FY13 Board of Regents, State of Iowa, Annual Economic Development and Technology Transfer Report

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1. Please briefly describe the relationship of your institution's economic development activities to the enhancement of economic growth in the state. The description should cover, but not necessarily be limited to the following:
   A. the relationship between institutional activities and creation of jobs and wealth in Iowa
   B. Institutional activities and services which indirectly promote economic development, such as training provided to staff of local economic development agencies

1A. Enhancement of Economic Growth through Job Creation and Retention, Investments, Sales, and Cost Savings

Iowa State University promotes economic growth in Iowa by moving research ideas to the market, supporting creation of new companies, offering assistance to existing companies, attracting new companies and entrepreneurs to Iowa, contributing to workforce and entrepreneurial development, and creating intellectual property.

Two recent examples of moving research ideas to the market come from Iowa State’s NSF Center for Biorenewable Chemicals. Two startup companies based on research by the Center have won grants supported by the National Science Foundation to develop their technologies for potential commercialization. Center leaders say the grants will allow the companies to "de-risk" their technologies for business and industry.

- OmegaChea Biorenewables LLC of Ames won a one-year, $225,000 Small Business Technology Transfer Phase 1 grant. The grant will help the company develop a new manufacturing platform that will use microorganisms modified to use unique enzymes for the production of biorenewable chemicals. The chemicals can be used to produce detergents, lubricants, and polymers.
- Glucan Biorenewables LLC of St. Louis won a six-month, $150,000 Small Business Innovation Research Phase I grant. The grant will allow the company to prove that its bio-based reaction system works with actual biomass to produce chemicals that can be used to make packaging, insulation, and other products.

Faculty and staff researchers, whether in departments, centers, or institutes, often work with experts in several key units to help fulfill ISU's economic development efforts.

The ISU Research Park is a resource provider and business incubator that encourages commercialization of university research. The Innovations Development Facility (IDF), part of the Plant Sciences Institute, incubates new plant biotechnology companies. The Institute for Physical Research and Technology (IPRT) Company Assistance Program, Small Business Development Center (SBDC), and the ISU Pappajohn Center for Entrepreneurship interact with companies across Iowa to solve technical, production, and management problems. The improved production resulting from these interactions allow businesses to retain and often expand their workforce. The ISU Research Foundation (ISURF) and Office of Intellectual Property and Technology Transfer (OIPPTT) manage, market, and license the intellectual property of ISU researchers and work with them to patent inventions and market the innovations to commercial partners. Finally, ISU Extension and Outreach’s Center for Industrial Research and Service (CIRAS) works with companies to enhance their performance, and Community and
Economic Development (CED) programs offer a variety of technical assistance, consulting, and educational programs to improve the quality of life in Iowa communities.

The following are some examples of the direct impact that these ISU units have had this past year.

- The ISU Research Park continues to be successful in initiating as well as nurturing numerous new businesses. Three new companies and affiliates joined the Park in FY13, bringing the historical total to 221 companies, research centers, and affiliates. Currently, there are 53 companies and research centers and 14 affiliates located in the Park, employing 1,240 and 139 people, respectively.

- There are currently three faculty-affiliated startup companies located in the Innovations Development Facility, the on-campus business incubator in the Roy J. Carver Co-Laboratory under direction of the Plant Sciences Institute. A total of 18 companies have used this business incubator space since the facility opened in September 2003.

- A summary of project evaluation data clearly shows that Iowa companies with technical problems and R&D needs continue to benefit from the services of IPRT Company Assistance. IPRT Company Assistance is composed of three segments that each aid Iowa’s businesses in unique ways: materials, nondestructive evaluation, and research cost-sharing. The Materials and Nondestructive Evaluation groups provide limited duration (typically up to 40-60 hours) no-cost technical assistance. The Research Cost-Sharing Program helps Iowa smaller companies utilize ISU’s faculty and facilities for research by providing a 1:1 cash-match on research projects. By working with these three groups, Iowa companies report positive impacts affecting their sales, investments, and operating costs throughout the languishing recovery from the economic recession of 2009-2013. Based on survey data, IPRT Company Assistance had a positive cumulative impact exceeding $100 million over the five years between FY2008-2012.

During the period FY2006-2013, IPRT had more than 700 interactions with Iowa companies covering 71 of Iowa’s 99 counties. In FY2012 alone, the companies that responded to the impact survey reported adding an estimated 20 new employees as a result of their interactions with IPRT Company Assistance. Additionally, the Company Assistance program has helped with the development of 30 startup companies in Iowa since 2002. There is potential to grow the economic impact of IPRT’s Company Assistance activities and utilize a wider range of ISU’s capabilities to increase its ability to help Iowa’s businesses.

- IPRT Company Assistance’s Materials Group worked with Insta-Pro International in Urbandale to test its replacement extruder parts. Insta-Pro manufactures extruders, presses, and other processing equipment for the feed and food industry. The extruders operate under demanding processing conditions involving high pressures and temperatures. Even high-quality components will exhibit wear over time and require periodic replacement. Insta-Pro came to IPRT seeking assistance in determining how well its replacement extruder parts stack up against the after-market
competitors. Insta-Pro replacement parts performed well when compared to the competition. Insta-Pro used the results from the performance comparisons to develop new marketing materials showing its product’s superiority. Because of this, IPRT Company Assistance’s materials group was able to play a key role in helping Insta-Pro grow its Iowa-based manufacturing. The longer term impact is still developing, but indications are this project had a significant positive impact on the company’s growth.

- Quatro Composites in Orange City turned to IPRT Company Assistance’s Nondestructive Evaluation Group for inspection of its parts. Quatro Composites manufactures carbon fiber for a variety of industries. To become an approved manufacturer of certain aerospace components, the company needed to ensure quality and establish the capability to perform nondestructive inspection on them. IPRT’s Nondestructive Evaluation Group worked with the company and identified a suitable inspection protocol that met the industry standards. This interaction allowed the company to develop the knowledge needed to fully implement the inspection potential provided by test systems, enabling them to successfully enter a demanding market. The result was a significant increase in sales for the company, as well as the creation of several jobs in a new inspection department that was created at Quatro.

- IPRT Company Assistance’s Research Cost-Sharing Program helped Cedar Rapids’ Diamond V Mills start a research project at ISU for its animal nutrition products. Diamond V Mills’ products are designed to optimize digestive function and nutrition key to animal and aqua health, productivity, efficiency, and profitability. IPRT helped set up and fund the research project with the company and ISU’s Biomedical Sciences Department to investigate the immunological benefits of Diamond V Mills’ proprietary product in dairy calves. Researchers will evaluate the anti-colonization properties of the product on Salmonella in dairy calves. While the project is still under way, the research may confirm that Diamond V Mills’ proprietary product reduces Salmonella colonization during calves’ most vulnerable stage in life. If confirmed, this product will significantly enhance food safety and animal health. In turn, this will lead to reduced animal loss for dairy farmers and will open up new markets for Diamond V Mills.

- During federal FY12, which is the most recent full year for the program, the SBDC provided business assistance to individuals and companies totaling 2,646 clients and 11,018 counseling hours. The SBDC also conducted 221 training workshops in which 3,483 individuals participated.

The ISU SBDC, along with the ISU Pappajohn Center for Entrepreneurship, provided 546 hours of counseling assistance to startup and existing companies; served 117 clients with one-on-one counseling; educated 433 attendees through workshops; provided advice to several hundred clients via telephone and e-mail; and advised 32 technology companies in the areas of licensing, equity-based financing, market entry, and numerous operational areas.
Technologies originating at ISU and licensed to Iowa companies have resulted in over $45 million in sales by those companies in calendar year 2012. Total sales of ISURF-licensed technologies were $647 million, not including germplasm.

OIP TT began supporting SBIR (Small Business Innovation Research) and STTR (Small Business Technology Transfer) outreach efforts in FY06. Preliminary award reports indicate that SBIR and STTR funding will be decreased compared to FY12. This is largely due to the impact of sequestration, which has resulted in agencies reducing the number of awards they make or delaying contract negotiations and release of funding. Outreach and training activities in addition to providing proposal preparation support has continued, and 21 companies received assistance in preparing 25 proposals through the Office of Intellectual Property and Technology Transfer in FY13. To date, awards worth $4.8 million have been reported for FY13, with 15 different Iowa companies winning 17 new or continuing SBIR and STTR awards. The Department of Defense, National Institutes of Health (NIH), and the National Science Foundation are funding this year’s Iowa SBIR/STTR award winners. The funded projects reflect Iowa’s strengths in biotechnology, information systems, manufacturing, and agriculture. Nearly $3.8 million in support was awarded from NIH for projects that range from the development of new medical devices and medical imaging technologies to new animal models for human diseases. In addition, nearly $1 million has been received from the National Science Foundation for projects that include the development of educational games and biomanufacturing applications.

The Regents Innovation Fund (formerly Grow Iowa Values Fund) program at Iowa State has a competitive research component that pairs ISU faculty members with Iowa industries (primarily new to young startups) to create economic benefit for the companies. Surveys completed by companies on projects funded from June 2006–June 2012 (surveyed one year after project completion) documented more than 118 jobs created or retained and an annual sales impact of more than $16.1 million due to the research projects conducted in partnership between ISU and the companies.

ISU Extension and Outreach’s CIRAS helps Iowa's economy prosper and grow by enhancing the performance of industry through applied research, education, and technical assistance. CIRAS has been working with companies in communities across Iowa for more than 50 years and has a vision for Iowa of healthy communities through business prosperity. Cumulatively, over the past five years, CIRAS and its partners have reported impact from companies totaling more than $1.8 billion ($1.5 billion in sales gained or retained, $227 million in new investments, $100 million in costs saved or avoided) with 25,675 jobs added or retained as a result of the assistance they received.

- Governor Terry E. Branstad officially recognized the contributions of CIRAS as the industrial extension arm of the university helping the College of Engineering and Iowa State University Extension and Outreach carry out the land-grant mission through a 50th anniversary proclamation from the State of Iowa Executive Department. The proclamation acknowledged that CIRAS was established in 1963 after receiving authorization and appropriated funds from the General Assembly, along with unanimous Board of Regents approval.
Last year, 1,613 businesses from 97 counties in the state received assistance on projects or attended educational workshops from CIRAS staff or partners. Companies responding to surveys reported $389 million in total impact — $333 million in sales gained or retained, $35 million in new investments, and $21 million in costs saved or avoided. Company executives stated that 5,638 jobs were added or retained as a result of the assistance they received from CIRAS and its partners.

Power Engineering and Manufacturing (PEM) LTD in Waterloo, Iowa, completed a Theory of Constraints (TOC) project with CIRAS that focused on improving throughput, communication, and profitability. PEM reported more than $9 million in impact due to this project — $6.1 million in sales gained or retained and $3.4 million in costs saved or avoided.

Impact of more than $937,000, retention of 30 jobs, and the creation of one additional job was the reported result of CIRAS technical assistance provided to ADA Enterprises, Inc., a manufacturer of plastic-coated steel outdoor furniture and agricultural supplies in Northwood, IA. The assistance helped the company design and implement a process for generating ongoing business improvement and greater profitability.

CIRAS government contracting specialists work with Iowa businesses, from one-person operations to some of the state’s largest employers, to help them understand the government procurement process and to secure contracts. As the only organization in the state of Iowa providing contracting assistance at all three levels of the government market segmentation — local, state, and federal — CIRAS staff provided counseling to more than 1,200 companies. Companies reported more than $153 million in government contract impact due in part to the assistance they received. The Defense Logistics Agency, which funds CIRAS to provide assistance to Iowa companies, indicated this impact helped create or retain 3,070 jobs.

More than 240 participants were trained in FY13 by attending conferences and workshops offered through a partnership of CIRAS and the College of Engineering (Civil, Construction, and Environmental Engineering, and the Electric Power Research Center) and the Iowa Energy Partnership for Industrial Energy Efficiency, which includes CIRAS, MidAmerican Energy, Michael’s Energy, Black Hills Energy, Iowa Association of Municipal Utilities, Alliant Energy, Corn Belt Power Cooperative, Iowa Association of Electric Cooperatives, Central Iowa Power Cooperative, Iowa Economic Development Authority Energy Team, and Van Meter Incorporated.

Energy efficiency workshops held across Iowa provided education on industrial lighting and steam systems. Continuing education was provided for civil engineering practitioners in geotechnical engineering, water resources, and environmental engineering. Attendees were able to obtain professional development hours toward retention of their Iowa engineering licenses.
- The ISU College of Engineering Industrial Assessment Center partnered with CIRAS in providing energy audits to eight manufacturing companies. ISU teams comprised of faculty and students, both graduate and undergraduate, visited company sites to collect data and conduct analyses. Reports were then created recommending ways each company could reduce energy consumption and increase profitability.

- CIRAS is working with the BEST of Iowa (Business Expansion and Strategic Trends), a coalition of Iowa utility concerns, Iowa Economic Development Authority (IEDA), Iowa Innovation Council, Iowa Workforce Development, Association of Business and Industry (ABI), Iowa Area Development Group, Iowa Business Council, Iowa Department of Education, and Iowa’s Regents universities and Community Colleges to provide a statewide coordinated business retention and expansion program. Economic developers throughout the state use the Synchronist data system to interview executives of Iowa industries to create an Iowa Competitive Capacity ScoreCard for the state. This report provides a detailed analysis of Iowa’s situation and identifies opportunities and risks to be addressed. The Governor and Lieutenant Governor of Iowa work with the local economic development partners to interpret the results and cultivate additional resources to assist business development strategies, with an emphasis on trade cluster companies around the state. The data also are used to affect statewide programs of change to address the varying needs of the state economy.

- CIRAS is working with the regional economic development marketing groups across Iowa to address economic development strategies in their particular regions. Strategic planning, workforce development, business outreach, buyer/supplier efforts, and industrial assistance programming is provided within each of the separate groups.

- To meet the increasing demand for Latino business and community development assistance, Community and Economic Development (CED) Extension and Outreach specialists trained 32 Latino business leaders and entrepreneurs, helped 18 minority entrepreneurs start or improve their businesses, and assisted with the creation of 13 jobs and the retention of 100 jobs for minority employees. Community development specialist Himar Hernández maintains contacts with Latino business owners throughout the state and has facilitated the development of Latino business networks in southeast and central Iowa. The city of Ottumwa and Hernández were featured on NBC’s TODAY Show in a piece on how communities adapt to changing populations. The TODAY Show learned about Ottumwa and Hernández’s work there in an article in the Wall Street Journal on November 8, 2012. Hernández’s work also was mentioned in The Chronicle of Higher Education. (TODAY Show video: http://www.today.com/video/today/51515671#51515671)

- CED Extension and Outreach specialists started and supported 18 local/regional housing trust funds with a dollar value of $10,029,720 in new and rehabilitation housing construction last year, generating approximately 140 jobs in Iowa (80
jobs due to direct effect and 60 jobs due to indirect and induced effects). The housing trust fund initiative was supported by the Iowa Finance Authority.

**1B. Training Opportunities for Staff of Local Economic Development Agencies and Other Activities that Indirectly Promote Economic Development**

The ISU Extension and Outreach Center for Industrial Research and Service (CIRAS) reports several economic development training and other activities.

- CIRAS held the second annual corridor procurement conference in Cedar Rapids, IA, educating companies on the key elements of capturing business sales with government agencies or partnering with prime contractors. The event provided opportunities for 50 companies to network with government buyers including contracting personnel from the city of Cedar Rapids, Linn County, Iowa State Prison Industries, Iowa Department of Administrative Services, Iowa Department of Transportation, and the Rock Island Arsenal.

- The Iowa Area Development Group (IADG) and CIRAS formed a partnership to expand the level of support for manufacturers and businesses based in rural areas across the state. The partnership combines CIRAS manufacturing and technical expertise with IADG’s financial acumen to provide comprehensive growth services to rural manufacturers.

- The College of Engineering Electric Power Research Center (EPRC) is a consortium of 10 utilities that sponsor multidisciplinary power systems research at Iowa State University. Eight of the 10 companies provide services in Iowa; the remaining two are international. Funds provided by the companies are used to conduct research on the reliable and economic operation of power systems. In addition, the research deals with the integration of increasing amounts of wind and solar energy into the grid and the implications of the electrification of transportation. EPRC research helps ensure that Iowa, the U.S., and the world have a supply of electric power that is cost-effective, reliable, and sustainable.

- Keeping Iowa youth interested and participating in STEM initiatives will create a better prepared future workforce and ultimately help improve economic development in the state of Iowa. The College of Engineering plays a vital role in filling the engineering pipeline by providing critical leadership to K-12 outreach efforts such as FIRST LEGO League, Junior FIRST LEGO League, Project Lead the Way, engineering summer kids’ camps, Mom’s Night out for STEM, and multiple other outreach events and hands-on activities. In FY13 more than 6,000 middle and high school students attended Project Lead the Way courses at 200 sites across the state. The College of Engineering also supported more than 4,000 youth participants as part of FIRST LEGO League, and hosted nearly 800 youth in engineering summer kids’ camps.

- A cooperative agreement between the U.S. Department of Agriculture (USDA) and CIRAS leveraged resources and the university’s expertise in biofuels, biobased chemicals, and end-use biobased products to develop rules, procedures, and infrastructure needed to operationalize the national BioPreferred® Program, which was created by the 2002 Farm Bill and expanded
by the 2008 Farm Bill. CIRAS developed systems to collect and access information on the biobased industry, and worked with the ASTM International standards committee to perfect the methodology for determining biobased content, and collaborated with USDA to establish programmatic policies to support operations, rules for designating biobased product categories, and regulations for the biobased certification labeling program. CIRAS identified more than 3,500 companies across the U.S. that represented more than 27,000 biobased products and assisted with the labeling of more than 900 biobased products.

ISU involvement with the USDA BioPreferred Program concluded in FY13 but the CIRAS contributions allowed USDA to take the next steps in operationalizing the systems that were developed and helping the biobased industry grow by gaining access to government markets.

**Agriculture and Natural Resources Extension and Outreach** reports several economic development training and other activities.

- **Economic Benefits from Hands-on Ventilation Workshops**
  A multistate, interdisciplinary team of Extension and Outreach specialists (South Dakota, Minnesota, Nebraska, and Iowa) developed a training program on ventilation system management that producers can understand and adopt into their operations supported by pork producer associations. The workshop incorporated a hands-on method that allowed participants to learn, not only from the specialists, but also from putting the newly acquired information into practice. Specialists worked together to build a model swine facility on wheels that contains all the equipment, inlets, and controllers needed to let producers practice ventilation principles.

  In Iowa 15 workshops reached 254 pork production operations and/or systems; 189 post-workshop surveys were completed; those completing the survey had influence over 10.7 million market hogs, representing a third of Iowa’s swine industry. After-workshop survey results indicated that participants had increased their confidence to make the proper changes to their system. About half of the participants estimated a value change in energy savings and improved farm air quality for their operation. The total benefit for all participants was reported at $411,600 in production improvements and energy cost savings.

- **Successful Intergenerational Transition of Farmland Ensured through Education**
  Access to capital and/or land ownership is a huge limitation for beginning and non-traditional farmers trying to enter into agricultural production and processing. Developing strategies to access capital for new start-up businesses or transferring land and farm operations from generation to generation is critical to a smooth transition from one owner to the next. More and more women are assuming farm management roles in existing operations or have become landowners through purchases or inheritance and are seeking ways to better manage and sustain the profitability of these farming operations.

  In conjunction with an ISU Extension and Outreach farm management specialist, Value Added Ag staff helped train and prepare educational leaders to conduct Annie’s Project farm management programs fostering improved problem solving,
record keeping, and decision making skills for farm women with an emphasis on estate planning, retirement, and succession planning. Survey results from 74 attendees indicated improved awareness and a request for additional in-depth training in estate planning (54 percent); 61 percent developed new support networks and identified new professionals to support their farm management tasks. Participants learned strategies that they plan to implement on their own farms.

- **Local Foods Potential Expanded**
  One of the major obstacles constraining local food production in Iowa is limited availability due to seasonality. Producers have expressed great interest in expanding their production potential through the use of high tunnels (HT) to extend their growing season and improve production quality and quantity. Extension and Outreach developed two related publications on rainwater catchment and vegetable production budgets for HT. Staff also conducted seven one-day workshops introducing HT production to growers across the state that reached 158 current or future growers. Four additional conference presentations that focused on high tunnel production introduced 100 additional growers to the production methodology.

  A high tunnel publication has been downloaded more than 150 times; 86 growers attended workshops on the topic. These attendees provided feedback and requests for additional training on crop specific production methodology. Portions of these workshops also were presented as breakout sessions at numerous local foods workshops across the state. Survey results show that as a result of these workshops 60 percent of attendees plan to increase their fruit and vegetable production and marketing.

- **Lowering Costs for Dairy Producers**
  More than 40 percent of dairy producers in Iowa are milking in stall barns or antiquated milking parlors that are achieving only 25 cows milked per person per hour. This not only creates a labor and financial drain, but also impacts human health and animal performance. An exceptionally useful tool for producers considering milking system decisions would be a database of costs, benefits, and economic ranges of income and expense variables and responses by producers who have already implemented decisions on building low cost parlors or automatic milking systems.

  The ISU Extension and Outreach Dairy Team analyzed surveys from producers with whom they had worked who had already installed a low cost parlor (LCP) or automatic milking system (AMS) on their farm. Surveys were completed by 90 percent of LCP producers (18/20 surveyed) and 8 AMS producers (50 percent of all AMS farms, since this is a very recent technology). Those that built an LCP are milking 55 percent more cows on average, while decreasing milking labor 28 percent (2.44 hrs/day). LCP milking labor costs decreased from $1.83/cwt milk to $0.95/cwt (0.98/cow/day to $0.50/day). LCP producers saw a 15 percent increase in milk production (8 lbs), 23 percent decrease in SCC (improved milk quality), and a 4 percent reduction in culling rate, equating to more than $80,000 of income increase per farm per year. These changes led to more than $2 million of additional annual income from the 26 farms completing the survey.
Drought Response Helps in Economic Decisions
The drought of 2012 highlighted the ability of ISU Extension and Outreach to accurately assess the situation and proactively provide research-based information and resources for farmers and service providers to help manage their operations in the face of an extreme weather disaster. Two rapid response drought webinars efficiently conveyed expert information to a statewide audience, giving producers the option of viewing the archived version at their own convenience. In addition, dozens of live regional drought meetings were held in cooperation with industry partners, with 5,300 farmers attending.

ANR Extension and Outreach specialists at Iowa State University conducted a drought educational webinar on Aug. 21, 2012, that was hosted at 51 sites across Iowa. A survey of participants showed a significant increase in their knowledge about grain quality concerns, feed implications, harvest considerations, fall fertility decisions, tillage, cover crops, and residue. More than 70 percent of respondents indicated that they plan to check and clean engine compartments more frequently to reduce the risk of combine and field fires, conduct soil tests, and adjust rates before applying fertilizer.

Fifteen percent indicated a likely economic impact from the knowledge they gained during the webinar of more than $50,000, followed by $10,001-25,000 (11 percent), $501-1,000 (10 percent), $1,001-5,000 (10 percent), $5,001-10,000 (10 percent) and $25,001-50,000 (9 percent). Participants identified teaching tools such as webinars (32 percent) and emails (32 percent) as most useful in receiving drought related farming information.

Food Safety Education Allows Local Food Providers to Improve Business
Iowa fruit and vegetable farms received assistance in writing food safety plans for on-farm production and post-production processes, resulting in more local food providers being able to continue in business by producing safe and healthy food and non-food agricultural products, taking into account economical, social, and environmental sustainability. Arranging for their GAP audits on the same day they received assistance in writing food safety plans resulted in a cost savings of up to 50 percent. Through education, Extension and Outreach creates an environment in which local food providers can support public health by making healthy food readily available, thus reinforcing good nutrition.

Local Food Providers Learn Good Ag Practices (GAP)
The growing demand for local and regional food offers an unprecedented market opportunity for small and mid-sized farms and holds great promise for increasing the access to healthy and affordable food for rural areas. However, participation in the food system beyond the local direct market often demands that farms demonstrate compliance with complex GAP certification. Working with the Northeast Iowa Food & Farm Coalition, ISU Extension and Outreach used a grant to achieve two goals: 1) to develop a training program to equip food safety “coaches” who could provide technical assistance to farmers to implement GAP and prepare them for food safety certification, and 2) to create a GAP cost-share program to assist farmers with the cost of an audit.

Through the coaching program, 21 Iowa fruit and vegetable farms received assistance in writing a food safety plan. The mock audit helped participants
identify food safety areas of concern, so they could address them prior to paying for a real audit. Following the mock audit, 11 farms requested a USDA GAP audit for their farm and 100 percent passed, allowing these growers greater market access for their produce.

- **Beef Producers Increase Profitability through Technology**
  Beef cow numbers in the United States are the lowest since the 1950s. The ISU Iowa Beef Center and the Iowa Cattlemen's Association hosted 10 Heifer Development Clinics across Iowa in January, February, and March 2012. Participants who completed a post meeting evaluation managed an average of 103 cows and retained 20 heifers each year. Over 90 percent of the attendees showed improved understanding of technologies available to develop heifers, management practices to improve conception and longevity and keys to successful heifer development. The majority of participants plan to retain heifers in the future and more than 20 percent plan to increase the number retained. Participants managed more than 61,800 cows and retained 12,000 heifers each year.

- **Improving Efficiencies in Grazing Helps Producers Increase Production**
  Improving productivity of pastures through better management allows increased beef production per acre of land. Improved productivity in turn incentivizes marginal land to remain in forage production. Profitable forage production on marginal land improves economic activity in rural Iowa, reduces soil erosion, and improves water quality. Extension and Outreach initiated the Iowa Certified Grazer Program in 2012, targeting advanced grazing managers to pilot a new curriculum for an advanced grazing school, and grazing mentor program.

  Survey responses indicated participants managed an average of 129 cattle and 235 acres. Seventy percent of the respondents improved beef production per acre by at least 20 percent. The median economic value resulting from these educational efforts was more than $1,000 per operation. The impact resulted in $1.1M in added economic activity to rural communities and improved the productivity equivalent to 64,000 acres, or the forage to support more than 35,000 beef cows.

- **Timely Farm Management with Online Ag Decision Maker and Estate Planning Workshops**
  Farmers, financial lenders, farm managers, and agriculture educators understand that having current, unbiased agricultural economics and business information is important to making sound farm management decisions. Knowing where to go in a rapidly changing agricultural environment to access up-to-date information that includes new and emerging issues is critical to their success.

  The Ag Decision Maker (AgDM) website, www.extension.iastate.edu/agdm, is such a resource. The website currently has more than 3,200 visitors per day, and an average of 65,000 unique users each month. These visitors spend a total of 500 hours on the site every day. Of visitors who visit more than once, the average number of visits is five to six times each month.

  AgDM materials were the key component to the Evaluating Your Estate Planning (EYEP) workshops across the state. Participation went beyond initial
expectations, with 13 meetings and 395 participants in the first year; 19 more meetings are planned. Evaluations found that after attending, 95 percent of participants knew the kind of information about their estate plan they should take to an attorney. Eighty-seven percent currently had a will, and 87 percent of participants were likely to visit their attorney to revise their will as a result of what they learned at the EYEP program.

A follow-up survey nine months after the EYEP meetings found 64 percent of participants had visited an attorney regarding their estate plan as a result of the program. Those who had not visited an attorney hadn’t because they didn’t feel a need to, already had a plan in place, or were still deciding what to do. Participants who visited with an attorney post-meeting went into that meeting more prepared and were able to save legal time and money by making decisions prior to the visit. More than 60 percent involved their family in decision-making and increased communications. Sixty-nine percent had held a family meeting to discuss their estate plan with their spouse, estate planning team, and/or heirs.

The Center for Agricultural Law and Taxation (CALT), the primary source of professional educational training in agricultural law and taxation, presented educational opportunities for attorneys regarding legal issues pertaining to estate planning and farm taxes. Approximately 1,500 attorneys from Iowa, North Dakota, and Kansas have participated in seminars and webinars on Agricultural Law, Farm Estate and Business Planning, and Farm Income Tax, ensuring that farm families have access to attorneys with current legal information to address their needs.

**4-H Youth Development** reports the following economic development training activity.

- **STEM Skills for Iowa’s Future Workforce**
  In order for Iowa youth to be successful in the 21st century, they must be prepared with science, technology, engineering, and math (STEM) skills necessary to meet Iowa’s workforce needs and economic development plans. ISU Extension and Outreach’s 4-H Youth Development program, in partnership with many local and national organizations and businesses, provided STEM opportunities for youth in every Iowa county. These programs inspire and prepare today’s youth to become science-literate citizens and meet future Iowa workforce needs. ISU Extension and Outreach plays a vital role in filling the STEM pipeline for Iowa companies. 4-H provides leadership for pre-collegiate (K–12) STEM outreach, including the State Science and Technology Fair of Iowa, 4-H STEM projects and exhibits, STEM camps, county STEM programming, 4-H STEM special events at the Iowa State Fair, and STEM focused 4-H clubs. In FY12, 590 sixth through twelfth grade students participated in the State Science and Technology Fair of Iowa. County Extension and Outreach programs engaged 20,379 participants in STEM focused programs or 4-H STEM projects ranging from environmental stewardship to geospatial mapping — from which 35 STEM exhibits advanced to the Iowa State Fair and 11,646 youth were enrolled in groups using STEM curricula or engaging in STEM activities in 4-H programs. In addition, 68 youth participated in STEM events at the Iowa State Fair, 12 youth participated in a STEM workshop at the State 4-H Youth Conference, and 12 youth participated in STEM workshops at the Iowa 4-H Center.
Keeping Iowa youth interested and participating in STEM initiatives will create a better prepared future workforce and ultimately help improve economic development in the state of Iowa. The Iowa Governor’s STEM Advisory Council established the North Central STEM Hub at ISU. As part of the STEM Initiative the North Central Hub supported STEM events in the region that had 155 youth attend and also hosted a STEM Festival event at VEISHEA that was conducted by 25 youth with an estimated attendance of more 2,000 youth. 4-H supported and participated in the Regional Scale-Up program that was overseen by the hub managers that as an aggregate of all regions had 283 Scale-Up programs reported, documenting 10,046 K-12 participants.

Human Sciences Extension and Outreach reports the following economic development training activity.

- **Volunteer Income Tax Assistance Helps Families Build Financial Security**
  The Earned Income Tax Credit (EITC) augments the wages of low- and moderate-income workers and, in turn, this flow of income makes a substantial economic impact in local communities. EITC recipients circulate their refunds through the local economy, creating a ripple effect that exceeds the size of the original refund. This money strengthens neighborhoods, assists small businesses, and spurs local economic development. ISU Extension and Outreach worked with community partners to recruit and train 60 volunteers to provide free tax preparation services to low- and moderate-income families through the Volunteer Income Tax Assistance (VITA) program. In 2013, VITA volunteers working at 24 VITA sites helped 1,633 low- and moderate-income Iowans complete their 2012 income tax returns. Special efforts were made to increase awareness of the EITC and VITA in rural Iowa. As a result, 675 filers qualified for the EITC and received $959,550 in the 25 counties that participated in the extension-community partnerships to expand VITA programs in rural Iowa.

Ames Economic Development Commission
The Ames Economic Development Commission’s (AEDC) five-year plan focuses on building key infrastructure, supporting business growth, and collaborating with Iowa State University and the Research Park on new ventures. AEDC has also developed its Workforce Development Initiative (WDI) that will target high-value projects and train skilled workers for a variety of industries.

2. Please provide the following information for FY13: (If your institution utilizes additional metrics specific to your institution’s specialized areas of research or service, please include them here)

   **Note: Unless noted, the data provided below are FY13 data.**

   a. Number of disclosures of intellectual property: 98
   b. Number of patent applications filed: 39
   c. Number of patents awarded: 24
d. Number of license and option agreements executed on institutional technologies, in total and in Iowa: 79 total, 39 in Iowa

e. Number of license and option agreements yielding income: 173

f. Revenue to Iowa companies as a result of licensed technology: $45 million (CY12)

g. Number of startup companies formed, in total and in Iowa (through licensing activities): 2 total, 1 in Iowa

h. Number of companies in research parks and incubators: ISU Research Park: 40 private and 13 university-related; Plant Sciences Institute Innovations Development Facility (IDF): 3 (all university-related or affiliated)

i. Number of new companies in research parks and incubators: ISU Research Park: 3 private, 0 university-related and 0 affiliates; Plant Sciences Institute IDF: 0 (university-affiliated)

j. Number of employees in companies in research parks and incubators: ISU Research Park: 1009 private and 231 university-related; Plant Sciences Institute IDF: 3 FTE (all university-related or affiliated)

k. Royalties and license fee income: $9.1 million

l. Total sponsored funding received: $326.4 million of which $193.8 million is for research

m. Corporate sponsored funding received for research and economic development, in total and in Iowa: $28.1 million total, $13 million in Iowa

n. Iowa special appropriations for economic development in the following categories:
   o Annual state appropriations for ongoing economic development programs (such as research parks, SBDC, IPRT): $2.4 million—includes $936,345 SBDC (includes state-wide programs), $122,355 ISU Research Park, and $1,365,602 IPRT
   o Regents Innovation Fund appropriations: $1,050,000

o. Research expenditures (federal, state and local; business; nonprofit; institution funds; all other sources): $261.0 million—Note that this is the FY12 total reported to NSF for its Higher Education Research and Development (HERD) Survey.

p. Licenses and options executed per $10 million research expenditures: 4 (est.)—Note that this is an FY12 figure, the most recent number available.

q. Sales of licensed products by Iowa-based companies: See d. above

r. Number of employees for current Research Park tenants and incubators, as well as former tenants that are still in existence in basic form world-wide: 3,802

3. Please describe the ways in which your institution is engaged in the following activities (For example, what is the nature of the outreach and service activities? Which units provide it? What kinds of people and organizations benefit?)
   A. Direct and hands-on technical assistance to businesses and entrepreneurs
   B. Direct economic development assistance to Iowa communities
   C. Economic development services provided by research parks, incubators or similar service units
3A. Direct and Hands-on Technical Assistance to Businesses and Entrepreneurs

Iowa State Economic Development
ISU has developed a comprehensive system to foster innovation. Our focus is on the transfer of university technologies into commercial applications in startup or existing companies. Functions include:

- **Business Development and Assistance and Entrepreneurial Activities**: Efforts related to startup companies, including business assistance services and SBIR/STTR applications.
- **Technical Assistance and Technology Development**: Solving technical problems, assisting in product development and process improvement projects for existing businesses. This includes the current efforts of no-cost technical assistance and cost-sharing projects.
- **Industry Relations**: Facilitation of a multitude of interactions between ISU and its industry partners, including the management of research relationships and interactions with economic development groups, legislative groups, and other third parties.
- **Community Development**: To disseminate and develop programming, facilitating community organizations, fostering community planning, and coordinating with community and regional economic development networks and organizations.
- **Technology Transfer and Licensing**: The transfer of intellectual property (patentable inventions, copyright works and proprietary materials) to business and industry through license agreements.
- **Physical Space**: Physical space for business incubation is available in the ISU Research Park, the Plant Sciences Institute’s Innovations Development Facility, the Center for Crops Utilization Research, and the BioCentury Research Farm.
- **Research and Instrumentation Facilities**: Iowa State University maintains more than 20 central research facilities that also serve communities and businesses on a fee-for-service basis.

**ServSafe®**
ISU Extension and Outreach nutrition and health specialists are registered instructors for the National Restaurant Association’s Educational Foundation’s internationally recognized food safety certification program. ISU Extension and Outreach specialists have taught the ServSafe® food safety certification program for more than 15 years. From July 1, 2012 through June 30, 2013, more than 1,000 Iowans participated in ServSafe® courses taught by ISU Extension and Outreach, with 90 percent successfully earning certification. Participants are from commercial retail foodservices such as restaurants and institutional operations such as hospitals and schools. Commercial operations recognize the value of training staff in safe food handling procedures, as an incidence of a foodborne illness can be devastating for business. In addition, promotion that staff members are certified in food safety can be a marketing advantage as many operations post these certificates. Proper preparation, holding, and service of food are critical in any place where food is served. Many of participants work in operations that serve those considered at greater risk of contracting a foodborne illness due to compromised immune systems; food safety training can avoid costly medical expense.
Technical Assistance for Startup Company
Harrisvaccines, located in the ISU Research Park, is a revolutionary animal health vaccine company started in 2005 by Dr. Hank Harris, a College of Agriculture and Life Sciences professor. The company turned to CIRAS to improve speed to market—accelerating their transition from start-up to an established corporation. Prior to the project, the company took eight to ten weeks to get a vaccine delivered. This decreased to four to six weeks as a result of the technical assistance. This project leveraged previous support from the ISU Research Park, Iowa Farm Bureau Federation and the Iowa Economic Development Authority.

$17M Impact Generated by Student Projects with Companies
Senior capstone design projects are the culmination of engineering education for undergraduate students. Iowa companies, through a partnership between CIRAS and the College of Engineering, provide students challenging opportunities to apply their engineering knowledge to real-world applications as a final step in preparation for joining the workforce.

By working with the students, companies gain a new perspective on difficult engineering problems as well as the value engineers bring to an organization. As a result of the projects, many companies achieve innovative solutions that lower costs and enhance productivity. The ability to showcase the company and recruit engineering students nearing graduation is an added benefit to the partnering businesses.

In addition to the senior capstone design projects, engineering students have worked with companies on projects related to cellular lean, materials, and facility planning.

In 2012, students worked on 53 projects with 27 different companies. Companies responding to surveys reported impact of more than $17 million for these projects.

$30 Million Impact Reported by Dyersville, IA, Manufacturer
ESAPCO, a manufacturer of fabric structures and greenhouses, in Dyersville, Iowa, saw an immediate impact from changes made as a result of a productivity improvement project with CIRAS. The company reported a $26M increase in sales and $3.9M in cost savings.

Department of Commerce and Department of Defense Programs Assist Company
Quality Machine of Iowa increased sales by $1M due to combined expertise from two CIRAS managed federal programs. This technical assistance was provided through the Department of Commerce Manufacturing Extension Partnership (MEP) and the Defense Logistics Agency Procurement Technical Assistance Program (PTAP) administered on behalf of the Department of Defense. The Audubon, Iowa, company received technical assistance in defense contract marketing skills, resulting in an award of a five-year defense contract. Technical assistance in lean manufacturing techniques resulted in cost improvements.

Applied Research Project on Company Worksite Wellness Program
With the upcoming implementation of the Affordable Care Act, understanding the impact of a worksite wellness program is increasingly important. Through funding provided by the Economic Development Administration University Center Program, CIRAS and Human Sciences Extension and Outreach partnered to conduct a pilot worksite wellness
program with three Iowa manufacturers: The Graphic Edge in Carroll, Timberline Manufacturing, Inc., in Marion, and Rosenboom Machine & Tool in Sheldon.

Research suggests that worksite wellness programs can generate a return on investment (ROI) of $4-8 per $1 invested as a result of increased productivity and decreased absenteeism and healthcare claims. A goal of the pilot program is to examine the ROI for Iowa employers.

This year, 60 employees from each of the three worksites were recruited to complete a baseline health risk appraisal (HRA) as well as an emotional and financial assessment - with 30 employees then randomly assigned to the control group, receiving no additional programming, and 30 employees assigned to an intervention group, which completed a 6-month educational program.

In January, 2014 the HRA will be repeated with the 60 employees to examine effects of the program on the workers. Health claim information and absenteeism records will also be collected. An analysis of the results will help companies make better informed decisions about the ROI of wellness programs on the company’s bottom line as well as the impact on employee well-being.

3B. Direct Economic Development Assistance to Iowa Communities

- **Sustainable Economies Program**
  ISU Extension and Outreach CIRAS and Community and Economic Development partnered to leverage $614,000 of state funding with $614,000 of federal funding through a 3-year grant from the Economic Development Administration University Center Program (EDA UCP). This Sustainable Economies Program provided Regional Trade Centers (RTCs) in rural Iowa with an in-depth economic assessment of the financial, social, and environmental “triple bottom line” well-being of the region, coupled with technical assistance to the critical organizations and businesses of the region.

Technical assistance was provided in the Carroll region, Lee County (Fort Madison and Keokuk), Appanoose County (Centerville), and Cerro Gordo County. Assistance helped these rural areas to better understand their economic sustainability and provided support in taking steps to long-term prosperity. In addition to the economic analysis, technical assistance projects were launched within the communities and businesses participating in the program.

In 2012, more than 38 distinct clients were served with more than 400 regional stakeholders attending planning meetings and sustainability sessions facilitated by ISU Extension and Outreach focusing on the steps needed for long-term success in the RTC. Stakeholders included participants from the business sector, government, nonprofits, education, and interested citizens — uniting a variety of existing programs to create a common set of goals and actions for their region.

- **Student Involvement in Business and Community Development**
  This year the Partnering Landscape and Community Enhancements (PLaCE) program involved nearly 200 students in outreach projects in dozens of Iowa
communities, including Mapleton, Cedar Rapids, Perry, Ottumwa, Des Moines, Dubuque, Cedar Rapids, Audubon County, and Sioux City. The ILR Community Visioning Program employed student interns to work in the Amana Colonies and seven other communities, and the Community Design Lab employed several interns to assist community design projects in Waukon, Maquoketa, and Clarinda. Funding through the ISU Provost office also has led to the development of the new Community Design Laboratory, providing a new venue for student engagement with Iowa’s communities.

- **Regional, State and Local Partnerships with ISU Extension and Outreach**

  ISU Extension and Outreach maintains partnerships and shares joint community development specialist positions with the Chamber of Commerce of Keokuk, the City of Fairfield, the economic development organization of West Liberty (WE-LEAD), the development organization of Cedar County (CCEDCO) and the regional development organization of Southwest Iowa (SWICO). Each of the local economic development positions are jointly funded by ISU Extension and Outreach and a local partner for which the person serves as a local development official who provides economic development education part time.

  ISU Extension and Outreach has established a unique partnership with the City of Dubuque and the University of Wisconsin to create a joint faculty position specializing in community planning and leadership. This partnership has resulted in a joint faculty hire who is located in Dubuque but serves both Wisconsin and Iowa. The agreement and joint appointment is one of the first of its kind in the country between two land-grant institutions. The person was hired at the rank of associate professor and is tenured at Iowa State University. Each state extension system pays half the associated costs. The research and extension programming focuses upon community leadership development extension education, and community leadership in response to natural disasters.

  ISU Extension and Outreach cosponsors a joint educational position with the Iowa League of Cities, focusing upon local government finance. Joint programming coordinated through this position included the Iowa state municipal clerks institute and webinar series on tax incremental financing attended by more than 500 across the state.

  In part because of collaborations with cities and organizations, and direct extension education and applied research assistance, ISU Extension and Outreach leveraged more than $130 million in local grants, infrastructure development, local staff time, volunteer time, and loans within the communities served.

- **Iowans Walking Assessment Logistics Kit (I-WALK)**

  First offered in 2010, I-WALK is a partnership of the Iowa Department of Public Health and ISU Extension and Outreach. The goal of I-WALK is to develop community coalitions and provide them with relevant, local information to help them continuously update, implement, and evaluate the infrastructure and programs to support a more walkable, healthy, and safe community. I-WALK has a heavy emphasis on data collection and analysis, with the goal of providing communities with the up-to-date information and data analysis necessary to
assist with identifying priorities that will make the best use of the limited financial resources available. To date, 31 sites representing 41 communities have participated in the program. More than 2,300 surveys have been completed in which 2,500 locations of barriers/opportunities were mapped. Teachers submitted 650 teacher tallies to formulate a baseline to use in grant applications, and more than 500 residents attended GPS workshops to collect infrastructure data. These GPS workshops yielded data for more than 8,200 midblock sidewalks, 5,300 intersections, and 2,500 additional features—all information for which the communities had no mapped data. In 2013 I-WALK was expanded and now includes assessment programs for both Safe Routes to Schools and Older Adults. More than 350 citizens have joined local coalitions, and although it often takes several years for efforts to materialize, several communities have used the generated data to submit grant proposals—a few of which have already been successful and will result in new infrastructure being built—to develop local programs (such as the Walking School Bus) and to develop plans for new sidewalks and trails to be constructed in the future.

- **Iowa’s Living Roadways Community Visioning Program**
  Since 1996 the Community Visioning Program has helped rural communities plan transportation enhancements using state funds from the Iowa DOT. To date, 200 Iowa towns have completed the process and collaborated with design teams to create conceptual transportation enhancement plans. Documented impacts of the program since 1996 include the following:
  - Ninety-four percent of participating communities complete at least one project.
  - Internet research of state funding shows that to date, 124 visioning communities received funding from five state programs to do 285 projects. Seventy-seven percent of the projects were directly related to visioning concept plans and 27 percent were not directly related to the program.
  - Nearly $30 million has been awarded to communities that have participated in community visioning.
  - Estimated cash matches from awardees exceed $12.6 million for an estimated $42 million generated.

  For example, since completing the Iowa’s Living Roadways Community Visioning process in 2012, the city of Manning has started the process of implementing concepts proposed through the visioning process, including new entrance signage, roadside plantings along Highway 141, Main Street improvements, and trail amenities. Estimated completion times for the signage and roadside plantings are Summer 2013 and Spring 2014, respectively. ([http://www.manningia.com/current-projects.html](http://www.manningia.com/current-projects.html)).

- **Mapleton Rebuild and Recover**
  The fall 2012 landscape architecture community design studio worked with the Mapleton Rebuild and Recover Committee and Foundation to identify landscape-based strategies for Mapleton’s long-term recovery. In 2011, more than half of the community was damaged by a Category 3 tornado. Students conducted focus groups, surveys, interviews, and mapping workshops with Mapleton residents to gain a better understanding of the needs and desires of the community. Based on the information they gathered, the class developed a
series of project proposals that address community infrastructure, renewable energy, recycling existing resources, and new uses for open spaces—including those created by the tornado. Since the completion of the studio, Mapleton applied for and was accepted to the 2013 Iowa’s Living Roadways Community Visioning Program through which they are continuing with transportation enhancement planning. Mapleton also applied for and was accepted to the 2013 Iowa’s Living Roadways Projects Program to do roadside planting, which was completed in spring 2013.

- **Fairfield Receives Environmental Excellence Award**
  Fairfield was one of three communities picked by Alliant Energy to participant in Alliant’s Hometown Rewards efficiency program. CED sustainability specialist Scott Timm organized the program in Fairfield. Participation resulted in Fairfield’s residential customers reducing their energy use by about 8.5 percent and commercial customers cutting energy use by about 8 percent. Because of the program, Fairfield earned Governor Terry Branstad’s Environmental Excellence Award for Energy Efficiency/Renewable Energy. Since early 2012, 1,800 volunteer hours have been spent planting trees at various locations in town. With a $1,000 grant from Home Depot, volunteers led by Timm weatherized 22 homes, half of which belong to military veterans. An energy-efficient Habitat for Humanity house is currently under construction.

### 3C. Services Provided—ISU’s Key Units Engaged in Economic Development

The Office of the Vice President for Research and Economic Development has worked closely with all of the key units previously mentioned, including the Office of the Vice President for Extension and Outreach, in promoting the University’s mission related to economic development and technology transfer. University administration has made some strategic changes for rapid expansion of the university’s economic development efforts.

- President Steven Leath appointed Michael Crum the new Senior Policy Adviser on Economic Development to work with internal and external groups. In addition to representing Iowa State on economic development boards, he'll work to strengthen coordination with constituents that include those boards, business associations, government agencies, communities and foundations. Crum will serve as a gateway for Iowa’s business community to the expertise and business services offered through Iowa State.

- The ISU Research Park now reports directly to the President’s Office, to allow the university to be more aggressive and more nimble in pursuing partnerships.

- The Iowa legislature this past spring invested $7.5 million to support Iowa State's Leading the Bioeconomy initiative. The investment is being used to leverage ISU's student education and to conduct research that strengthens Iowa's bioeconomy and leads to new biosciences jobs in the state of Iowa. The initiative will invest $2.25 million to expand the Biorenewables Laboratory and the BioCentury Research Farm, providing new equipment, facilities and capabilities that both create discoveries and translate those discoveries into successful commercial processes. The initiative will invest $2.75 million to expand work in eight new and existing research projects. Another $1.45 million will be used to
renovate three existing laboratories: the Animal Science Nutrition Laboratory, the Livestock Health and Feed Efficiency Laboratory and the High Throughput Mass Spectrometry Laboratory. Iowa State will use $500,000 to attract high caliber graduate students interested in the biorenewables field. This initiative will strengthen the university’s research programs by awarding 12 one-year graduate fellowships in 2014, and support Iowa’s bioeconomy workforce by offering new specialized courses in biorenewables.

Iowa State will invest $600,000 ($200,000 each) in efforts to build partnerships with companies and agencies on biosciences research projects; establish an industrial liaison office to work with Iowa biosciences companies; and expand the Biobased Foundry program of technological entrepreneurship.

The following units are the key units that focus attention on economic development and technology transfer at ISU; however, significant additional activity also occurs across campus in individual academic departments, centers and institutes, and colleges.

**Iowa State University Research Park**

The Iowa State University Research Park is a 230-acre development with over 446,000 square feet of building space and is located south of the Iowa State University campus. Iowa’s governor and legislators provided $12 million in funding to support a new building in the Iowa State University Research Park. The new facility will bring together formerly scattered services and agencies that support technology transfer and economic development, Construction of the new building is expected to be completed within the next three years. Currently, the Research Park offers two types of incubator facilities.

- **Biotech Wet-lab Incubator:** ISU Research Park houses an 8,000 sq. ft. wet-lab incubator facility. The incubation facility provides laboratory space for the growth and development of start-up, spin-off and established biotechnology companies. Features include:
  - **Technology Incubator:** The Technology Incubator identifies early-stage, tech-based concepts and businesses and aids in economic development and technology transfer. This provides an environment for growth by helping develop viable business plans and secure financial backing. To date, the Technology Incubator has supported over 80 start-up companies. To qualify, businesses must be Iowa companies formed under Iowa law, in the pre-venture capital stage of development, show potential for growth and development as an Iowa company, be based on a technology and related to ISU research and/or research services.

**Innovations Development Facility (IDF).** This is a business incubator operated by the Plant Sciences Institute to promote the commercialization of plant biotechnology. IDF encourages ISU faculty, staff, and students to commercialize their research in the plant sciences and promotes the development of startup companies among aspiring entrepreneurs. IDF is housed in the Roy J. Carver Co-Laboratory and consists of six well-equipped laboratory modules and three office spaces. The facility offers an environment to transition research from a university to a business setting. The IDF facility is a productive research location where scientists from academe and industry can work together to advance the mission of the Plant Sciences Institute and to promote economic development in Iowa.
Institute for Physical Research and Technology (IPRT)

Through IPRT Company Assistance, Iowa companies can leverage the expertise of the IPRT research centers and other ISU capabilities in order to solve technical problems, create new products and processes, and increase productivity and quality. IPRT Company Assistance provides help through both its R&D cost-sharing program and through short-term, no-cost technical assistance. IPRT actively collaborates with Iowa companies on technology development projects. Many successful businesses have emerged from IPRT technologies, including Mechdyne of Marshalltown and BodyViz of Ames. In addition, startup companies such as Iowa Powder Atomization Technologies of Ames and Avello Bioenergy of Boone have received assistance from IPRT and are showing great commercial potential.

The staff members of the Materials Group and the Nondestructive Evaluation Group within Company Assistance provide significant and broad expertise to help Iowa manufacturers address material and inspection issues. These programs offer state-of-the-art capabilities to businesses, and both groups have expanded their capabilities and facilities to keep pace with research advances and modern industrial needs. This direction allows them to interact with various industrial clients and tackle an increasingly wide range of challenges.

The Research Cost-Sharing Program is available to Iowa companies for pursuing research conducted at ISU. The program, offered through IPRT Company Assistance and funded by the state, provides an effective yet inexpensive way to access the facilities, expertise, and knowledge of the faculty and professionals working at Iowa State. Through the Cost-Sharing Program companies can receive 1:1 cash matching on their research projects.

The Virtual Reality Applications Center (VRAC) is an interdisciplinary research center under IPRT whose primary focus is developing computer interfaces that integrate virtual environments, wireless networking, pervasive computing and third generation user interface devices to amplify the creativity and productivity of people. Research facilities at VRAC assist companies in addressing a diverse range of challenging problems spanning science, engineering, and the humanities.

Small Business Development Center at ISU (SBDC) and Pappajohn Center for Entrepreneurship

These units work with researchers to define the technologists' role in the company, evaluate markets, assist in the creation of a business plan and help the company develop connections with a network of business resources including consultants, accountants, attorneys, prospective employees and investors. In a typical year, the Pappajohn Center, working with IPRT, the Plant Sciences Institute, ISURF/OIPTT and other research centers, identifies approximately 25 prospective new technologies. These technologies can take six to 26 months to develop sufficiently to justify the formation of businesses. During this time the researcher receives business development assistance from the Small Business Development Center and Pappajohn Center for Entrepreneurship to move the technology from the researcher's bench to the marketplace. The Pappajohn Center helps the researcher develop the model for the business and establish the network of resources necessary to implement the plan. These resources can include business assistance, students or capital. The Pappajohn
Center/SBDC also continues to provide a referral network and facilitates the recruitment of students including access to internships.

**ISU Research Foundation (ISURF) and the Office of Intellectual Property and Technology Transfer (OIPTT).** ISURF owns and ISURF and OIPTT jointly manage, market, and license the intellectual property for Iowa State University. ISURF/OIPTT works with faculty members in regard to the reporting and protection of innovations, including patenting inventions. It markets the innovations to find commercial partners interested in licensing. ISURF also provides assistance to Iowa companies, including ISU faculty startups with SBIR and STTR applications. An FY13 reorganization brought the team responsible for negotiating industry-sponsored research agreements into OIPTT to more closely coordinate efforts to build public-private relationships.

- Iowa State University and the University of Iowa began offering a new research sponsorship option in 2013 that allows industry to pre-negotiate exclusive licenses to breakthroughs that grow out of their partnerships with university researchers. The new option spurs increased partnerships between Iowa’s Regents universities and industry by giving companies more tools to protect their research investments, and increase the rate of technology transfer to the private sector.

- The ISU Research Foundation hired a part-time Entrepreneur in Residence, Kurt Heiar. The intent is that his experience as a private sector CEO and entrepreneur will assist university efforts to move technology into the marketplace and create jobs for Iowans. He assists faculty and researchers; builds databases of investor, state and corporate contacts who will assist ISU companies; helps young ISU-affiliated companies and fledgling entrepreneurs overcome problems to keep them moving forward; presents guest lectures to classes and student organizations; and reviews existing technologies at ISU to help determine which have business viability.

**Extension and Outreach Center for Industrial Research and Service (CIRAS) helps companies grow and prosper.** The CIRAS mission is to improve the quality of life in Iowa by enhancing the performance of industry through applied research, education, and technical assistance. CIRAS has been working with companies in communities across Iowa for 50 years and has a vision for Iowa of healthy communities through business prosperity. Because multiple resources are necessary to meet the needs of Iowa businesses, CIRAS partners with Iowa's universities, community colleges, government agencies, and business associations throughout the state.

- Account managers meet with clients to assess needs and provide links to resources that companies can use to increase their competitiveness. Solutions are offered through a combination of direct assistance from center staff, university faculty, partner organizations, and outside consultants.

- CIRAS staff has expertise in • engineering • innovation • government contracting • productivity • management practices • safety • supply chain management • sustainability • quality management • community-business economic development.
Service to industry includes technical assistance and applied research in conjunction with ISU College of Engineering labs; regional economic development studies to better understand rural economies; development of company transformational plans for profitable growth; and educational workshops and mentoring for small to medium sized businesses.

CIRAS manages the statewide National Institute of Standards and Technology’s Hollings Manufacturing Extension Partnership (MEP), a program of the Department of Commerce. The objective of the MEP program is to be a catalyst for strengthening American manufacturing — accelerating its ongoing transformation into a more efficient and powerful engine of innovation driving economic growth and job creation. Through this program, CIRAS provides small to medium sized companies with the training, tools, and connections to accelerate innovation, leading to new opportunities in domestic and export markets.

The Defense Logistics Agency, on behalf of the Department of Defense, administers the Procurement Technical Assistance Program (PTAP). The purpose of the program is to generate employment and to improve the general economy by serving as a resource for businesses pursuing and performing under contracts with the Department of Defense, other federal agencies, state and local governments and with government prime contractors. CIRAS is responsible for this program in the state of Iowa. Staff helps businesses determine if they are suitable for government contracting, provides workshop training and outreach events, assists businesses with capturing government sales, and provides post award contract assistance.

CIRAS manages the Economic Development Administration (EDA) University Center Program in Iowa. The EDA’s mission is to lead the federal economic development agenda by promoting innovation and competitiveness, preparing American regions for growth and success in the worldwide economy. CIRAS was awarded a three-year grant to develop and implement the Sustainable Economies Program. This program integrated detailed economic studies with financial, social, and environmental technical assistance to communities and businesses in rural trade centers across Iowa. This integrated, scientific-based approach to sustainability and the triple bottom line helped the businesses, communities, and overall regional economy begin the process of reliable, long-term growth.

Agriculture and Natural Resources Extension and Outreach provides unbiased, research-based information and education to agricultural professionals to grow the economic base of Iowa agriculture. Extension and Outreach educates Iowans about local actions to produce a safe, sustainable, accessible, and affordable food supply for the state, the nation, and the world. Programs address all segments of the food supply chain, from productive capacity of Iowa’s agricultural and human resources, to production and processing technology, market functions, and management. Programming also includes accessibility, affordability, and safety to reduce food insecurity of Iowa families. Assessment, analysis, and education are provided on a broad scope and scale of Iowa’s food system.
➢ Commercial agriculture production programs provide research-based information and education on economically viable commercial production of commodity crop and livestock producers. Field days, research reports, webinars, meetings, peer groups, decision support software, and on-farm research and consultation help farmers and agribusinesses stay current on latest trends and technologies to improve efficiency and sustainability. Emphasis is placed on long-term economically and environmentally optimal production systems.

➢ Protecting Iowa’s natural resources is essential to a sustainable agriculture based economy and for quality of life for all Iowans. Education, demonstration, and information programming address management decisions affecting farmed and natural landscapes as they relate to soil and water quality, conservation practices, tree management, recreational activities, energy efficiency, certification programs, and connecting youth and families with nature.

➢ Global market conditions and increasing climate volatility contribute to increased risk for farmers. Educational programming and decision support software provide farmers with methods to evaluate market conditions, government programs, crop insurance, farm leasing arrangements, and how production systems impact risk exposure.

➢ Financial management of farm businesses has a significant impact on long-term sustainability, growth, and overall success. Programs address economic decisions for crop and livestock production, land management and values, machinery investments, and human resource management. The farm population is aging and facing decisions about their retirement and estate and the next generation of farmers. Programs address the needs of new farmers and estate planning for farm families and tax and estate professionals.

➢ Local food production is rapidly growing in the Midwest to address the increasing demand for locally produced fruits, vegetables, and animal products. These farming operations typically are smaller with lower capital and provide opportunities for new farmers to get started or existing farms to diversify their operation. Programs address strategic and tactical decisions, as well as the day-to-day production and marketing decisions for these farms.

**Community and Economic Development Extension and Outreach** helps organizations and local governments develop and build their capacity to make Iowa communities better places to live and work.

➢ Extension and Outreach community and economic development specialists provide skills training each year for more than 40,000 community leaders, local government officials, business owners, entrepreneurs and volunteers.

➢ Community sustainability services focus on helping organizations and individuals meet the needs of the present without sacrificing the ability of future generations to meet their own needs. These services provide communities, economic developers, individuals, and businesses with the tools to manage the financial, social, and environmental issues they face to ensure success in the long run.
CD-DIAL (Community Development — Data, Information, and Analysis Laboratory) works with communities and organizations to build decision-making capacity as they collect and use information about their local population. Iowa Community Indicators Program provides Web-based information products such as local retail trade analysis and demographic and economic indicators. Regional trade center analysis provides an in-depth economic assessment of the financial, social, and environmental "triple bottom line" well-being of a regional trade center.

The Community Visioning Program empowers local leaders through a planning process that results in a transportation enhancement plan reflecting the values and identity of the community. Community tourism assessments help communities learn how their current tourism assets and readiness place them within today's tourism marketplace. In addition, they receive recommended steps for building tourism as a community economic tool.

Human Sciences Extension and Outreach provides research-based information and education to help families make decisions that improve and transform their lives.

Programming focuses on activities and projects to help Iowans live healthier lives through improved healthy behavior and physical health, and enhanced family, work, and community environments. Programs address caregiving for the aging population, community health, financial health, nutrition and physical health, and parenting.

Specialists help individuals, families, communities, professionals, and organizations assess their health and well-being needs; provide training, tools, and resources to meet those needs; and evaluate the impacts of these efforts to help Iowa reach the Governor's goal of becoming the healthiest state in the nation by 2016.

Human Sciences Extension and Outreach addresses emerging issues that affect the economic viability of Iowa families. Specialists help unmarried parents or parents in unstable relationships who have young children to build the knowledge and skills necessary to form and sustain healthy family and co-parenting relationships. The Planning Your Financial Future program helps child care providers manage their money and plan for retirement. Interactive workshops are designed to increase consumer knowledge and self-confidence in making health insurance decisions, so consumers can meet both their health insurance needs and budget.

4-H Youth Development prepares Iowa's young people for future careers. One in every five Iowa youth develops communication, citizenship, leadership and life skills by participating in 4-H programs.

Extension programs that engage Iowa youth in science, technology, engineering and math activities build skills to ensure that more students are well equipped to be knowledgeable citizens and begin college or career training prepared for success.
K-12 outreach programming connects Iowa children and youth with Iowa State University’s knowledge and research base to help them reach their full potential. Education and positive youth development experiences are offered on campus, within counties, and out of state.

K-12 outreach includes both 4-H Youth Development programs as well as outreach partnerships through the Iowa State colleges. These experiences help youth get excited about learning and discover new career choices.

Youth are challenged to actively pursue education beyond high school and build skills that improve their communities today. Programs are delivered through volunteers, community-based partners, educators, and county staff. Specialists assess youth programming needs, train adults who implement quality educational programs and experiences, ensure safe environments, and evaluate programs.

4. Please briefly describe two or three examples of major economic development collaborative projects with such other entities as Regent universities, Iowa community colleges, the Iowa Department of Economic Development, Iowa Workforce Development, or other state agencies.

**Major Economic Development Collaborative Projects**

**NSF EPSCoR**
Iowa EPSCoR, a $22 million NSF-supported effort of the three Regent university partners to boost the state’s research capacity in renewable energy and energy utilization, aims to make impacts far beyond the universities’ research labs. A Future Leaders in Advancing Renewable Energy (FLARE) Institute has been established. The statewide institute is designed to develop a skilled and diverse workforce that can meet the needs of Iowa’s emerging green economy. The program works with Iowa’s community colleges to strengthen their courses in science, technology, engineering, and math. And, the program is working to identify effective strategies for encouraging women and underrepresented minorities to enter science and technology fields. Iowa EPSCoR is also making connections with industry and policy leaders across the state and the country.

**STEM education**
Iowa State University is one of six Iowa STEM hubs selected by the Governor’s STEM Advisory Council in May. Each STEM network hub will work with business, education institutions, non-profit groups and others in their region in a way that best fits local needs, interests and resources. The hubs will provide more equitable statewide access to outstanding Iowa STEM education programs.

**Proof of Concept Initiative**
In a collaborative effort with the Iowa Innovation Corporation, Iowa State has established an initiative that focuses on increasing the transfer of technology while reducing the time to commercialize. Technology development and business development occur in parallel
by engaging staff from the ISU Research Foundation, the ISU Research Park, the Pappajohn Center for Entrepreneurship, and technology experts. This initiative provides a single, visible interface for faculty, staff, and students seeking state-supported research funding opportunities and provides simplified, coordinated communication. More information appears in Appendix 1 of this report.

State-wide committees
Many people from ISU serve on committees that promote economic development programs, such as the Iowa Innovation Council, the Iowa Innovation Corporation, the Biosciences Alliance of Iowa, the Iowa Innovation Council’s Iowa Advanced Manufacturing Committee, Iowa Meat Processors Association, Institute of Food Technologists-Iowa Section, the Iowa Lean Consortium, the Partnership for Industrial Energy Efficiency, Professional Developers of Iowa, the Iowa Business Council, the Iowa Alliance for Wind Innovation and Novel Development (IAWIND), Innovate Iowa!, and Capital Crossroads.

5. Please provide the following information about Grow Iowa Values Fund projects for FY 2013:
A. Identify and briefly describe each project or initiative which received GIVF funding in FY 2013 including information on outcomes or progress made
B. Identify metrics which were used to measure outcomes for each project and report progress on each metric for FY 2013
C. Provide a description of the sources of the matching institutional dollars for each GIVF-funded project

The Regents Innovation Fund (formerly Grow Iowa Values Fund [GIVF]) program has a competitive research component that pairs ISU faculty members with Iowa industries to create economic benefit for the companies. See Appendix 1 for a complete report.

6. Optional: If desired, please include observations regarding:
A. Availability of startup and venture capital for technology entrepreneurs
B. Suggestions for new programs or activities that could further enhance the impact of university technology transfer and service on creation of jobs and wealth in Iowa.

6A. Availability of startup and venture capital for technology entrepreneurs

The Values Funds to the universities have provided a valuable source of funding for proof of concept/early-stage development funding for the innovations that will become the next generation of businesses. Iowa State University has established a Proof of Concept Initiative (POCI) to fill a portion of the funding gap created by the loss of Values Funds. The POCI provides early-stage funding and commercialization assistance to researchers with promising discoveries.

Iowa has multiple seed funds, most of which are regional with varying capabilities or capacity to make investments. The Wellmark Fund has also provided early-stage capital to early-stage companies.
There remain several challenges to overcome. There are very few true venture capital firms located in the state of Iowa actively investing funds at this point in time. Iowa continues to suffer from a lack of investment capital to start up and rapidly grow technology and innovation-based firms. In addition, each fund has a particular focus, the investment profile further limiting choices and resulting in very little competition. Most venture firms invest with other venture firms, one as lead with the others in secondary positions to spread risk and assure the ability to continue to fund the needs of the company, and this is a major problem in Iowa. Firms must look outside the state for significant investments of more than $5 million. As always, really good businesses with really good management teams will attract money; developing experienced and skilled management teams remains a major challenge. Iowa State works with the Iowa Innovation Council and Iowa Economic Development Authority to identify breaks in the small business support system and to build supports in those areas.

6B. Suggestions for new programs or activities that could further enhance the impact of university technology transfer and service on creation of jobs and wealth in Iowa.

Restoration of funds for economic development and technology transfer activities due to budget cuts in the past several years would greatly enhance the University's efforts in this area. The following is a summary of what benefits would occur if funds were restored in the units affected by budget cuts.

- **Small Business Development Centers.** The SBDC helps its clients generate new taxes for the Iowa treasury in the form of income taxes on new jobs and sales taxes on increased sales. During the last full program year ending September 30, 2012, SBDC clients generated a total of $2,300,400 in new taxes, resulting in a return on investment of $1.72 for every Iowa tax dollar expended on the program. In addition, the SBDC helped clients avoid eliminating through layoffs or firm closings 524 jobs, resulting in a savings of unemployment compensation benefits of $2,197,043. Additional state support to SBDC would increase the state’s return on investment and retain Iowa jobs.

- **Iowa State University Research Park.** Any new funds to the ISU Research Park would be utilized to support costs associated with the planned expansion of the Park as well as to increase marketing efforts to attract new tenant companies.

- **Institute for Physical Research and Technology (IPRT).** The need for IPRT’s expertise by Iowa industries is rapidly growing. Over 75% of the Iowa manufacturers that IPRT serves have fewer than 100 employees. This means that Company Assistance’s typical industrial client will likely not have the needed expertise internally to address its material and inspection issues.

  The Materials Group of the IPRT economic development program provides short-term technical assistance to Iowa manufacturers at no cost to the user, and this is often the first interaction that manufacturers have with the University. Additional funding would allow for growth of materials assistance, enhancing the program’s delivery of services. The unit seeks to offer a wider scope of services that directly meet the needs of Iowa manufacturers, such as in areas of IT and biotech.
The Nondestructive Evaluation (NDE) Group functions similarly to the Materials Group in that short-term technical assistance is provided to Iowa manufacturers on a no-cost basis. The focus of the NDE Group is to assist companies in areas of inspection and quality control. To that end, the NDE Group serves as an unbiased source of information, offering clients a broad range of expertise in various inspection methodologies. Manufacturers often do not have staff acquainted with these capabilities, so the NDE Group in effect complements the engineering capabilities of their clients. The unit assists client companies in addressing problem areas, ensuring product development and quality. This assistance requires robust budget support to maintain the needed flexibility to successfully address the wide range of industrial concerns.

The Company Assistance Research Cost-Sharing Program administers cost-sharing contract research projects, working with Iowa’s small to medium-sized manufacturers. These small companies have very limited R&D dollars and facilities. Additional funding would help Company Assistance to leverage Iowa companies’ limited resources. These are projects that impact the economy by introducing new products, addressing manufacturing processes, and improving quality. All of these areas strengthen Iowa's global competitiveness in the manufacturing sector.

A unique feature of the economic development program in IPRT is the active participation of scientists from internationally renowned ISU centers such as the Center for Nondestructive Evaluation, the Virtual Reality Applications Center, and the Center for Catalysis. These centers have excellent track records of spinning off new Iowa startup companies in the areas in which they excel. Additional state funding to IPRT units would have a rapid positive impact on Iowa’s manufacturing sector. An investment now would result in continuing benefits to Iowa’s companies, important opportunities to retain our brightest students, and new startup companies based on increased technology transfer from IPRT centers.

- **ISU Extension and Outreach Center for Industrial Research and Service (CIRAS)** has successfully leveraged its state budget to bring in additional federal grants and fees to expand technical assistance, education programs, and economic development studies to support Iowa businesses. In FY13 CIRAS helped generate an additional $1.39 of external funds for each $1 of state funds provided, yielding approximately $3 million of additional funding. More than $1 million of CIRAS grant funds were distributed to other business outreach units on campus and to community colleges to help them expand their work with Iowa companies.

For every $100,000 of additional state funds that are made available, CIRAS would be able to leverage the funds to bring in an additional $150,000 from grants and fees and hire two new business professionals to provide services in the areas of engineering, biorenewables, energy systems, management practices, government contracting, productivity, growth services, supply chains, quality systems, and community-business economic development. These two staff would help create nearly 50 jobs and $5,000,000 of new sales, cost savings, and investment impact in Iowa companies.
ISU Extension and Outreach works across ISU colleges and with external partners to provide technical assistance, research-based education, and access to the resources of ISU to improve the quality of life in the state. Iowans want an economy that can form new businesses, grow existing industry, enhance communities, and recruit companies to the state. With Iowa STEM jobs expected to grow by 16% this decade, Iowans see the need to stop the “brain drain” and take steps to develop the state’s future workforce, connecting youth with opportunities here in Iowa. These are only a few of the basic needs and urgent trends facing this state. ISU Extension and Outreach has the capability to address these concerns with education for Iowa’s people, but needs additional resources to operate at the full capacity required to meet these challenges.

- ISU Extension and Outreach work in economic development is growing businesses and strengthening communities.
- ISU Extension and Outreach tackles food and environmental challenges by supporting local actions to produce a safe, sustainable, and affordable food supply.
- Programs for health and well-being are helping Iowa become the healthiest state in the nation.
- Through K-12 youth outreach, ISU Extension and Outreach is preparing Iowa’s young people for the future, including through one of our most recognizable programs- 4-H.

ISU Extension and Outreach expects to leverage every $100,000 in new state funds with $180,000 in new federal matching funds, grants, fees and gifts to generate a projected $2.8 million of impact and 28 new jobs throughout Iowa. For every $100,000 of new funds, an estimated three additional staff will be hired to address growing demands and increase the depth and reach of work with families, businesses, and communities in all 99 counties across the state.