1) prediction of emergency energy production and efficiencies from utilizing natural disaster woody debris in portable generating stations 2) woody biomass availability for bioethanol conversion 3) multi-state forest carbon storage estimates of baselines, balances, and catastrophic losses 4) a carbon estimation system for rural and urban forests predicting the spatial distribution of forest harvesting patterns with implications in resource availability, sustainability, wildlife habitat assessments and corridors (e.g. black bear habitat assessment; and forest certification programs, and 5) development and calibration of a model on the effects of land-use on water quality. Currently, a joint project, sponsored by NASA and being conducted by Radiance Corporation and MSU Department of Forestry, is using the MIFI system to validate MODIS forest change detection products for modeling regional level natural disaster damage. It has also been used to assess species specific damage and impacts related to timber ownerships, parcel sizes, and edge effects.*

## *Agritourism and Recreational Hunting and Fishing*

*1. NRE - The Natural Resource Enterprises (NRE) Program was established in the Department of Wildlife and Fisheries and Cooperative Extension Service at MSU to educate non-industrial private (NIP) landowners in the Southeast about sustainable natural resource enterprises and compatible habitat management practices. The Natural Resource Enterprises Program is focused on effectively delivering information to landowners and community leaders that will encourage informed decision-making regarding the management of land and enterprises. Landowners seeking ways to supplement the income from their land will find resources and information about outdoor recreational businesses such as agritourism operations, hunting leases, nature trails, as well as wildlife habitat management guides. The Natural Resource Enterprises Program (NRE) has created videos, articles, and holds workshops to assist landowners with businesses.*

*2. MS Agritourism Association – Agritourism is the fastest growing sector in the tourism industry, valued at \$150 million in the US and \$3.5 million in Mississippi. Increasingly, urbanites are looking for ways to experience the outdoors. Agritourism is a popular way for families to connect and spend quality time away from electronic devices. Agricultural producers continue to adapt to changing economic realities and many find that devoting a small portion of acreage to agritourism efforts is a relatively profitable way to use their land. The Mississippi State University Extension Service is doing many things to support existing and potential enterprises with networking, education, programming, and services. Union County Agent Stanley Wise is the president of the Mississippi Agritourism Association which co-hosts the annual Mississippi Fruit and Vegetable Growers/Agritourism Conference and Trade Show as well as the annual Mississippi-Tennessee Agritourism conference. Additionally, Mr. Wise also travels to farms across Mississippi to imprint corn mazes using the latest GIS technology. The Natural Resource Enterprises holds workshops on business development where participants hear from and interact with successful practitioners, expert lawyers, accountants, and marketing strategists. Other programmatic efforts being developed include updated economic impact of the contribution of agritourism enterprises in MS, outreach to existing and potential enterprises to build business know-how, and leadership in bringing together agritourism efforts by different agencies across the state.*

## *Family Development*

*1. MSU Extension's Mississippi Child Care Resource and Referral Network- Current government regulations permit the educational levels of non-Head Start early care and education providers to be minimal, creating a disparity in the quality of care provided to infants, toddlers, and pre-school-age children. In order to improve the quality of care for Mississippi's most vulnerable population, it is critically important to maintain a rigorous training system with numerous opportunities for face-to-face*

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training, distance training, and personal technical assistance. This ensures the two-fold gain of increased school readiness for young children and improved capacity of the early childhood workforce. Since 2005, Mississippi State University expanded its partnerships to increase the number of Mississippi Child Care Resource & Referral sites from the original three to twelve. The sites provide a wide array of materials, supplies, equipment, and services to parents, early care and education providers, students, child development centers, and community members at little or no charge. Two other sites, one at First Regional Library in Hernando County and one Global Education Mobile (an RV equipped with computers and resource materials) expand the reach of the MSCCR&R Network beyond the original community college campus locations.

Throughout 2011, the MSCCR&R Network offered 863 trainings to 19,070 participants and over 2,237 hours of direct technical assistance. In 2012, MSCCR&R Network began offering a Professional Development program to further improve the quality of care by increasing provider education. By choosing either a 120-hour Child Development Associate program, a 135-hour Mississippi Director's Credential, an Advanced National Director's Credential through Aim4Excellence, or additional professional development courses, over 560 Mississippi childcare providers have made the commitment to higher professional quality and standards. To accommodate the training expansion, the MSCCR&R Network has expanded its training coordinator staff to 30, significantly increasing the number of educational opportunities for early care and education providers across the state. Additionally, seven MSU-ES Child and Family Development Area Agents work with the MSCCR&R Network to provide training.

2. *Financial Education for Adults.* More than 2,000 Mississippians learned to improve financial health and make wise consumer decisions in sessions taught by MSU-ES Family Resource Management agents and Volunteer Money Mentors. A series of 12 publications and videos in MSU's "Healthy, Wealthy, and Wise Program" offered online has been used to teach unemployed women participating in Christian Women's Job Corp groups statewide by MSU educators, as well as financial educators with United Way, public libraries, and other programs in Mississippi and other states. Impacts reported by participants include: unbanked consumers opening an account, reviewing personal credit reports, starting an emergency savings account, reducing debt, paying cash for large purchases, avoiding predatory loans, and addressing consumer complaints.

## Youth Development

1. *Science Engineering, and Technology* The Mississippi State University Extension Service 4-H Robotics program is in its 4th year of offering exciting, hands-on robotics opportunities to Mississippi youth. The program got its start in Newton County, Mississippi and as one city council man and robotics volunteer said, "the robotics program helps us speak victory into the child's life even before they see it for themselves." Co-sponsored by the Extension Center for Technology Outreach the robotics program focuses on offering a unique opportunity to many Mississippi youth who live or attend school in rural Mississippi or underserved areas where robotics programs are difficult to find. Active in 27 counties, the robotics program reaches out to roughly 3,000 youth. In addition, the program has also been responsible for bringing in additional educational opportunities such as the NASA Summer of Innovation Program sponsored by the White House.

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2. *4-H Tech Team - The social media revolution is re-defining how companies do business, how communities connect, and how identities are shaped. Mississippi State University Extension 4-H Tech Team is made up of youth who understand the benefits of technology and how to maximize ROI (return on investment) for others. The team offer hands on training for communities, businesses, and emergency providers across the state. The team explains how to define a strategy, create a good plan, and implement a strategic approach to accomplish pre-determined goals. Then, they assist individuals in setting up the social sites or tools they feel would best meet their needs. The 4-H'ers often serve or resources following the training. Fourteen county municipals have been trained by the 4-H tech team and 19 youth trainings were offered to 4-Her's to become a member of the State 4-H Tech Team.*

## *Community and Economic Development*

1. *MSU Extension Center for Government Technology - Since 1973, the Certification Training Program for Municipal Clerks, Deputy Municipal Clerks, and Tax Collectors has offered these municipal officials an opportunity to achieve both state and national certification. The program is sponsored by the Center for Governmental Training & Technology in the Mississippi State University Extension Service and is accredited by the International Institute of Municipal Clerks. To date some 1,000 municipal clerks, deputy clerks and tax collectors have received their Certified Municipal Clerk designation. The three year program consists of 30 individual, exam-based, courses in the areas of public administration; social and interpersonal skills; and current strategic issues in municipal government. The strength of the program rests in its ability to link municipal clerks, deputy clerks and tax collectors with changes in laws, approaches to improved efficiency, and the sharing of common problems and solutions, while providing these officials the opportunities to achieve greater professionalism and strengthen services to the citizens of their community.*

2. *The Southern Rural Development Center (SRDC) seeks to strengthen the capacity of the region's 29 land-grant institutions to address critical contemporary rural development issues impacting the well-being of people and communities in the rural South. The SRDC accomplishes this mission by: stimulating the formation of multi-state research teams, coordinating the development and revision of educational materials and maintenance of a centralized repository of educational resources, organizing and delivering high priority rural development research and educational workshops/conferences, providing leadership for the preparation of science-based rural development policy reports, and building partnerships that link the South's land-grant university system with other key entities committed to rural development activities in the region.*

## *Other, including multi-focus:*

1. *Ag Economics and Risk management – Risks such as weather, price changes, pests, and disease are defining traits of Southern agriculture. Furthermore, the U.S. government spends billions of dollars per year to provide a safety net for farmers. The risk management and policy analysis group at Mississippi State University focuses on three areas of research: 1) designing new risk management tools and strategies for producers, 2) evaluating federal commodity programs and private-sector risk management tools and educating producer on their use, and 3) evaluating alternative federal farm safety net and insurance policies and sharing the cost/benefits with producer groups and policy makers in Washington DC. In 2011 the Web of Science showed MSU to be one of the top four universities in the country in agricultural risk policy research. Research conducted at MSU was used to set premium rates on \$10 billion of federal crop insurance policies in 2012. MSU agricultural economists have also helped develop agricultural index insurance products in the United States and in Ghana, Mongolia, Peru, and Vietnam.*

## Intellectual Property –

	FY2009	FY2010	FY2011
# of Invention Disclosures	51	51	44
# of Patents Applied For	18	31	25
# of Patents Awarded	5	8	3
# of Licenses Executed	4	13	12
# of Business Start-Ups	0	1	6
# of Plant Variety Protection Certificates Applied For			2
# of Plant Variety Protection Certificates Awarded			1
\$ Value of Income received from Plant Variety/Germplasm Development	\$339,000	\$270,000	\$257,000
\$ Value of Income received from all other Intellectual Property	\$43,000	\$58,000	\$79,000

## 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:

1. *Marshall Ryegrass*
2. *Miscanthus*
3. *Mississippi Turfgrass*
4. *Rex Rice and Clearfield*

**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. *SOYBEAN SMART Program- Soybean Management by Application of Research and Technology program (SMART) is a total management program for soybean crop production begun in 1992 by MSU-ES. SMART is delivered through the Mississippi State University Extension Service and funded by the Mississippi Soybean Promotion Board. The program incorporates information on all aspects of production, including tillage practices, maturity groups, variety selection and planting dates to help producers make timely management decisions that increase yield and profitability.*

2. *Genomics – The Institute for Genomics, Biocomputing, and Biotechnology (IGBB) has played a key role in characterizing the genomes of crop plants and their wild relatives. This work has resulted in the identification of genes underlying traits of economic and adaptive importance which, in turn, has guided breeding efforts aimed at introducing characteristics from wild plants (such as disease resistance) into their domestic relatives. **Cotton Diversity** - Along with its partners, the IGBB has begun to define and utilize the genetic diversity within the genus *Gossypium* as a means to protect and increase the value of U.S. cotton. The IGBB has played an integral role in sequencing the genome of *Gossypium raimondii*, a diploid parent of the tetraploid commercial cotton species *G. hirsutum* and *G. barbadense*. With the *G. raimondii* genome nearly complete (a manuscript for submission to Science is in preparation), the IGBB has started to use DNA resequencing and comparative genomics techniques to align shotgun sequence reads from all *Gossypium* species and major *G. hirsutum* commercial cotton lines to the *G. raimondii* reference. Computational analysis of aligned sequences is allowing rapid identification of single nucleotide polymorphisms (SNPs) and other genetic features that (a) contribute to superior fiber quality and yield (b) confer disease-, drought-, and pest-resistance, and (c) underlie evolutionary divergence within *Gossypium*. **Advancing Pine Genomics.** Loblolly pine (*Pinus taeda*) is arguably the most important crop plant in Mississippi. However, the genomes of conifers (including loblolly pine) are more than seven times the size of the human genome making research on this group difficult. The IGBB is among the first groups to develop high-throughput molecular tools for loblolly pine. This work has helped catalyze a full-scale loblolly pine genome sequencing effort. Just as the *Gossypium raimondii* genome sequence has allowed rapid advances in cotton breeding, the loblolly pine genome sequence will expedite improvement of pines and other conifers. The value of this cannot be understated; the U.S. is looking to the Southeast to provide even more wood and wood products for its growing populace.*
3. *Catfish Nutrition – More than 60% of the domestic production of catfish occurs in the Mississippi Delta where, during 2011, 201 farms involving 55,500 pond acres produced a farm gate value of more than \$222 million. Feed is the single largest variable operational cost in catfish production. Research conducted over the last 20 years by MAFES fish nutritionists at the NWAC in concert with the catfish industry has completely redefined commercial catfish diets, reducing catfish production cost by developing a nutritional data base used to formulate cost-efficient feeds. Given the recent increases in ingredient prices (particularly soybean meal, corn, and animal proteins) and the concurrent dramatic increase in catfish feed cost, this data base is vital to the continued success of the industry. Specifically the data is used to formulate feeds that are lower in protein, that contain no animal protein, that use less expensive alternative proteins and supplemental lysine to replace a significant portion of the soybean meal, and that use less expensive energy sources to replace a portion of the corn. Research under practical conditions has also led to improved vitamin and mineral premixes. Phytase enzymes are used to replace dicalcium phosphate in catfish diets. This has led to up to an 80% reduction in fecal phosphorus. The use of high vitamin C diets to boost immune function has been shown to be ineffective and these type diets are no longer used. Collectively these changes potentially result in a savings in feed cost of about 75 dollars per ton annually or about 35 million dollars annually over the industry while simultaneously enhancing water quality and environmental stewardship.*
4. *Freedom Miscanthus - MAFES scientists are developing new systems of producing feedstocks for bioenergy production to increase biomass yields and efficiency of feedstock conversion. Biomass crops can produce 600 gallons of biofuel per acre. Bioenergy crops offer a viable alternative for*

Mississippi producers. MAFES scientists have been studying grassy biomass feedstocks for 12 years. A recent breakthrough has been the development of giant miscanthus as a feedstock. The crop can grow as tall as 12 feet and produce as much as 22 tons/ac biomass. Unlike seeded varieties of Miscanthus, Giant Miscanthus is sterile and only reproduces vegetatively, reducing the risk of escape and diminishing its potential as an invasive. Its perennial nature, outstanding yield and quality and lack of invasive characteristics make it ideally suited for production on a wide variety of soils in the Southeastern United States. Freedom Miscanthus has been protected with a plant patent and licensed to Repeve Renewables.

5. Poultry – Scientists in Poultry Science at MSU have had a long and productive relationship with scientists in the USDA Poultry Research Unit on campus. Nutrition and disease are two areas of particularly fruitful research. MSU has developed a unique in ovo system to deliver nutrients directly into broiler eggs to boost pre- and post-hatch nutrient optimization. Several nutrients have shown promise in improving hatchability and reducing the costs associated with failure to thrive in newly hatched chicks. For the last 10+ years, MSU research has provided evidence that administering a ts11-MG vaccine to layer pullets has the potential to protect flocks that are later exposed to F-strain Mycoplasma gallisepticum. Additional research has shown efficacy of in ovo administration of coccidiosis vaccine to eggs in protecting chicks from subsequent infection. Finally, research with parthenogenesis is providing clues to poor fertility often observed in broiler breeder hens that typically show a fairly high incidence of spontaneous development of infertile eggs.

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

Board Sale impact on Cattle Prices - Internet Video conference board sales – Another example of innovative service activities has been the work of MSU Extension livestock specialists and agents, in cooperation with beef cattle commodity groups, in developing video board sales of truckload lots of animals. Since the sales began in 2008, Mississippi producers have received premiums above average market prices for almost 14,000 animals. Premiums averaged approximately \$0.1/lb.

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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	82
Number of multi-county/multi-parish regional offices	4 Regional R&E Centers
Number of major 4H camps	54 day camps, 6 week-long residential camps
Number of 4H participants	95,683
Number of contacts with clients recorded by extension for the most recently completed year (include professional and volunteer contacts)	3,634,744
Number of volunteers for the most recently completed year and number of hours volunteered	9700 volunteers, 2,123,343 volunteer 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. *Forest Landowner Tax - Many landowners pay more than their fair share of taxes on their timber income. Even forest landowners using accountants need to understand how timber expenses are reported and income is taxed. Income Taxes and the Family Forest, a short course developed by MSU Extension Forestry, helps landowners and tax preparers understand both federal and state income tax rules related to forest management and timber harvesting. During 2012, three courses were conducted, which were very well received benefiting 87 participants and impacting nearly 20 thousand acres of timberland. Participants valued the material presented at over \$200 thousand in potential savings. Three more courses are schedule for this year.*
2. *MIFI – The Mississippi Institute for Forest Inventory (MIFI) and the Forest and Wildlife Research Center (FWRC) at Mississippi State University (MSU) developed and implemented a Web-based forest inventory analysis system that has been used in monitoring, planning, extension outreach and biofuel industry recruitment. MIFI has a proven track record for developing relationships and bringing biofuel industry to the state (for example, BHT Hickory, Bluefire Ethanol, Interchem, and Kior). Extension applications have allowed Mississippi counties to assess the economic potential derived from its forestlands, form appropriate policies, and plan accordingly.*
3. *Market Maker- Mississippi MarketMaker went live in November of 2007. Since its inception the web site has continued to increase the awareness of potential markets for producers and agribusinesses in Mississippi. In May of this year the Mississippi MarketMaker site had over 93 thousand hits, 4th most across the 19 states involved in MarketMaker nationally. In 2007, Mississippi had 26 registered Farmers Markets; today that number has increased by 35 markets to a total of 63. Agritourism firms have grown from 4 to 55. A conservative estimate of growth for specialty agriculture, over the last three years, due to the existence of MarketMaker is approximately \$1.9 million.*



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## Community Development Programs/ Impacts

1. *Turning the Tide on Poverty - Residents of two Mississippi counties, chosen to participate in special program offered for their high rates of poverty and the significant problems associated with populations living in poverty, took on the challenge of changing their communities from the inside out. Led by Extension agents and county directors, volunteers learned to facilitate study circles and form action teams to address the most pressing needs in their communities, embracing diversity and using the assets available. At least 60 citizens and Extension agents in Neshoba County and 36 in Lauderdale County devoted hundreds of hours in the pilot project which is already yielding results as action teams work on projects and enlist others in their communities to join in, reaching a total of 2,095 community members, including: 232 American Indian Males, 237 American Indian Females, 237 White Males, 323 White Females, 432 Black Males, 643 Black Females, 1,815 limited resource adults, and 177 non-limited resource community members--quite a diverse cross-section of citizens all working toward common goals.*
2. *Extension Broadband Education and Adoption Team (e-BEAT) - This initiative is expanding online payment systems for small municipalities in the state, expanding the adoption of e-commerce strategies by small businesses, accelerating the development and delivery of digital literacy and other broadband education topics to citizens and organizations across the state, and guiding the development of citizen-based committees that are engaged in expanding broadband access to underserved people and places in Mississippi.*
3. *Center for Government Training - Newly elected county supervisors from across Mississippi participated in an orientation program designed to address basic laws and ethical issues which supervisors face daily. This orientation program helped expose 119 of the state's 120 newly elected supervisors to both the legal and fiscal responsibilities of their office. In addition to preparing them for the challenges of the office, the program allowed them to interact with officials from various state agencies and officials from other counties. These interactions immersed the newly elected-officials in the current best practices and emerging theories of local government service delivery within the state.*
4. *Municipal Clerk Certification Program – Since 1973, the Certification Training Program for Municipal Clerks, Deputy Municipal Clerks, and Tax Collectors has offered these municipal officials an opportunity to achieve both state and national certification. The program is sponsored by the Center for Governmental Training & Technology in the Mississippi State University Extension Service and is accredited by the International Institute of Municipal Clerks. To date some 1,000 municipal clerks, deputy clerks and tax collectors have received their Certified Municipal Clerk designation. The three year program consists of 30 individual, exam-based, courses in the areas of public administration; social and interpersonal skills; and current strategic issues in municipal government. The strength of the program rests in its ability to link municipal clerks, deputy clerks and tax collectors with changes in laws, approaches to improved efficiency, and the sharing of common problems and solutions, while providing these officials the opportunities to achieve greater professionalism and strengthen services to the citizens of their community.*
5. *Extension Center for Technology Outreach - With the recently established Extension Center for Technology Outreach and the new Technology Resources and Learning program area, the Extension Service is now able to provide educational opportunities and assistance to Mississippians in technology education and use. The mission of the Center for Technology Outreach coincides with the overall Extension mission by providing research-based information, educational programs and technology transfer in the areas of modern technology and its uses.*

*The major focus of the Center is to provide leadership in technology information, adoption, training, and support for clientele in the state of Mississippi. The Center serves to strengthen the cooperative partnerships with county governments, communities, businesses, and other traditional Extension partners such as agricultural commodity promotion boards.*

- 6. Stronger Economies Together (SET) - SET is spurring the development of multi-county coalitions that are producing long-term regional economic development plans that align with, and help build on, the economic development clusters that serve as the key drivers of a region. Two SET regions are now actively in place in MS.*

## *Family and Consumer Science Programs/ Impacts*

- 1. Serve Safe – Mississippi State University Extension Service(MSU-ES), in partnership with the Mississippi Restaurant and Hospitality Association, the National Restaurant Association, and the Mississippi State Department of Health, provides the primary food safety management certification course used in Mississippi. The ServSafe program is an 8 to 16 hour face-to-face training with a national certification offered by the National Restaurant Association Educational Foundation. This course educates foodservice managers, owners, and foodservice employees from a variety of foodservice settings, including commercial restaurants, hospitals, school foodservice, childcare centers, and other locations where food safety policies and procedures are required and necessary to protect public health.*
- 2. Real World/Financial Management - Assisted by a wide variety of community volunteers from local businesses and non-profit organizations, Extension Service has provided Welcome to the Real World, a budgeting simulation experience statewide to more than 12,000 middle school, high school, first-generation college students, as well as Boys and Girls Clubs in the past year, and more than 34,000 students in the past five years. Program participants assigned a scenario including occupation, marital status, ages of children, and salary visit 17 stations manned by volunteers to make spending choices about housing, automobiles, childcare, telephone and other regular expenses paid by contemporary families As each expense is deducted from their salary, students must re-evaluate choices and begin to understand the difficulties of making ends meet. According to students' evaluations, the activity encouraged them to: continue their education to increase their potential future earnings, to postpone having children, to start saving, and to focus on spending money carefully.*
- 3. Tummy Safe – The Centers for Disease Control and Prevention reported on June 10, 2011, that foodborne illness can be prevented through the application of three methods. These are production inspection, food manager training and consumer education. Food Managers in child care settings in Mississippi are required to obtain certification in food safety (MSDH, 2009). TummySafe© is a very successful child care provider's food managers certification and training program. Participants can complete the curriculum in one of two ways, a traditional classroom setting or in a technology advanced way such as by engaging in the curriculum via their computer. The participant can log in and log out to complete the curriculum and quizzes throughout the curriculum require information mastery before the participant is permitted to continue. The child care provider can print a statement of completion to earn 6 contact hours through the Mississippi Department of Health and they then take a proctored exam at their local county extension office for certification. This technologically advanced delivery method*

*eliminates Child Care Providers difficulty with travel, leaving the facility and scheduling inflexibilities. TummySafe© is a six-module curriculum on Food Safety designed specifically for the Child Care provider. Since the implementation of TummySafe©, approximately 3500 Child Care Providers have completed the curriculum. Of these, approximately 55% have chosen the CD delivered curriculum. The program enjoys a pass rate of 76%.*

#### *4-H and Other Youth Development Programs/ Impacts*

- 1. Mississippi 4-H ATV Youth and Adult Safety - The program's objectives are to: 1) develop increased awareness of ATV Safety; 2) develop youth and adult ATV Safety training programs in every county; 3) to establish a base group of agents and adult volunteers to receive the ATV Safety Institute (ASI) Instructor Rider Certification. The goals are to have trained youth and adult teams across the state capable of providing sound training on ATV safety and to work toward meaningful legislation pertaining to ATV safety in our state. The number one goal, of course, is to provide through education a safer rider and in the process substantially reduce injury and/or death that can occur with ATV use. The state now has 15 nationally certified trainers in this program and 225 youth and adults trained through a 4.5 hours ATV Rider Course.*
- 2. Science and Technology Team - The Adopt-A-Stream and 4-H2O programs are administered by the Mississippi 4-H program and focus on environmental education. Educational modules emphasize the importance of water quality, water conservation, and watershed issues. By teaching the public how the improper disposal of everyday items can pollute rivers, lakes and streams, we make a positive impact on the quality of Mississippi's groundwater. In an effective Train-the-trainer model senior 4-H'ers shared their knowledge of science, engineering, and technology with over 1600 elementary youth via hands on science experiments and water testing at field days, fairs, and festivals.*
- 3. YES – The Youth Environmental Science (Y.E.S.) program is an innovative process for enhancing science competencies and environmental appreciation by immersing elementary students in 5 full days of natural resources-based, experiential science instruction. Initiated during the 2011/2012 academic year by Extension Service employees in the Department of Wildlife, Fisheries and Aquaculture at Mississippi State University, the Y.E.S. program delivered over 1500 hours of state aligned science curriculum to nearly 1200 3rd-5th grade students from the Starkville School District. Approximately 75% of these students were from underrepresented groups and nearly 70% were eligible for the free/reduced-lunch program.*

#### *Other high impact/notable Extension programs*

- 1. Center for Resolving Human-Wildlife Conflicts. Conflicts and damage related to human-wildlife interactions cost Mississippi residents over \$10 million annually in crop, property, and health related losses. The Center for Resolving Human-Wildlife Conflicts (CRHWC), housed within the Department of Wildlife Fisheries and Aquaculture is designed to expand research, educational, and outreach opportunities that develop and promote solutions to improve wildlife-human coexistence, reduce monetary damages, and increase quality of life for the nearly 3 million residents of Mississippi. Integrated expertise from MSU Extension and research divisions will fulfill the CRHWC's multifaceted mission to address the ever-growing problem through: broad-spectrum educational programming, dissemination of human-wildlife conflict information to professionals and the laity through written and digital formats, graduate level research, and*

*professional development opportunities. In addition, the CRHWC will partner with various government entities, businesses, and other stakeholders throughout Mississippi to promote the importance of our mission to the state economy and human health/welfare.*

2. *The Mississippi Horse Park and AgriCenter - is a multi-million dollar infrastructure which is a partnership of Mississippi State University, The City of Starkville , and Oktibbeha County. As a division of MSU- ES, the MS Horse Park has impacted our community through outreach and service and become a leader in the region. To date the Horse Park has hosted 554 events with an economic impact of \$24,274,400 since 2002. This measurable success means that the local economy receives back into the community \$12.20 for every dollar invested. This kind of investment is extraordinary in today 's marketplace. The Horse Park stimulates our area by creating jobs; increasing demand for goods and services; attracting new tourism and potential college students, plus contributing to the 2% sales tax.*

*Additional comments or items of note regarding extension:*

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

1. *Plant and Nematode Diagnostic Lab –During CY 2011 the Nematode Diagnostic Lab processed 3500 samples for 3100 clients, generating \$22,000 in sample fees and \$41,500 in MOAs.*
2. *Soil Testing Lab – During FY2012 the MSU Soil Testing lab analyzed \$27,161 soil samples for 6566 clients, generating 39,595 soil reports and \$165,952 in revenue.*
3. *Ag Communications Print Shop – During FY 2012 the Print Shop printed 8,272,623 copies+ 116,172 4-color copies generating \$332,871 in fees.*

## **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.*

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## Station 1

<i>Station name</i>	<i>North MS Research &amp; Extension Center</i>
<i>Location (zip code)</i>	<i>Verona, MS 38879</i>
<i>Size (acres), including owned and long-term leased land</i>	<i>3400 sq. ft. Meeting room, 9700 sq. ft. offices</i>
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	<i>Beef Cattle, Sweet Potatoes, Forages, Forestry, Row Crops, Ornamental &amp; Vegetable Horticulture</i>
<i>Notable or unique characteristics or assets</i>	<i>Multiple Meeting Rooms, Video Conferencing Capability in two rooms Pizza Farm (Farm exhibit illustrating production origins of all pizza ingredients. Miniature farm, shaped like a pizza with each slice representing an ingredient. 900 elementary students/yr )</i>
<i>Number of personnel (FTEs)</i>	<i>4.04</i>

## Station 2

<i>Station name</i>	<i>Northeast Branch Experiment Station</i>
<i>Location (zip code)</i>	<i>Verona, MS 38879</i>
<i>Size (acres), including owned and long-term leased land</i>	<i>423 acres 1000 sq. ft. lab space</i>
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	<i>Corn, Cotton, Soybeans, Ornamental &amp; Vegetable Horticulture Research, foundation rice production.</i>
<i>Notable or unique characteristics or assets</i>	<i>Irrigation Capability, Wet Chemistry Lab, Great Equipment Storage &amp; Shops</i>
<i>Number of personnel (FTEs)</i>	<i>6.22</i>

## Station 3

<i>Station name</i>	<i>North MS Branch Experiment Station</i>
<i>Location (zip code)</i>	<i>Holly Springs, MS 38635</i>
<i>Size (acres), including owned and long-term leased land</i>	<i>508 acres 600 sq. ft. meeting room space 2600 sq. ft. office space 550 sq. ft. laboratory</i>
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	<i>Forestry, Soil Sedimentation Studies, forages, agro-forestry research.</i>
<i>Notable or unique characteristics or assets</i>	<i>Collaboration with ARS Sedimentation Lab in Oxford, MS including colocation of ARS satellite office on Holly Springs ES.</i>
<i>Number of personnel (FTEs)</i>	<i>3.01</i>

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## Station 4

Station name	<i>Pontotoc Ridge-Flatwoods Branch</i>
Location (zip code)	<i>Pontotoc, MS 38863</i>
Size (acres), including owned and long-term leased land	<i>640 acres 340 sq. ft. meeting room space 1500 sq. ft. lab space 2000 sq. ft. office space</i>
Key focus area(s) (e.g. poultry, crop demonstration, etc.)	<i>Corn, Soybeans, Sweet Potatoes, Cotton Research</i>
Notable or unique characteristics or assets	<i>Foundation Sweet Potato Program, Wet Chemistry Lab Greenhouses</i>
Number of personnel (FTEs)	<i>14.22</i>

## Station 5

Station name	<i>Prairie Research Unit</i>
Location (zip code)	<i>39756</i>
Size (acres), including owned and long-term leased land	<i>2456 acres (350 head Adult Beef Cattle -crossbred) 1900 sq. ft. meeting room space 1440 laboratory space 6600 sq ft. office space</i>
Key focus area(s) (e.g. poultry, crop demonstration, etc.)	<i>Forage Research, Beef cattle emphasis, Native warm-season grass grazing trials, Environmental services (pollination, wildlife habitat, carbon sequestration).</i>
Notable or unique characteristics or assets	<i>Extension demonstration beef herd – Extension, Growsafe System for measuring individual feed intake</i>
Number of personnel (FTEs)	<i>7.67</i>

## Station 6

Station name	<i>Black Belt Branch Experiment Station</i>
Location (zip code)	<i>39739</i>
Size (acres), including owned and long-term leased land	<i>655 acres</i>
Key focus area(s) (e.g. poultry, crop demonstration, etc.)	<i>Corn, Soybeans, Turf and Cotton Research</i>
Notable or unique characteristics or assets	<i>Only 30 miles from Campus. Allows scientist on campus to conduct trials relatively close to campus when space is limited on campus farms. Shops, equipment and pesticide storage. Unique prairie soils. Long-term (10 year) remote sending multi and hyper-spectral imagery data set.</i>
Number of personnel (FTEs)	<i>1.75</i>

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## Station 7

<i>Station name</i>	<i>Central MS Research &amp; Extension Center</i>
<i>Location (zip code)</i>	<i>39154</i>
<i>Size (acres), including owned and long-term leased land</i>	<i>4209 sq. ft. meeting space, 530 sq. ft. lab space and 4908 sq. ft of Office Space</i>
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	<i>Extension &amp; Research Offices, Meeting rooms and Video Conference capabilities in multiple rooms</i>
<i>Notable or unique characteristics or assets</i>	<i>Provide office space for Alcorn State University (1890) Extension program</i>
<i>Number of personnel (FTEs)</i>	<i>2.13</i>

## Station 8

<i>Station name</i>	<i>Brown Loam Branch Experiment Station</i>
<i>Location (zip code)</i>	<i>39154</i>
<i>Size (acres), including owned and long-term leased land</i>	<i>1700 acres. (350 Head Adult Beef Cattle- crossbred herd), 840 sq ft meeting space, 610 sq ft of office space.</i>
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	<i>Beef Cattle, Forages, Corn, Peanuts, Bioenergy Crops</i>
<i>Notable or unique characteristics or assets</i>	<i>Growsafe – system for measuring individual feed intake</i>
<i>Number of personnel (FTEs)</i>	<i>10.08</i>

## Station 9

<i>Station name</i>	<i>Coastal Plain Branch Experiment Station</i>
<i>Location (zip code)</i>	<i>Newton, MS 39345</i>
<i>Size (acres), including owned and long-term leased land</i>	<i>1172 acres 1400 sq. ft. Office Space 2556 sq. ft. Meeting Space</i>
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	<i>Wildlife &amp; Fisheries, Forage Trials, Forestry, Natural Resource Conservation, Peanut Variety Trials</i>
<i>Notable or unique characteristics or assets</i>	<i>Video Conferencing Capability</i>
<i>Number of personnel (FTEs)</i>	<i>1.26</i>

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## Station 10

Station name	Truck Crops Branch Experiment Station
Location (zip code)	Crystal Springs, MS 39059
Size (acres), including owned and long-term leased land	176 acres 730 sq ft meeting space 2000 sq ft lab space 1138 sq ft office space 5 greenhouses (~13,500 sq. ft. greenhouse)
Key focus area(s) (e.g. poultry, crop demonstration, etc.)	Pecans, Grapes, Blueberries, Vegetable & Ornamental Research and Demonstration
Notable or unique characteristics or assets	Annual Field Day – over 7000 attendees 6 – Hi-Tunnel Facilities, Greenhouses, Video Conferencing, Tomato greenhouse shortcourse
Number of personnel (FTEs)	11.66

## Station 11

Station name	Delta Research & Extension Center
Location (zip code)	Stoneville, MS 38776
Size (acres), including owned and long-term leased land	4850 acres Center Complex -11,000 sq. ft meeting rooms, 28,000 sq. ft. lab space, 19000 sq. ft. office space
Key focus area(s) (e.g. poultry, crop demonstration, etc.)	Cotton, Corn, Rice, Soybeans, Catfish Research
Notable or unique characteristics or assets	See section 3, subsection 5.
Number of personnel (FTEs)	114.98

## Station 12

Station name	Coastal Research & Extension Center
Location (zip code)	Biloxi, MS 39532
Size (acres), including owned and long-term leased land	32 ac 13,862 sq. ft. office space, 3,173 sq. ft lab space and 6,024 sq. ft. of meeting space
Key focus area(s) (e.g. poultry, crop demonstration, etc.)	Ornamental Horticulture, Formosan Termites, Extension and Research Activities, Coastal Sustainable development research, Estuarine ecology and restoration,
Notable or unique characteristics or assets	Coastal restoration and sustainability
Number of personnel (FTEs)	10.14



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## Station 13

<i>Station name</i>	<i>South MS Branch Experiment Station</i>
<i>Location (zip code)</i>	<i>Poplarville, 39470</i>
<i>Size (acres), including owned and long-term leased land</i>	<i>97 acres</i>
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	<i>Horticulture – Ornamental, Fruit, and &amp; Vegetable Research</i>
<i>Notable or unique characteristics or assets</i>	<i>MSU scientists are collocated with USDA-ARS scientists sharing labs, meeting spaces, and greenhouses. Ornamental horticultural variety development.</i>
<i>Number of personnel (FTEs)</i>	<i>10.59</i>

## Station 14

<i>Station name</i>	<i>White Sand Research Unit</i>
<i>Location (zip code)</i>	<i>Poplarville, MS 39470</i>
<i>Size (acres), including owned and long-term leased land</i>	<i>440 acres (150 Head mixed breed – Adult Beef Cattle)</i>
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	<i>Beef Cattle, Forages, Peanut Research</i>
<i>Notable or unique characteristics or assets</i>	<i>Small feed mill for mixing research rations</i>
<i>Number of personnel (FTEs)</i>	<i>4.0</i>

## Station 15

<i>Station name</i>	<i>Beaumont Unit</i>
<i>Location (zip code)</i>	<i>Beaumont, MS 39056</i>
<i>Size (acres), including owned and long-term leased land</i>	<i>20 acres</i>
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	<i>Ornamental &amp; Vegetable Research including grapes and blueberries</i>
<i>Notable or unique characteristics or assets</i>	<i>2 Hi-Tunnels and 1 Greenhouse</i>
<i>Number of personnel (FTEs)</i>	<i>1.11</i>

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## Station 16

<i>Station name</i>	<i>Experimental Seafood Processing Lab</i>
<i>Location (zip code)</i>	<i>39567</i>
<i>Size (acres), including owned and long-term leased land</i>	<i>2 acres 1140 sq. ft. meeting rooms, 3900 sq. ft. lab space, 770 sq. ft. office space</i>
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	<i>Extension Food Safety Program Seafood Processing and Seafood Safety Research</i>
<i>Notable or unique characteristics or assets</i>	<i>Radsourc irradiation machine</i>
<i>Number of personnel (FTEs)</i>	<i>1.33</i>

## Station 17

<i>Station name</i>	<i>Research Support – North Farm</i>
<i>Location (zip code)</i>	<i>39762 (campus)</i>
<i>Size (acres), including owned and long-term leased land</i>	<i>712 acres</i>
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	<i>Corn, Cotton, Soybeans, Peanuts, Turf – Research &amp; Extension Demonstration</i>
<i>Notable or unique characteristics or assets</i>	<i>Location of Rose Garden for Extension and Research SPAR units (see page 7) – Field lab- 21,800 sq. ft, modern pesticide storage and mixing facilities – 11,000 sq. ft., large shops &amp; equipment storage-20,963 sq. ft., greenhouses – 25-749 sq. ft. and dry storage – 30,160 sq. ft. Collaboration with ARS</i>
<i>Number of personnel (FTEs)</i>	<i>12.97</i>

## Station 18

<i>Station name</i>	<i>Research Support – South Farm</i>
<i>Location (zip code)</i>	<i>39762</i>
<i>Size (acres), including owned and long-term leased land</i>	<i>1524 acres 350 Adult Beef Cattle – Purebred, Angus, Hereford and Charolais</i>
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	<i>Poultry, Beef Cattle, Aquaculture, Forages, Energy Feedstock Research</i>
<i>Notable or unique characteristics or assets</i>	<i>Commercial size poultry houses, poultry processing facility, collaboration with USDA-APHIS in aquaculture, 100 small research ponds with remote monitoring</i>
<i>Number of personnel (FTEs)</i>	<i>7.02</i>

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## Station 19

<i>Station name</i>	<i>Joe Bearden Dairy Research Center</i>
<i>Location (zip code)</i>	<i>39762</i>
<i>Size (acres), including owned and long-term leased land</i>	<i>1080 acres</i>
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	<i>Dairy Research - Waste Management, Physiology, Nutrition, Heat Stress Management</i>
<i>Notable or unique characteristics or assets</i>	<i>Calan gates for individual feeding. Double 8 Rapid Exit Parallel Parlor, Double 4 Herringbone Research Parlor</i>
<i>Number of personnel (FTEs)</i>	<i>4.21</i>

## Station 20

<i>Station name</i>	<i>McNeil Research Unit</i>
<i>Location (zip code)</i>	
<i>Size (acres), including owned and long-term leased land</i>	<i>440 acres</i>
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	<i>Horticulture – Ornamentals, Formosan Termite Research</i>
<i>Notable or unique characteristics or assets</i>	<i>Collaboration with ARS, Horticulture Research and Collaboration with Forest &amp; Wildlife Research Center</i>
<i>Number of personnel (FTEs)</i>	<i>0.25</i>

## Station 21

<i>Station name</i>	<i>Crosby Arboretum</i>
<i>Location (zip code)</i>	<i>39466</i>
<i>Size (acres), including owned and long-term leased land</i>	<i>104 acres, Interpretive Center 700 Acres Natural Area</i>
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	<i>Environmental Education, preserving, protecting, and demonstrating native plants. Educational programs &amp; community educational events on native species and coastal ecosystems.</i>
<i>Notable or unique characteristics or assets</i>	<i>Pinecote Paviliaon – recognized by American Institute of Architects.</i>
<i>Number of personnel (FTEs)</i>	<i>5.5</i>

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## Station 22

Station name	Mississippi Horse Park
Location (zip code)	39762
Size (acres), including owned and long-term leased land	100 acres
Key focus area(s) (e.g. poultry, crop demonstration, etc.)	Equine Activities including: rodeo, horse shows, harness racing, western equitation, therapeutic riding. Venue for dog shows, livestock shows, ATV training, concerts, etc.
Notable or unique characteristics or assets	69,000 sq. ft. Indoor arena that will seat 3000. 60 x 90 ft covered outdoor arena 150 RV sites with water and electrical hookups 350 Horse stalls
Number of personnel (FTEs)	4 FTEs

## 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.

*Poultry Industry –The poultry industry produces the largest farm gate value of any crop in Mississippi, with 1478 farms producing more than 765 million broilers and 1,442 million eggs valued at more than \$2.4 billion, annually. Scientists in the Department of Poultry Science maintain a diverse research program that addresses key needs of this important industry. Two issues of economic importance to the poultry industry in Mississippi are Mycoplasma gallisepticum (MG) infection in laying hens and embryo development and hatchability of broilers. MSU research is underway to determine effects of pre-lay use of MG vaccines on laying hens. Other MSU research involves injection of vaccines and nutrients directly into eggs to improve broiler embryo health and hatchability. Using modern proteomics techniques, MSU scientists have found that methionine supplementation increases the volume of breast muscle. However, some other trials suggested that the higher meat yields observed when feeding high amino acid level diets were not necessarily the most economical. Post-harvest research on control of Salmonella and Campylobacter in chicken meat is of great relevance to the poultry industry and will help poultry processors meet performance standards. The control of Listeria monocytogenes in ready-to-eat poultry and meat products is another research focus. Work by MSU scientists will improve public health through production of safer poultry products. Pre-harvest research is underway to characterize Salmonella and Campylobacter in the litter beds of broiler houses to better target and understand disinfection procedures. Litter windrowing techniques, litter amendments and application rates, and alternative bedding materials, are being investigated. Effects of probiotics, primarily Lactobacillus and*

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*Bifidobacterium used in broiler production, may have negative consequences for reproductive performance of breeders. MSU research is currently in progress to assess this and determine whether these probiotic bacteria can be used successfully in breeder management.*

*2. Catfish Industry - More than 60 % of the domestic production of catfish is grown in Mississippi. The Thad Cochran National Warmwater Aquaculture Center (NWAC) is among the world's largest aquaculture research facilities, host the Southern Regional Aquaculture Center (SRAC) and supports this important industry through research and extension. The Mission of the NWAC is to provide solutions to the most pressing problems of the aquaculture industry through basic and applied research, extension, and diagnostic services. Since its inception in 1987, it has become the most important regional aquaculture activity in the southeastern United States. Research and extension problem areas for the southern region are identified each year by the Industry Advisory Council (IAC), which is composed of representatives of state and regional aquaculture associations, federal, territorial and state agencies, aquaculture producers, aquaculture marketing and processing firms, financial institutions, and other interests or organizations. The IAC provides an open forum wherein maximum input from private and public sectors can be gained and incorporated into annual and ongoing plans for the Center*

*3. Commodity Boards – Mississippi State has close ties with Mississippi commodity promotion boards and receives more than \$2.8 million/year in sponsored research funding to conduct applied research that meets the needs of these important industry partners. In 2012, MSU received funding from the United Soybean Board, the Mississippi Soybean Promotion Board, the Mississippi Corn Promotion Board, Cotton Incorporated, Mississippi Rice Promotion Board, Peanut Promotion Board and the Mississippi Beef Producers.*

*4. Master Research Agreements – Mississippi State has master research agreements with Monsanto, Dow, Pioneer, and Bayer Crop Science under which directed research projects are conducted using research work orders.*

*5. KiOR – KiOR is a next-generation renewable fuels company that has developed a proprietary Biomass Fluid Catalytic Cracking (BFCC) process to convert biomass into renewable crude oil. KiOR's renewable crude oil is processed using standard refinery equipment into gasoline, diesel and fuel oil blendstocks that are compatible with the existing fuel infrastructure. In 2011, KiOR began construction on its first commercial-scale plant in Columbus, MS, and has plans to open 4 larger plants in Mississippi and throughout the SE over the next several years, operating at a scale that will compete with other biofuels producers and traditional petroleum production. KiOR's technology platform is feedstock flexible and able to convert a wide variety of biomass into renewable fuels. KiOR's feedstock strategy emphasizes the use of sustainable, non-food biomass for conversion into its renewable gasoline and diesel blendstocks. Sustainability is dependent on using feedstocks that are abundantly available, do not compete with food production or agricultural land use, harvestable, and consistently available over the long term. In the Southeast U.S., Southern yellow pine will be an important biomass product and will be used as the primary feedstock in the Columbus, MS, plant. In siting the Columbus plant, KiOR depended heavily on information from the Mississippi Institute for Forest Inventory and their partners in the Forest and Wildlife Research Center, Mississippi State. Current, spatially-explicit forest inventories from the Mississippi Institute for Forest Inventory provided the basis for understanding regional biomass supply and long-term sustainability.*

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

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1. *Plant breeding programs*
2. *Turfgrass*
3. *Bioenergy crops and conversion technologies*
4. *Genomics and proteomics*
5. *Peanuts*
6. *Horticultural Crops (fruits, vegetables, and ornamentals)*

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?

1. *Grain/Nut Crops (Soybean increase, Peanuts increase)*
2. *Meat Animal (Beef Increase, Poultry)*
3. *Biofeedstocks, Bioconversion, and allied industry-*
4. *Woody Biofeedstocks*
5. *Recreational land ownership*
6. *Crop consulting, precision ag, ag data management-*

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 safety, biosecurity, rural economic development, etc.

1. *Mississippi/Alabama SEAGRANT Consortium - The National Sea Grant College Program, administered by the National Oceanic and Atmospheric Administration (NOAA), is a federal/state partnership that matches NOAA Sea Grant expertise and resources with state academic institutions. The Mississippi-Alabama Sea Grant Consortium (MASGC), created in 1972, is one of 32 Sea Grant programs. Consortium members include Auburn University, Dauphin Island Sea Lab, Jackson State University, Mississippi State University, The University of Alabama, The University of Alabama at Birmingham, The University of Mississippi, The University of Southern Mississippi and the University of South Alabama. The mission of MASGC is to enhance the sustainable use and conservation of ocean and coastal resources to benefit the economy and environment in Alabama and Mississippi. To fulfill this mission, MASGC commits to interdisciplinary environmental scholarship and community-based natural-resource management. The tools available in support of the MASGC mission are applied interdisciplinary research, communications, education, extension and legal services using both targeted and cross-cutting approaches. These tools are utilized at local, state, regional, national and international arenas. The bi-state resources include nearly 3,200 square miles of inland water and 966 miles of estuarine shoreline, and support more than 7 million residents. MASGC operates through its 2009-2013 Strategic Plan with guidance from a Board of Directors and Advisory Council.*

2. *SRAC – Southern Regional Aquaculture Center - See above description in Section 3, Bullet 2.*

3. *Gulf Coast Cooperative Ecosystem Study Unit - The Gulf Coast Cooperative Ecosystem Studies Unit (GC-CESU) facilitates collaborative research, education and technical assistance pertaining to the human and natural environment, within and beyond the region, among federal and state agencies, universities and non-governmental organizations. Federal Partners include: Bureau of Land Management, Department of Defense, National Aeronautics & Space Administration, National Park Service, Natural Resources Conservation Service, US Forest Service, US Geological Survey-Biological Resources Division Department of Army, Corps of Engineers. Academic Institutions include: Auburn University, Houston Advanced Research Center, Louisiana State University, Mississippi State University, Stephen F. Austin State University, Southern University and A&M College, Sul Ross University, Tarleton State University The Nature Conservancy, The University of Texas at Austin, The University of West Florida, Troy University, Texas A&M University-Corpus Christi, Texas A&M University-Kingsville, University of Arkansas-Division of Agriculture, University of Arkansas at Monticello, University of Central Florida University of Florida, University of Georgia, University of Louisiana at Lafayette.*

4. *Regional AFRI CAP projects – Scientists from MSU are participating in 2 regional NIFA-AFRI CAP projects under the Sustainable Biofuels initiative. Expertise in development of advanced feedstocks and pyrolytic conversion technologies are central components of these projects supported by MSU.*

5. *Market Maker- Mississippi MarketMaker went live in November of 2007. Since its inception the web site has continued to increase the awareness of potential markets for producers and agribusinesses in Mississippi. In May of this year the Mississippi MarketMaker site had over 93 thousand hits, 4th most across the 19 states involved in MarketMaker nationally. In 2007, Mississippi had 26 registered Farmers Markets; today that number has increased by 35 markets to a total of 63. Agritourism firms have grown*

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*from 4 to 55. A conservative estimate of growth for specialty agriculture, over the last three years, due to the existence of MarketMaker is approximately \$1.9 million.*

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

- 1. USDA-ARS Southern Region – 18 Specific Cooperative Agreements with ARS to address regional research issues in agriculture*
- 2. Northern Gulf Institute (NGI) - The Northern Gulf Institute (NGI) is a partnership of Mississippi State University, the University of Southern Mississippi, Florida State University, Louisiana State University, the Alabama Dauphin Island Sea Laboratory, and the National Oceanic and Atmospheric Administration. The NGI 2011-2021 Strategic Plan describes our unique identity and capabilities, the purpose of the work we do, our long-term goals and our near-term implementation activities. The Northern Gulf Institute engages nationally and internationally recognized academic experts who provide intellectual and technological capacity to address comprehensive regional ecosystem approaches to science and management in the northern Gulf of Mexico*
- 3. HHS/EFNEP FNP - Expanded Food and Nutrition Education Program. Mississippi State University's Expanded Food and Nutrition Education Program teach limited resource families how to eat nutritious meals at minimal costs. EFNEP works with adult participants teaching them how to compare prices, prepare nutritious meals, and stretch food dollars as to not run out of food before the end of the month. In 2011, the number of adult participants that graduated from EFNEP was 699. Through parent and caregiver participation, 1,860 additional family members were affected by the nutritional content of EFNEP. Additionally, 48,007 youth participated in EFNEP programming in 2011. The curriculum taught in these programs is based on the United States Department of Agriculture (USDA) Food Guidance System known as MyPlate, as well as the 2010 USDA Dietary Guidelines.*
- 4. Energy Institute/Sustainable Energy Research Center - The Energy Institute (EI) at Mississippi State University (MSU) was created in 2008 to provide a mechanism to coordinate energy research at MSU, to encourage scientists and engineers to work together on energy projects, and to provide an atmosphere to exchange ideas and develop creative solutions for the complex energy challenges facing the world today. The EI at Mississippi State University is comprised of five research organizations: The Institute of Clean Energy Technology (ICET), the Micro-Cooling Heating and Power (CHP) group, Save Energy Now (Southeastern Center for Industrial Energy Intensity Reduction), the Southeast Clean Energy Application Center (CEAC), and the Sustainable Energy Research Center (SERC). The EI works to develop new technologies to promote energy efficiency through combined heating and power concepts and energy audits, as well as developing technology to generate renewable transportation and heating fuel from biomass. Additionally, the EI and its industry partners are working together to find new methods to dispose of nuclear waste and sequester carbon from electrical generation. The Sustainable Energy Research Center (SERC) was established in January 2006 at Mississippi State University (MSU) through funding from the U.S. Department of Energy (DOE). SERC was formed to create an infrastructure for coordinated interdisciplinary, collaborative research in the development of environmentally and economically sustainable energy sources based upon Southern biomass resources. SERC is comprised of approximately 50 faculty in over 10 disciplines, and employs*



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*over 50 graduate students. SERC is also a catalyst for forging partnerships between academia, business, and the U.S. government. The primary research thrusts within SERC are: conversion of pyrolysis oil into fuel oil and hydrocarbons; conversion of synthesis gas into hydrocarbons and chemical compounds; microbial development of triglycerides and conversion to hydrocarbons; optimization of combustion of biofuels; energy feedstock yield trials and feedstock engineering; economic analysis of biofuel production;*

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.

- 1. Department of Health*
- 2. Department of Human Services*
- 3. Mississippi Department of Environmental Quality*
- 4. Department of Marine Resources*

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

- 1. Temperate, warm-season agronomic cropping system with long growing season and abundant rainfall.*
- 2. Abundant water resources,*
- 3. Coastal/Marine Resources*
- 4. Abundant forest resources*
- 5. Substantive potential for abundant and diverse biofeedstock production.*

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

## Section 8: Education and Human Capital Development

### Student Population –

<i>Number of students graduated in most recent year with Bachelor’s degrees in related field of study</i>	<i>College of Agriculture and Life Sciences (CALC)– 298; College of Forest Resources (CFR) - 34</i>
<i>Number of students graduated in most recent year with Master’s degrees in related field of study</i>	<i>CALS – 16; CFR – 19</i>
<i>Number of students graduated in most recent year with Doctorate degrees in related field of study</i>	<i>CALS – 39; CFR - 9</i>
<i>Number of students graduated in most recent year with Associates or other less than baccalaureate qualifications in related field of study</i>	

### 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.)

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### *Continuing education programs or training for producers or industry*

1. *Logger Education - There were an estimated 1,073,113 logging truck loads in Mississippi during 2006 (most current data available). In terms of dollar value, each log truck load generates an average \$16,194 in output, \$6,641 in value-added, and \$4,070 in wages and salaries for Mississippi’s economy. Each 100 logging truck loads generate 11.5 jobs for Mississippi. Clearly, logging is important to the Mississippi economy. Instructors from forest industries and MSU’s Extension Service and Forest and Wildlife Research Center teach courses developed by the Mississippi Logger Education Council. In addition to loggers, the council includes MSU personnel, along with representatives of Mississippi Forestry Association. The curriculum includes classes in the Sustainable Forestry Initiative, Best Management Practices and water quality, business management, and logging and transportation safety. When participants complete all four of the classes they are designated a qualified logger. The designation is important to loggers supplying wood to companies that are certified under the Sustainable Forestry Initiative guidelines. 2,100 individuals are currently qualified in the Mississippi Professional Logging Manager Program. These individuals work for 1,100 companies in the state.*
2. *GIS Training Program - Over the past 6 years the Geospatial Education and Outreach (GEO) Project has offered more than 250 workshops on geographic information systems (GIS) to over 2,500 participants. The primary target audience is municipality and county government agencies, including tax assessor offices and law enforcement. State and federal agencies, including Forestry Commission, MDOT, and Homeland Security, Navy, NOAA, and NASA also have benefitted. These 2 and 3 day courses cover introductory concepts of GIS through advanced database and server systems. Through experience and multiple examinations the GEO Project team is authorized and certified by ESRI, the largest developer of GIS software, to offer*

workshops with retail registration fees of \$1,010 for a 2-day workshop and \$1,515 for a 3 day workshop at no cost to Mississippi state and local government employees. The workshops are delivered at, or near, participant's place of employment, eliminating travel expenses to take part in the workshops. Doing away with registration fees and travel expenses for the workshop participants the GEO Project has saved the state of Mississippi over \$6.2M. The efforts of the GEO Project were recognized in 2008 with the South Central Arc User Group Founder's Award "for being instrumental in changing the future of GIS in the south central United States" and with the MSU State Pride Award in 2010 and 2011.

3. *The Greenhouse Tomato Short Course, a training for prospective and current producers of hydroponically grown greenhouse tomatoes and other vegetables, has been coordinated by MSU-ES 1988. Typically the Short Course, which has evolved into a national conference over the years, attracts growers and exhibitors from 25 to 28 states and 2 to 4 other countries. The impact of this program over its first few years was to increase the number of producers in Mississippi from 15 to 120. Currently, as the largest and longest running training in the U.S., the Short Course serves growers, County Agents, Specialists, and Industry Research Scientists from across the country. Working together with a team of Specialists from MSU-ES to provide producers with the technical support needed, the greenhouse tomato industry has about \$5 million in annual sales. Over the past 23 years, the Greenhouse Tomato Short Course has trained over 2,600 participants.*
4. *The Center for Continuing Education (CCE) is dedicated to supporting the mission of Mississippi State University by extending non-formal educational opportunities to individuals and organizations throughout the State and region. We offer professional development and workforce training opportunities for those seeking occupational advancement and certifications, personal enrichment classes for those looking to learn new lifelong skills, and register continuing education units (CEU's) for those who participate in non-credit course work. All of our programs and classes are offered in conjunction with MSU faculty and State agencies and are designed to enhance the wellbeing and professional knowledge of individuals. In addition to the many programs and courses offered through CCE, we also provide event management services to those looking to offer educational continuing education activities such as workshops, seminars, and conferences. Programs and certifications currently offered through the CCE include:*

## **Professional Development and Workforce Training**

### **Safety & Environmental Certifications**

#### **Asbestos**

*Abatement Worker Initial*

*Abatement Worker Refresher*

*Abatement Supervisor/Contractor Initial*

*Abatement Supervisor/Contractor Refresher*

*Inspection and Assessment Initial*

*Inspection and Assessment Refresher*

*Management Planner Initial*

*Management Planner Refresher*

*Project Designer Refresher*

*O&M: OSHA Class III (16 hour) Initial*

*O&M: OSHA Class III (8 hour) Refresher*

*AHERA/LEA*

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## **Lead**

*Renovator, Repair and Painting (RRP) Initial*  
*Renovator, Repair and Painting (RRP) Refresher*  
*Dust Sampling Technician Training*  
*Abatement Supervisor Initial*  
*Abatement Supervisor Refresher*  
*Inspector Initial*  
*Inspector Refresher*  
*Risk Assessor Initial*  
*Risk Assessor Refresher*

## **OSHA**

*OSHA 10 Hour General Industry*  
*OSHA 30 Hour General Industry*  
*OSHA 10 Hour Construction*  
*OSHA 30 Hour Construction*

## **Forestry Certifications**

*Ethics for Foresters*  
*Board of Registered Foresters (BORF)*  
*Prescribed Burn Short Course*

## *Professional Certification Programs*

- The Certified Crop Adviser (CCA) certification was established as a program of the American Society of Agronomy (ASA) in 1992, with the first certifications awarded in 1993. The CCA program was established to provide a benchmark for practicing agronomy professionals in the United States and Canada. Typically, CCAs are field agronomists or salespeople working in public, private or commercial sectors; consultants and farm managers; natural resource conservation personnel; educators and extension specialists; government and academic scientists and agronomy researchers; and technical support personnel. The CCA program is voluntary, providing a base level of standards through testing and raising that standard through continuing education. Each CCA had to pass two exams (international and local) and submit credentials detailing their education, crop advising experience plus two references for evaluation/approval by a local CCA governing board. The exams cover four major competency areas: nutrient management, soil and water management, integrated pest management and crop management. Continuing education must also fall into one of these four areas to be valid for CCA Continuing Education Units (CEUs). They must also sign and adhere to a code of ethics. MSU Extension Service faculty have been very active in providing CEUs in all four areas through test preparation exercises, field days, workshops, short courses, and web-based curricula. The program estimates that greater than 70% of crop acreage in the US is directly or indirectly impacted by a CCA. It is estimated the percentage in Mississippi is higher. CCAs are recognized by the USDA-RMA as Agricultural Experts for crop insurance claims. The number of CCAs with at least a Bachelor of Science Degree is greater than 70%. To maintain the certification, the CCA must earn 40 hours of continuing education every two years. The program has averaged a 94% renewal rate. Average passing*

- percentage over all testing opportunities is 60%. There are currently 145 Certified Crop Advisors certified by the Mississippi Board. The CCA program currently operates in the US, Canada, and India. Additional programs are currently in development for Mexico and Argentina.
2. *PSEP - The Mississippi State University Extension Service through the Pesticide Safety Education Program offers and conducts courses of training to individuals to become certified or recertified. The program provides self-study manuals to those individuals who are seeking first time certification. The program also conducts certification workshops in each County Extension office for Private Applicators (producers). The Commercial Applicators need recertification every three years and applicators are given the opportunity to attend twenty scheduled workshops during the year to get recertified. The program also provided twenty-two other workshops during the year to other stakeholders to provide certification and recertification opportunities.*
  3. *Acidified Canned Foods Training and General Food Safety for MS Certified Farmer's Market Vendors: Six training classes have been conducted by program coordinators from the MSU-FSNHP Department. Seventy-nine participants have completed the training, successfully passed the exam (86% pass rate), received certificates for the Acidified Canned Foods training and will be permitted to sell acidified canned foods at MS Certified Farmer's Markets once their processing areas are approved by the MSDH.*
  4. *The ServSafe Certification is an 8 to 16 hour face-to-face training with a national certification offered by the National Restaurant Association Educational Foundation. Certification lasts for a five-year period. MSU-ES employees are certified instructors of the National Restaurant Association and are required to re-certify as instructors/proctors every five years as well. Between July 2011 and May 2012, eight MSU-ES instructors conducted 32 classes to 489 students with a 79% passage rate. Courses were conducted in 14 different counties with participants from 89 different Mississippi cities.*
  5. *Mississippi Child Care Resource & Referral Network. Throughout 2011, the MSCCR&R Network offered 863 trainings to 19,070 participants and over 2,237 hours of direct technical assistance. In 2012, MSCCR&R Network began offering a Professional Development program to further improve the quality of care by increasing provider education. By choosing either a 120-hour Child Development Associate program, a 135-hour Mississippi Director's Credential, an Advanced National Director's Credential through Aim4Excellence, or additional professional development courses, over 560 Mississippi childcare providers have made the commitment to higher professional quality and standards. To accommodate the training expansion, the MSCCR&R Network has expanded its training coordinator staff to 30, significantly increasing the number of educational opportunities for early care and education providers across the state. Additionally, seven MSU-ES Child and Family Development Area Agents work with the MSCCR&R Network to provide training.*
  6. *TummySafe© is a very successful child care provider's food managers certification and training program. Participants can complete the curriculum in one of two ways, a traditional classroom setting or in a technology advanced way such as by engaging in the curriculum via their computer. The participant can log in and log out to complete the curriculum and quizzes throughout the curriculum require information mastery before the participant is permitted to continue. The child care provider can print a statement of completion to earn 6 contact hours through the Mississippi Department of Health and they then take a proctored exam at their local county extension office for certification. This technologically advanced*

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delivery method eliminates Child Care Providers difficulty with travel, leaving the facility and scheduling inflexibilities. TummySafe® is a six-module curriculum on Food Safety designed specifically for the Child Care provider. Since the implementation of TummySafe®, approximately 3500 Child Care Providers have completed the curriculum.

7. Research and Training Center on Blindness and Low Vision (RRTC) Certifications - Successful Placement of the Older Consumer with Visual Impairment
8. We also offer hundreds of online Personal Enrichment classes and Professional Development certifications in partnership with Ed2Go and Gatlin Online Career Training. A complete list of these classes and certifications can be found at <http://www.ed2go.com/msstate/> and <http://www.gatlineducation.com/msstate/>

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

1. 4-H Volunteer Leadership Training -Volunteer training and development is critical in helping Mississippi State University Extension Service today's youth through 4-H. It is our goal to provide 4-H volunteers with the tools that they need in order to prepare our youth to be the best that they can. In 2011/2012, approximately 2250 4-H volunteer participated in local and district training, such as club management, project work, and leadership skills. There were 241 4-H volunteer that participated in the State Volunteer Conference. There were 571 volunteers participating in Distance Education Lunch Bunch and Supper Club Training. There were 56 4-H volunteer that participated in the Southern Region Volunteer Forum.
2. 4-H Leadership Team - The Mississippi State University Extension Service 4-H Leadership Team is comprised of 95 4-H members across the state. Members serve as ambassadors for the Mississippi 4-H Youth Development Program while representing 95,683 Mississippi 4-H Members. These outstanding youth leaders wear the distinctive green blazer proudly and are advocates of youth development in their respective communities as well as statewide. Team members are involved with promotional activities; provide programmatic input through committee and task force assignments. Members participate and assist in training workshops and meetings and assist with 4-H Day at the State Fair.

Entrepreneur training and other special training or education initiatives

1. Food as a Business: Entrepreneurs interested in owning and operating a food processing business in MS do not have one place to go to receive all of the information needed to legally start a food processing business. Participants receive the information and support they need to develop thriving businesses and successfully market their specialty food products at this one-day seminar. This year's program attracted 42 participants at 5 locations bringing the total to 615 since the initiation of Food as a Business. In 2008 the program was expanded to a teleconference format hosting 5 sites across the state giving more people the opportunity to attend without having to traveling long distances.
2. Natural Resources Economic Enterprises - Demand for outdoor recreation that involves hunting, fishing, wildlife watching, horse trail riding, farm tours or other nature-based tourism is popular throughout the world with U.S. citizens (87.5 million) spending over \$122 billion on wildlife-

*related recreation in 2006 (U.S. Department of the Interior 2007). Expenditures for outdoor recreation produced \$2.7 billion in economic impact to Mississippi in 2008 with this level of impacts occurring on an annual basis (Jones 2011). During 2005-2008, outdoor recreation increased Mississippi rural property values by 52% or \$673/acre and those tracts that were leased for recreational hunting collected over \$25/acre on average (Jones, unpublished data). Landowners and farmers are interested in capitalizing on this outdoor recreational market (hunting, angling, wildlife watching, agritainment) and the Natural Resource Enterprises Program at MSU is meeting this demand by currently hosting national educational workshops in 11 U.S. states (Alabama, Arkansas, California, Indiana, Louisiana, Michigan, Minnesota, Mississippi, New Hampshire, South Carolina, and Tennessee). These events are being conducted through requests of the American Farm Bureau Federation and Extension Services of sister land-grant universities. In terms of impacts, NRE has educated approximately 3,000 landowners who own nearly 2 million acres about enterprise development and conservation on working lands. Following events, nearly 650 farmers across the country have implemented NRE enterprises on their lands generating an estimated \$5.7 million in family incomes. Likewise, over 2,000 landowners have employed conservation practices on an estimated 1.3 million acres as a result of NRE outreach programming.*

#### *National defense, including National Guard, training or educational initiatives*

- 1. Military Training - In early May, Mississippi State University Extension Service agricultural specialists trained an elite group of military personnel preparing to assist the Afghan Ministry of Agriculture. After their deployment, these men and women will maintain their contact with MSU specialists as they assist Afghan agricultural agents with demonstration food plots and other agriculture-related responsibilities. A dozen members of the 31st Rear Operations Center's Agri-Business Development team based at Camp Shelby received the training. They are anticipating a 10-month deployment to Afghanistan. Members of the team have backgrounds in agricultural economics, veterinary medicine, cattle production, plant pathology, agronomy and related fields.*

#### *K-12 specific educational programs and initiatives*

- 1. Real World Budgeting Simulation for Students. Assisted by a wide variety of community volunteers from local businesses and non-profit organizations, Extension Service has provided Welcome to the Real World, a budgeting simulation experience statewide to more than 12,000 middle school, high school, first-generation college students, as well as Boys and Girls Clubs in the past year, and more than 34,000 students in the past five years. Program participants assigned a scenario including occupation, marital status, ages of children, and salary visit 17 stations manned by volunteers to make spending choices about housing, automobiles, childcare, telephone and other regular expenses paid by contemporary families. As each expense is deducted from their salary, students must re-evaluate choices and begin to understand the difficulties of making ends meet. According to students' evaluations, the activity encouraged them to: continue their education to increase their potential future earnings, to postpone having children, to start saving, and to focus on spending money carefully.*
- 2. Training K-12 Teachers of Personal Finance. In partnership with the National Endowment for Financial Education's High School Financial Planning Program, the Mississippi Council on Economic Education, and the Federal Reserve Banks of Atlanta and St. Louis, Extension provided*

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teacher training and free curricula and classroom resources worth more than \$54,000 for 181 teachers in the past year, preparing them to provide financial education to an estimated 3,620 students. Programs were certified through the Mississippi Department of Education to provide continuing education credits program for participants at no cost, and were offered at selected sites, statewide, by video-conference to make it convenient for teachers to attend.

3. *Expanded Food and Nutrition Education Program. Mississippi State University's Expanded Food and Nutrition Education Program teach limited resource families how to eat nutritious meals at minimal costs. EFNEP works with adult participants teaching them how to compare prices, prepare nutritious meals, and stretch food dollars as to not run out of food before the end of the month. In 2011, the number of adult participants that graduated from EFNEP was 699. Through parent and caregiver participation, 1,860 additional family members were affected by the nutritional content of EFNEP. Additionally, 48,007 youth participated in EFNEP programming in 2011. The curriculum taught in these programs is based on the United States Department of Agriculture (USDA) Food Guidance System known as MyPlate, as well as the 2010 USDA Dietary Guidelines.*

Additional comments or items of note regarding education and training:

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## 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. <i>State and Federal Appropriations and impact on budget</i>
2. <i>Recruiting and retaining top tier scientists and specialists while competing with industry that can offer much more lucrative compensation packages.</i>
3. <i>Maintaining up to date facilities, equipment, and personnel in an era of rapidly developing technologies, such as: molecular methods, marker assisted selection for breeding, biocomputing, precision ag technologies, etc.</i>
4. <i>Experiment station facilities (branch stations) development, maintenance, and enhancement.</i>
5. <i>Developing, protecting, and licensing technologies that produce royalties to support research programs.</i>

Top 5 key challenges for the Extension Service in your state

1. <i>State and Federal Appropriations and impact on budget</i>
2. <i>Recruiting and retaining top tier scientists and specialists</i>
3. <i>Maintaining relevance of extension in an internet age, adapting to rapidly changing means of technology transfer</i>
4. <i>Diversity of workforce</i>
5. <i>Transitioning to a 21<sup>st</sup> century Extension model</i>



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

Top 5 emerging opportunities and trends for the Experiment Station

<i>1. Water conservation and water quality</i>
<i>2. Bioenergy - feedstocks, harvest and transportation systems, conversion technologies, and sustainability.</i>
<i>3. Sustainable cropping systems in the context of declining water resources, climate change, herbicide resistant weeds, and information technology.</i>
<i>4. Emerging technologies (molecular methods, Biocomputing, biotechnology, etc)</i>
<i>5. Environmental sustainability/stewardship</i>

Top 5 emerging opportunities and trends for the Extension Service

<i>1. Economic and environmentally sustainable bioenergy education and technology transfer.</i>
<i>2. Water quality and quantity conservation.</i>
<i>3. Sustainable cropping systems education (biotech crops).</i>
<i>4. Health/obesity education</i>
<i>5. Rural community economic development and technology outreach</i>

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

<i>1. Declining state and federal appropriations</i>
<i>2. Health/obesity</i>
<i>3. Maintaining key personal and programmatic succession planning</i>
<i>4. Maintaining relevance of research/extension programs in an era of exponentially increasing technology and information.</i>
<i>5. Food production/security/safety.</i>

**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.**

<i>1. Climate conducive to abundant and diverse agricultural production (long growing season, abundant rainfall, etc)</i>
<i>2 Diversity of food, fiber, and fuel production systems. Agricultural infrastructure and know legible, adaptive producer base.</i>
<i>3. Aquaculture resources, infrastructure, and workforce. Abundant water resources and shallow aquifer.</i>
<i>4. Waterways transportation capabilities and proximity to deep water ports.</i>
<i>5. Coastal, marine, forest, and wildlife resources.</i>

## 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.

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Please provide the names and contact information for three individuals who you would suggest for interviewing in your state:

<b>Name</b>	<b>Title</b>	<b>Organization</b>	<b>Telephone</b>	<b>Email</b>
<b>Randy Knight</b>	<b>President</b>	<b>MS Farm Bureau</b>	<b>(601) 573-4290</b>	<b>rknight@msfb.org</b>
<b>Chip Morgan</b>	<b>Executive VP</b>	<b>DELTA Council</b>	<b>(662) 686-3356</b>	<b>cmorgan@deltacouncil.org</b>
<b>Derrick Surrette</b>	<b>Exec Dir.</b>	<b>MS Assoc. Supervisors</b>	<b>(601) 353-2741</b>	<b>Dsurrette@massup.org</b>

## 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:

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