

Institutional Information Request Form

Southern Region: Value of Extension Services and Experiment Stations

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

For each of the land-grant institutions participating in this project, Battelle is requesting information, data, project examples, etc. that will help illustrate the value of experiment stations and extension services. Completion of this information request is an important step in the information gathering required for this project. We are requesting that at each institution, the Experiment Station Director and the Extension Director **jointly** complete each section to the best 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 triggs@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
triggs@battelle.org

Section 1: Institutional Profile

University Name	Clemson University
Extension Service Director (name, phone, email)	Dr. John Kelly, Extension Director 864-656-3642, jkelly@clemson.edu Dr. Steve Meadows, Extension Chief Operating Officer 864-656-3382, smdws@clemson.edu
Experiment Station Director (name, phone, email)	Dr. George Askew, Experiment Station Director 864-656-2661, gaskew@clemson.edu

Personnel

Number of Personnel in Extension (FTE)	316.36
Number of Personnel in Experiment Station (FTE)	176.30

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

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Section 2: Income/Revenue Sources

Income Source	2011 \$ Income Received by Extension	Funding Trend for Past 3 Years	2011 \$ Income Received by Experiment Stations	Funding Trend for Past 3 Years
<i>Federal Formula Funds</i>	\$7,656,722	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$4,062,956	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing
<i>State Appropriations</i>	\$13,730,421	<input type="checkbox"/> Increasing <input type="checkbox"/> Stable <input checked="" type="checkbox"/> Decreasing	\$12,352,362	<input type="checkbox"/> Increasing <input type="checkbox"/> Stable <input checked="" type="checkbox"/> Decreasing
<i>Local Government Appropriations (Counties, etc.)</i>	\$907,520	<input type="checkbox"/> Increasing <input type="checkbox"/> Stable <input checked="" type="checkbox"/> Decreasing	\$	<input type="checkbox"/> Increasing <input type="checkbox"/> Stable <input type="checkbox"/> Decreasing
<i>Federal Grants and Contracts</i>	\$2,543,003	<input type="checkbox"/> Increasing <input type="checkbox"/> Stable <input checked="" type="checkbox"/> Decreasing	\$7,223,498	<input checked="" type="checkbox"/> Increasing <input type="checkbox"/> Stable <input type="checkbox"/> Decreasing
<i>State Grants and Contracts</i>	\$386,803	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$317,047	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing
<i>Local Grants and Contracts</i>	\$35,209	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$60,069	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing
<i>Industrial Grants and Contracts, including grants and contracts from commodity groups</i>	\$331,469	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$837,593	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing
<i>Foundation Grants and Contracts</i>	\$174,560	<input type="checkbox"/> Increasing <input type="checkbox"/> Stable <input checked="" type="checkbox"/> Decreasing	\$731,239	<input type="checkbox"/> Increasing <input type="checkbox"/> Stable <input checked="" type="checkbox"/> Decreasing
<i>All Other Grants and Contracts</i>	\$4,406	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$173,702	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing
<i>Sales of Products and Services</i>	\$7,540,377	<input checked="" type="checkbox"/> Increasing <input type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$4,996,403	<input checked="" type="checkbox"/> Increasing <input type="checkbox"/> Stable <input type="checkbox"/> Decreasing
<i>Intellectual Property Revenues</i>	\$	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$621	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing
<i>Gifts</i>	\$1,106,995	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$1,594,820	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing
<i>Other</i>	\$2,050,792	<input type="checkbox"/> Increasing <input type="checkbox"/> Stable <input checked="" type="checkbox"/> Decreasing	\$4,894,695	<input type="checkbox"/> Increasing <input type="checkbox"/> Stable <input checked="" type="checkbox"/> Decreasing
TOTAL	\$36,468,277	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$37,245,005	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing

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		<input type="checkbox"/> Stable <input checked="" type="checkbox"/> Decreasing		<input type="checkbox"/> Stable <input checked="" type="checkbox"/> Decreasing
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Are these income/revenue numbers based on a cash or accrual accounting basis? Accrual

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?

In the past five years, state funding for extension and experiment station activities have decreased more than 36%. Extension has also seen a similar decrease in funding from local appropriations as the economy at local, state and federal levels have had a downward trend over this time period as well. Federal grants and contracts have become increasingly harder to obtain. Many of the programs that once offered programs with budgets in the \$100K - \$300K range have now been revised to combine resources and focus on larger subjects that require multiple partners. These opportunities provide larger award ranges but have increased the competitive nature of these awards since fewer awards are now given. During these difficult times, generated revenues for research and extension programs and sales have increased or at least stayed stable. This is an indication that the services and goods provided by this industry are still in demand.

Section 3: Research and Extension Activities

Key Initiatives, Institutes and Programs:

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

Research

1. Sustainable Animal Production Systems
2. Water Quality and Water Quantity
3. Sustainable Energy
4. Global Food and Hunger
5. Sustainable Agricultural Production for (non food) Horticultural Crops

Extension

1. Sustainable Agronomic and Animal Production Systems
2. Economic and Community Development
3. Forestry and Natural Resources (includes Water Quality and Quantity)
4. Food Safety and Nutrition
5. Youth Development

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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.

<i>1. State of the Art Greenhouse Range</i>
<i>2. Specialized equipment for genomic analysis, e.g. gene sequencers</i>
<i>3. Specialized facility for molecular biology research</i>
<i>4. Advance Plant Technology Center in the Planning Stage at the Pee Dee Research and Education Center</i>
<i>5. Facility upgrades at university farms and remote research centers</i>

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:

Research

Plant Sciences, Crop Science, Plant Genetics and Agronomy

<i>1. Soybean Rust Monitoring Techniques and research on the kudzu bug</i>
<i>2. Improving cotton crops by reducing stink bug damage</i>

Animal Sciences, Animal Health, Livestock

<i>1. Forage Fed Beef production</i>
<i>2. Development of integrated gastrointestinal nematode control methods to decrease the reliance on chemical dewormers.</i>

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

<i>1. New shelf stable food packaging systems utilizing retort pouch processing to improve quality and extend shelf life.</i>
<i>2. Preventing food deterioration and enhancing the composition of food being stored through the use of enhancer coatings, to include natural antimicrobials and antioxidants.</i>

Food Safety and Biosecurity

<i>1. Development of nanotechnology applications for food safety and quality.</i>
<i>2. Development of sensing and analytical devices to detect pathogens which can affect food safety and security.</i>

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

<i>1. Processing Switchgrass as biofuel by freeing plant sugars from the cellulosic cell walls.</i>
<i>2. A marine algal biomass production process is being examined for its potential to produce ethanol and biodiesel.</i>

Environmental Sciences, Natural Resources, Sustainability

<i>1. Remote sensing (Intelligent River) of water quality in rivers and other applications</i>
<i>2. Impact of non-point source pollution along South Carolina's coast</i>

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Community and Economic Development

1. New coatings have been developed which deter adhesion of oyster and barnacle larvae to ship's hulls, using a non-toxic naturally occurring compound

2. Adaptations of traditional industrial cluster development to benefit rural communities are being examined.

Other, including multi-focus:

1. *Climate Change: Examination of the genetic and cellular signals that begin dormancy in fruit, nuts and horticultural crops.*

2. *Impacts of population growth and climate change on greenhouse gas emissions and carbon cycling on coastal regions.*

Extension

Plant Sciences, Crop Science, Plant Genetics and Agronomy

A collard crop improvement project was started in 1994 with pest/disease management, cultural practice, and nutrient management elements. This has at this date (2011) reduced the number of insecticide applications from an average of 14 per crop to between 5 and 6 per crop for a saving of \$193/A [2011 dollars] and the nutrient management program has reduced the nitrogen application rate by 30% resulting in a \$114/A savings [2011 dollars and nitrogen prices]. A current project has developed new hybrid cultivars in concert with USDA [South Atlantic Vegetable Laboratory] and is currently attempting to commercialize these cultivars. These hybrids stay in the field longer without flowering and will result in ~\$100/A improved returns from a longer standing crop.

2. The potential yield loss due to Asian Soybean Rust is \$13,900,000. Based on CU recommendations, South Carolina growers spray less than 25% of the total acreage for rust only once at a cost of less than \$8 per acre = \$1,180,000. Less than 1% of the South Carolina soybean crop is lost to rust = \$1,390,000. (Cost of needed protective sprays is \$1,180,000; rust cost for S.C. soybean industry is \$2,570,000; cost of original projected 20% yield loss in South Carolina is \$27,800,000. The savings to growers is \$25,230,000.) The research on selected soybean seeds showed that the seeding rates can be reduced by 40% (from 137,500 to 82,500 seeds per acre) if soybeans are planted during the optimum planting window. With this reduction, the savings would be \$18 per acre. With high anticipated soybean acreage this year (about 560,000 acres), South Carolina growers would save about \$10 million. Therefore, the profitability of soybeans can be significantly increased with reduced seeding rates.

Animal Sciences, Animal Health, Livestock

1. Tall fescue is the predominant cool season perennial forage in much of the southern United States with 8.5 million cattle grazing wild-type endophyte-infected fescue. South Carolina has approximately 91,900 cattle grazing wild-type infected tall fescue each year; however, a toxin producing endophyte significantly decreases conception rates in beef cows. In an applied research study examining pasture management practices to improve reproductive rates, grazing cattle on alternate forages only during the breeding season improved conception rate by 20%. Using current market prices, calves (600lb) are worth \$720 at weaning. The annual impact to the beef industry in South Carolina if cattle producers adopted this simple and straightforward management change would be \$13,233,600. Accounting for the 25% more cattle conceiving in the first 30 days of the breeding season results in an additional

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\$1,654,200 in revenue from increased market weights at weaning. Economic impacts calculated across the tall fescue belt where over 35 million acres of tall fescue are grown would be far greater. Fescue is an excellent forage option for producers in South Carolina and throughout the Southeastern US if managed correctly. This research directly addresses a simple and easily adoptable approach for improving management schemes and increasing production profit in tall fescue based pasture systems. Other studies are ongoing which examine lifetime effects of *in utero* tall fescue exposure as well as effects on male reproduction.

2. The South Carolina Legislature passed Regulation R.61-43, Standards for the Permitting of Agricultural Animal Facilities in 1996. According to Sections 100.190 and 200.190 of the regulations, growers of all permitted animal confinement facilities in South Carolina are required to attend a training provided by Clemson University. From January 1999 to date we have trained over 200 producers and other personnel. Certified producers are required to obtain 10 hours of training credit every 5 years to maintain their certification. The Confined Animal Manure Manager (Camm) program team is charged with developing a recertification program for this need. All participants reported knowledge gained.

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

There were 74 new or value-added food products or packages entering the market as a result of Extension work.

Food Safety and Biosecurity

1. Extension collaborated with other state agencies and 20 groups as part of the Department of Homeland Security's measures to protect farm and food production systems from potential vulnerabilities to terrorist activities and the best practices for responding to threats. On the local county level Extension agents continue to work with local communities through the commodity associations, and the local emergency managers and maintain a CART-County Agriculture Response Team, with some capacity to respond to an agriculture disaster.

2. In an effort to reduce food-borne illness, agents conducted ServSafe® food safety training for managers, supervisors, and other food handlers. A total of 249 food service employees received a course completion certificate, representing 153 food establishments. These food handlers can potentially affect 323,140 people. The National Restaurant Association has estimated that the average cost of a food-borne illness outbreak to an establishment is about \$75,000. The approximate economic value of the trainings could be as high as \$11,475,000 by preventing outbreaks.

Environmental Sciences, Natural Resources, Sustainability

1. Intelligent River pilot sites were installed to remotely collect and display real-time water quality data to aid policy decision makers. The EPA-DHEC designated a Watershed Center of Excellence for S.C. federally-funded green infrastructure stormwater management system was installed in Aiken County to mitigate erosion of Sand River.

2. Extension Master Naturalist volunteers provided 4,327 hours of service, which equates to a value of \$77,886 in program support (using an \$18 value /hour of volunteer time for South Carolina).

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Agritourism and Recreational Hunting and Fishing

1. A wildlife food plot planting guide was developed to enhance hunting as an alternative income source for landowners.

Youth Development

1. Adults contributed 19,278 hours of volunteer service, which represents a \$347,004 value of program support. (According to ES-237 there were 4,291 volunteers. Each volunteer contributed a minimum of 6 hours.) Coordinators and volunteers of afterschool 4-H programs have reported that youth are learning organizational and time management skills that will be useful as they enter college.

Community and Economic Development

1. Some 2,072 people participated in Palmetto Leadership, Senior Leadership and Junior Leadership programs. Participants strengthened their community awareness and ability to access community resources, built partnerships, and strengthened their capacity to respond to future issues and opportunities. Participants have a greater knowledge about the county in which they live and/or work including education, economic development, healthcare and social issues. The Palmetto Leadership program provides participants with a venue to give back to their community through a class service project experience. Participants are able to grow their professional and personal networks, providing new opportunities for collaboration and more efficient and effective community service. Historically, most graduates of the leadership class will involve themselves on boards, community action groups, and task forces to help the community. Class members have become members of non-profit boards. Our last research indicated that 70% of the graduates were still involved in a responsible community project three years after graduation.

2. Preliminary data from a survey of farmers markets at the state level indicates sales across all community farmers markets at \$75,000 per market. This average value indicates the total value of sales at farmers markets in South Carolina of \$7,500,000 million with an economic impact of \$9,000,000.

Intellectual Property

Research

	2009	2010	2011
<i># of Invention Disclosures</i>	9	7	6
<i># of Patents Applied For</i>	11	3	4
<i># of Patents Awarded</i>	3	7	0
<i># of Licenses Executed</i>	1	1	0
<i># of Business Start-Ups</i>	<i>Unknown</i>	<i>unknown</i>	<i>unknown</i>
<i># of Plant Variety Protection Certificates Applied For</i>	0	0	0
<i># of Plant Variety Protection Certificates Awarded</i>	0	0	0
<i>\$ Value of Income received from Plant Variety/Germplasm Development</i>	0	0	0
<i>\$ Value of Income received from all</i>			

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<i>other Intellectual Property</i>			
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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:

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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.

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

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Section 4: Extension Service Programs

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

Metric	Number
<i>Number of county/parish offices</i>	46
<i>Number of multi-county/multi-parish regional offices</i>	
<i>Number of major 4H camps</i>	1
<i>Number of 4H participants</i>	64,312
<i>Number of contacts with clients recorded by extension for the most recently completed year (include professional and volunteer contacts)</i>	307,503
<i>Number of volunteers for the most recently completed year and number of hours volunteered</i>	6,021

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

Support was provided for the state and local agribusiness community, by serving local farmers markets. According to the South Carolina Department of Agriculture, South Carolina has 100 community based farmers markets. Economic and community development extension and applied research supports activities at each one of these markets directly in many cases (by assisting local leaders in establishing and managing markets in communities such as Blackville and Conway) or by serving as a go to source of advice concerning market management and economics. Preliminary data from a survey of farmers markets at the state level indicates sales across all community farmers markets at \$75,000 per market. This average value indicates the total value of sales at farmers markets in South Carolina of \$7,500,000 million with an economic impact of \$9,000,000.

Community Development Programs/ Impacts

Some 2,072 people participated in Palmetto Leadership, Senior Leadership and Junior Leadership programs. Participants strengthened their community awareness and ability to access community resources, built partnerships, and strengthened their capacity to respond to future issues and opportunities. Participants have a greater knowledge about the county in which they live and/or work including education, economic development, healthcare and social issues. The Palmetto Leadership program provides participants with a venue to give back to their community through a class service project experience. Participants are able to grow their professional and personal networks, providing new opportunities for collaboration and more efficient and effective community service. Historically, most graduates of the leadership class will involve themselves on boards, community action groups, and task forces to help the community. Class members have become members of non-profit boards. Our last research indicated that 70% of the graduates were still involved in a responsible community project three years after graduation. Some 108 people in other programs successfully collaborated with others in the region to address an issue.

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Family and Consumer Science Programs/ Impacts

In an effort to reduce food-borne illness, agents conducted ServSafe® food safety training for managers, supervisors, and other food handlers. A total of 249 food service employees received a course completion certificate, representing 153 food establishments. These food handlers can potentially affect 323,140 people. The National Restaurant Association has estimated that the average cost of a food-borne illness outbreak to an establishment is about \$75,000. The approximate economic value of the trainings could be as high as \$11,475,000 by preventing outbreaks.

Expanded Food and Nutrition Education Programs were conducted for 1,812 limited resource adults to improve nutrition practices, food safety, and food resource management practices such as planning meals, comparing prices, and using grocery lists. More than 6,032 hours were contributed for this project, which represents a \$108,576 value of program support. As a result of participating in EFNEP, 70% improved in one or more food safety practices; 89% improved in one or more nutrition practices; 86% improved in one or more food resource management practices; 49% of participants increased the amount of physical activity; 97% of participants improved their diet; 57% increased fruit consumption; 60% increased vegetable consumption; and 52% increased consumption of calcium-rich foods.

4-H and Other Youth Development Programs/ Impacts

4-H Volunteers reported seeing significant improvement in the children's overall reading, writing, and math skills as well as the children's willingness to work together as a team to solve problems and make decisions. In addition, there were reports that the children's self-confidence and self-pride increased.

Other high impact/notable Extension programs

The National eOrganic Project has expanded as the organic agriculture Extension Service website: www.eorganic.info. Over 86 participants participated in programs to enhance the use of organic farming systems. Over 2,200 persons visited the Clemson Organic Farm market.

Extension programs support the "S.C. Grown" initiative of the state Agriculture Department for fruits, vegetables and herbs. Horticultural crop production practices include variety selection and pest management for commercial producers of vegetables, peaches and other fruits, turfgrass and nursery plants.

Locating a "U-pick," farm stand, corn maze or pumpkin patch in the Pee Dee region is just a few clicks away now thanks to an online resource launched by Clemson Extension. The Pee Dee AgriTourism Passport incorporates Google Maps to enable residents and visitors to locate on-farm lodging, produce stands and other agriculture-related businesses. The website divides an array of businesses into easy to follow categories, including wineries, seafood, Christmas tree vendors and museums. Users of the site can see the businesses on a map and click locations to access the vendors' websites. A printed version of the map that folds to the size of a passport will be available at area chambers of commerce, convention and visitor bureaus and welcome centers. Agritourism also can include anything that connects consumers with the heritage, natural resources or culinary experiences unique to the agricultural industry. The program is integrated with S.C. MarketMaker, a program managed by Clemson that

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leverages this resource and facilitates development of similar websites in other tourism regions of South Carolina. MarketMaker and the AgriTourism Passport were developed as a means of sharing information about food and farm-based businesses with the public. The programs connect all elements of the food chain — from farmers and fishermen to processors and distributors — so they can more efficiently conduct business.

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?

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

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

Station 1

<i>Station name</i>	Pee Dee REC
<i>Location (zip code)</i>	2200 Pocket Road, Florence, South Carolina 29506
<i>Size (acres), including owned and long-term leased land</i>	2,300 acre
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	Conducts applied research and outreach on row crops with an emphasis on enhancing crops through biotechnology. This facility focuses on the major field crops in this section of the coastal plain, along with environmental, wildlife, and ecological studies.
<i>Notable or unique characteristics or assets</i>	There are 800 acres for research plots, 1,000 acres of forest, and the remaining 500 acres consist of buildings, roads, ponds, and swamps. The John B. Pitner Center is the heart of the Pee Dee REC campus. It is a large building that contains 50 offices, 30 laboratories, a library, a 350 seat theater style auditorium, two 50 seat classrooms, a 60 seat seminar room, and a 30 seat conference room. Normally several thousand visitors hold seminars, meetings, tours, field days, and other events at the Center each year.
<i>Number of personnel (FTEs)</i>	43.69

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Station 2

<i>Station name</i>	<i>Edisto REC</i>
<i>Location (zip code)</i>	64 Research Rd., Blackville, SC 29817
<i>Size (acres), including owned and long-term leased land</i>	2,354 acres
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	Applied research and outreach on sustainable crop and livestock production systems, including row crops, vegetables, and beef cattle. The center aids citizens, researchers, students, and faculty in finding better ways to grow and harvest crops, raise beef cattle and conserve natural resources.
<i>Notable or unique characteristics or assets</i>	Three laboratory buildings have been completed so that now every project has a new field laboratory. Inside each lab is 1200 square feet of floor space and a 400 sq. ft. loft. Each lab is custom fitted with whatever is needed to fulfill the project objectives including storage space for harvested crops and a field wet lab. To aid in the in-depth study of these crops a <u>new greenhouse complex</u> was built consisting of four 900 sq. ft. Units each with <u>fully automated controls</u> . <u>Climate Monitoring</u> - Edisto is one of two sites selected in South Carolina to host a state-of-the-Art NOAA <u>US Climate Reference Network</u> station (station name: SC Blackville 3 W) with automated measurements of air temperature, humidity, solar radiation, soil temperature and moisture, leaf wetness, and rainfall.
<i>Number of personnel (FTEs)</i>	30.09

Station 3

<i>Station name</i>	<i>Sandhill REC</i>
<i>Location (zip code)</i>	900 Clemson Road, Columbia, South Carolina 29229
<i>Size (acres), including owned and long-term leased land</i>	600 acre campus
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	Research and outreach on economic and community development, and environmental stewardship. The center's faculty builds the collaborations needed to identify and address the state's opportunities and challenges for the 21st century.
<i>Notable or unique characteristics or assets</i>	The facility plays host to several festivals, high school track meets, community events and the long-running <u>Sparkleberry County Fair</u> . Features of the Administrative Building include: wood used was rescued from abandoned SC Mill, no east or west glass exposure, all carpeting made from recycled fibers, "Green roof," passive chilled beam system for cooling, wastewater is recycled, no CFC refrigerants, building materials extracted and processed regionally.
<i>Number of personnel (FTEs)</i>	14.91

<i>Station name</i>	<i>Coastal REC</i>
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<i>Location (zip code)</i>	2700 Savannah Highway, Charleston, SC 29414
<i>Size (acres), including owned and long-term leased land</i>	325-acre research farm
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	Research and outreach on vegetable and specialty crop production with an emphasis on the effects of plant-based foods on human health and nutrition. Focus on developing production, and post-harvest methodology and pest management.
<i>Notable or unique characteristics or assets</i>	Houses 112,000 sqft of laboratory, office and meeting space with newly completed 14,000 sqft of greenhouse space.
<i>Number of personnel (FTEs)</i>	16.57

<i>Station name</i>	Belle W. Baruch Institute of Coastal Ecology & Forest Science
<i>Location (zip code)</i>	Baruch Institute of Coastal Ecology and Forest Science Highway 17 North, PO Box 596 Georgetown, SC 29442-0596
<i>Size (acres), including owned and long-term leased land</i>	
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	Research and education programs focused on the ecology and management of the natural resources of the coastal region of South Carolina for the betterment of the state's citizens. The institute conducts research on more than 80,000 acres of coastal forest through public and private partnerships.
<i>Notable or unique characteristics or assets</i>	7,000 square-foot office and laboratory facility; 12,000 square foot conference and education facility
<i>Number of personnel (FTEs)</i>	10.50

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

Archbold Tropical REC - Conducts applied research and outreach on advancing economic and community development through environmental conservation. The center acts as a liaison for scientists interested in research, and develops educational programming and partnerships with local communities.

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.

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

1. The Southern Pasture and Forage Crop Improvement Conference met in Aiken, SC. This meeting hosts animal and pasture experts from across 14 southern states in a two day meeting format. This year's programs involved many presentations including how to effectively cut fertilizer costs, the effectiveness of fertilizer additives (i.e. NutriSphere), how to incorporate and manage legumes, new forage releases for the Southeastern US, how to match forages to animal species, how to manage summer annual grasses, effects of hay preservatives on hay quality and digestion, and the potential of switchgrass in southern forage systems.

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

Advanced plant technology, remote sensing devices, new varieties, especially for energy production.

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?

We expect growth in agriculture, forestry and natural resource 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. The Southern Region Fruit Consortium is a collaboration between North Carolina State University and institutions from South Carolina (Clemson University), Georgia, Virginia, Tennessee, and Arkansas. The consortium's steering committee plans in-service training and offers travel funds to support agents' participation. It is a method used to develop the expertise of agents who may not have the opportunity in their state for training in fruit. The Virtual Small Fruit Center is creating more visible and active focal points for stakeholders within and outside the university for research, Extension, and outreach activities related to small fruit production, handling, processing, marketing and consumption. South Carolina is partnering with the states of North Carolina and Georgia on this program.

2. The Regional Forestry Position is a liaison of the southern land-grant universities and the USDA Forest Service - Southern Region. The Forester is responsible for increasing coordination and regional level technology transfer, information dissemination, and educational activities. Working closely within the Extension System and the USDA Forest Service, the Forester identifies opportunities and works with natural resource professionals to address them. South Carolina is one of thirteen southern states cooperating in this effort.

3. The Orchard Floor Management program provides leadership and direction to orchard and vineyard floor management in South Carolina, North Carolina, and Georgia. The Orchard Floor Management program conducted 10 research trials and three on farm demonstration plots related to weed management in fruit crops. Outreach efforts by this program consisted of developing weed control recommendations for 10 state and regional publications, conducting 21 educational programs in three states, and contributing articles to regional newsletters. The program was listed as a co-recipient of an SCRI grant coordinated by Virginia Tech to determine the impact ground cover manipulation can have on winegrape vigor.

4. The Regional Peach Initiative is a partnership between South Carolina and Georgia. The Initiative will increase coordination and expansion of efforts in conducting educational programs throughout the region. Accomplishments include:

- Education and research to help fruit growers adapt to new, exotic pests, these include brown marmorated stink bug, *Halyomorpha halys*, bean plataspid, *Megacopta cribraria*, spotted winged drosophila, *Drosophila suzukii*.
- Export facilitation work in conjunction with USDA, APHIS, GA Dept of AG, Clemson University's Division of Plant Industry, Georgia Peach Council & South Carolina Peach Council. 2011 pilot program resulted in export of ca. 20 loads of SC fruit to Mexico. 2012 pilot will shift to post-harvest pest mitigation via fumigation. Efforts are underway to facilitate 2012 exports from both GA & SC.
- Specialist is a senior editor for an annually updated peach IPM guide, which is used in GA, SC and at least seven other southeastern states. UGA Cooperative Extension Bulletin 1171, 2012 SE Peach, Nectarine and Plum Pest Management & Culture Guide. (62 pp.)
- Specialist has participated in winter peach meetings, including SE Fruit & Vegetable Conference, Savannah, GA; Byron, GA; Quitman, GA (S GA/N FL); Ridge Meeting, Edgefield, SC; and Piedmont Meeting, Gaffney, SC.

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- Specialist collaborates on peach research, primarily with USDA, ARS counterparts at Byron, GA and has, in recent years, been coauthor on papers addressing management of borers and plum curculio. In 2012, collaborators are initiating work to examine the influence of fruit ripening and time-related degradation of insecticide residues on fruit vulnerability to plum curculio.

5. The Executive Director for the Association of Southern Region Extension Directors promotes efficiency and effectiveness of the Cooperative Extension Service in 13 Southern states by working with the directors of Extension from the Southern region to expand multistate Extension programs through electronic technology and the sharing of resources. The regional organization is headquartered on the campus of Mississippi State University.

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

USDA Forest Service
USDA EPA-DHEC
US Department of Homeland Security

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.

South Carolina Department of Agriculture
SC Forestry Commission
SC Department of Natural 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 21st Century agbioscience economy?

Growing climate is suited to 12 month production of bio-mass species.

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

The Southern Regional institutions are able to work together to develop a list of relevant subject matter and presenters for the Virtual Conferences and collaborate with others to develop training modules.

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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>	522
<i>Number of students graduated in most recent year with Master's degrees in related field of study</i>	63
<i>Number of students graduated in most recent year with Doctorate degrees in related field of study</i>	29
<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

Master Cattleman –In this fee-based program multiple topics were covered over a 5 week period by area producers. Enrollment at each location is limited to 35 to ensure adequate instruction on a personal basis. Beef Quality Assurance certification is offered as an optional program at this Master Cattleman series

The Grass Master's program – This multi-night fee-based seminar series covers the basics of forage selection, establishment, and management. Basic concepts of rotational grazing are also covered along with weed management. We are also exploring the possibility of offering this series in an on-line format for those who prefer learning at home at their own pace and in their spare time.

The Confined Animal Manure Manager (Camm) program - The South Carolina Legislature passed Regulation R.61-43, Standards for the Permitting of Agricultural Animal Facilities in 1996. According to Sections 100.190 and 200.190 of the regulations, growers of all permitted animal confinement facilities in South Carolina are required to attend a training provided by Clemson University. From January 1999 to date we have trained over 200 producers and other personnel. Certified producers are required to obtain 10 hours of training credit every 5 years to maintain their certification. The Confined Animal Manure Manager (Camm) program team is charged with developing a recertification program for this need.

Master Wildlifer/Master Naturalist -course had a major impact on improving these lands for wildlife and other natural resources.

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Professional Certification Programs

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

Palmetto Leadership, Senior Leadership and Junior Leadership programs

Entrepreneur training and other special training or education initiatives

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National defense, including National Guard, training or educational initiatives

Afghanistan ANR training for South Carolina National Guard

K-12 specific educational programs and initiatives

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Additional comments or items of note regarding education and training:

A total of 8,490 programs and/or activities were conducted in 2010-11 throughout the 46 counties of South Carolina.

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>Competitive hiring of research scientists due to industry demand</i> |
| 2. <i>Reduction in availability of small to mid-size AFRI competitive grants programs</i> |
| 3. <i>Building strong public/private research programs with the ag industry</i> |
| 4. |
| 5. |

Top 5 key challenges for the Extension Service in your state

- | |
|---------------------------------------------------------------------------------------------|
| 1. <i>Budgets</i> |
| 2. <i>Recruitment and retention of agents, especially Agriculture and Natural Resources</i> |
| 3. <i>Changing political demographics in the state</i> |
| 4. <i>Mentoring with current staffing levels.</i> |
| 5. |

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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. Precision agriculture relative to irrigation and fertilizer applications</i>
<i>2. Increased demand for new crops and new crop varieties</i>
<i>3. Sustainable agriculture practices for animal and food production</i>
<i>4. Plant-based alternative energy</i>
<i>5. Forested watershed monitoring and management</i>

Top 5 emerging opportunities and trends for the Extension Service

<i>1. Water issues – quality and quantity</i>
<i>2. Locally grown food initiatives</i>
<i>3. Youth development (4-H)</i>
<i>4. Food safety and preservation – start up small business</i>
<i>5. Growing Agriculture sector in the state</i>

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

<i>1. Budgets</i>
<i>2. Recruitment and retention of agents, especially Agriculture and Natural Resources</i>
<i>3. Changing political demographics in the state</i>
<i>4. Mentoring with current staffing levels.</i>
<i>5.</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. The Southern Regional institutions have a strong history of working together to develop ways to collaborate, produce and share resources – eXtension, the National Association of Extension Program and Staff Development Professionals (NAEPSDP), and the Southern Rural Development Center are good examples.</i>
<i>2. Strong collaborative research among the states capitalizing on regional similarities in climate and soils</i>
<i>3. Heavy population growth along the coastal plain in all states increases pressure on land for ag and forestry creating opportunities for research</i>
<i>4.</i>
<i>5.</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. Please provide the names and contact information for three individuals who you would suggest for interviewing in your state:

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Name	Title	Organization	Telephone	Email
Mr. Kevin Gadson		South Carolina State Extension Advisory Council	843-740-5000 x5553 – (work) 843-296-4957 (cell)	Kevin.gadsden@ccbcc.com
Mr. Thompson Smith		South Carolina State Extension Advisory Council	864-617-5551 (cell)	stoneybroo@aol.com
Mr. Chalmers Carr		South Carolina Peach Council	803-685-5381	peaches@titanfarms.com
Mr. Roy Baxley		South Carolina Cotton Board	843-774-9817	N/A
Mr. David Winkles		South Carolina Farm Bureau	803-936-4213	dwinkles@scfb.org

Section 11: Additional Comments

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

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