

## AGRICULTURE REQUESTS

- *Agricultural Water Use*
  - **Organization:** Oklahoma State University
  - **Amount Requested:** \$1,000,000
  - **Purpose:** The requested funds will be used for research needed to evaluate the vulnerability and resilience of agricultural, ecological, economic and social systems to the expected changes in water use and water resource availability resulting from climate variability, public policy and land-use change. This interdisciplinary project will enlist soil and crop scientists, horticulturalists, bio-systems and agricultural engineers, agricultural economists, and forest and rangeland eco-hydrologists to provide the knowledge and technology base for understanding the effects of conservation practices, public policy and land-use change on Oklahoma's water budget.
  - **Justification:** Oklahoma's water future is clouded by climate variability; lack of resilience or sustainability in water-dependant rural economies, social systems and ecological systems; impaired water quality; increasing water demand; and the potential for significant water transfers inside and outside basins. From 1970 – 2000 the population of Oklahoma grew by 36%, but the number of groundwater and surface-water permits nearly tripled (OWRB, 2007). Periodic droughts have led to frequent water shortages and water quality problems. For example, at the peak of the drought period ending in 2007, water supplies around the state were dangerously low. The 2006 drought alone cost the state's economy over \$500 million (wheat, corn, cotton, rye, soybean, sorghum and peanuts), and Oklahoma cattlemen received \$6.5 million in drought compensation from USDA. Oklahoma encompasses wide variations in climate and land use which complicate the development of public policies pertaining to water. Current water policies are inadequate to address emerging issues such as water shortfalls, alternative water rights regimes and interstate conflict. In 2012, the state will complete its Comprehensive Water Plan update and attempt to address the changing needs of the state, including changes in water policy, increased reliance on bio-fuels, population growth and economic development. Research is needed to guide the formation of the state's water policies.
  - **Authorization:** CSREES (Cooperative State Research, Education and Extension Service) was eliminated as an agency by the Food, Conservation, and Energy Act of 2008 (P.L. 110-246) and replaced by the National Institute of Food and Agriculture (NIFA), whose primary role is to administer competitive grants for fundamental and applied research, extension, and education. CSREES was created by the combination of the USDA's Cooperative State Research Service (CSRS) and Extension Service (ES) into a single agency by the 1994 Department Reorganization Act (P.L. 103-354), with the purpose of advancing knowledge for agriculture, environment, human health and communities by supporting research, education, and extension programs in the Land-Grant University System and other partner organizations.
  
- *Animal Waste Management*

- **Organization:** Oklahoma State University
  - **Amount Requested:** \$575,000
  - **Purpose:** The requested funds will be used to continue research on developing sustainable, environmentally safe, and ecologically healthy animal waste management practices in semiarid ecosystems that contribute to economic development in rural communities, with the goals of reducing loss of nutrients and odor from livestock waste systems, developing efficient water use strategies for livestock wastewater, and evaluating economic impacts of concentrated livestock feeding operations. The research team at OSU will also focus on a comprehensive, multidisciplinary approach to animal waste management in semiarid ecosystems by addressing all aspects of the waste stream from livestock diet through waste treatment, land application and impacts to the semiarid ecosystem.
  - **Justification:** The Southern Great Plains is a water-limited portion of the nation; however, it is also one of the most productive agricultural regions for livestock and feed production. Federal funding for management of animal waste is essential for development of economical, sustainable, and environmentally prudent waste management practices for the animal industry in this semiarid region. Benefits of this project will be the development of sustainable, environmentally safe, and ecologically healthy animal waste management practices in semiarid ecosystems. The initiative will improve international competitiveness of the region, improve the database for management decisions, ensure available water supplies and clean water, gain information on reduced tillage systems, maximum water use efficiency of subsurface irrigation systems, effective nutrient cycling and biodiversity of the landscape, and enhance understanding of microbial ecology in relation to land management, conservation, bioremediation, agricultural production, and biomedicine. Twelve jobs for students trained in sustainable agricultural disciplines will be created by the current proposal.
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- ***Biotechnology and Research in Agriculture***
    - **Organization:** Redlands Community College
    - **Amount Requested:** \$950,000
    - **Purpose:** The requested funds will be used for the Renovation of Darlington Agriculture Hall at the Darlington Education and Applied Research Center to

include science and research laboratories for Plant Science, Artificial Insemination and Ecology. Renovations will include classrooms, laboratories for teaching and research, and a limited amount of equipment. The new renovation will provide student study areas and faculty offices to ensure maximum availability for students and industry/producers. The funds will be used as one-time start-up funds to provide the facilities that will be sustained by state funds, tuition and fees as well as public/private partnerships with the growing Redlands Undergraduate Agriculture Research Program.

- **Justification:** Redlands Community College (Redlands) is preparing Agriculture students to transfer to four-year institutions to pursue baccalaureate and graduate degrees in Agriculture. Agriculture professionals, skilled in research, investigation and inquiry are in wide demand to serve producers and contribute to the scientific needs of the agriculture industry. The short-term impact of this project is the ability of applied research technicians to graduate with the skills to serve in the agriculture industry in entry-level jobs in food and feed production, production agriculture, and other agriculture industry jobs. Long-term impacts include students with knowledge in research basics transferring to premier four-year institutions, particularly Oklahoma agricultural colleges, with the skills to move forward in advanced classes and become research professionals in the agriculture industry. In both the short and long term impacts, Redlands students will be qualified for internships and research assistant positions that will benefit the industry, the higher education institutions and, most importantly, the students as they earn salaries to support further educational opportunities.
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- ***Expanded Wheat Pasture***

- **Organization:** Oklahoma State University
- **Amount Requested:** \$360,000
- **Purpose:** The purpose of this initiative is to develop science and technologies, uniquely adapted wheat varieties, decision-support economic models, and extension education programs to increase profitability of the many dual-purpose wheat (i.e., wheat grain and stocker cattle) enterprises in Oklahoma and the southern Great Plains, and to strengthen the economies of rural communities.
- **Justification:** The prospects for winter wheat pasture greatly influence the market for most of the fall-weaned beef calves in the United States. Annual income in Oklahoma could be increased by \$91 million by improving the

technical efficiency of production of the 1.5 million stocker cattle that are grown to heavier weights on wheat pasture prior to being finished in feedlots. In addition, the opportunity for growth of the industry has never been greater than it is currently because of the changing structure of the U. S. beef cattle industry and the high cost of weight gain for cattle in feedlots. Annual income of rural Oklahoma communities could potentially be increased by \$242 million by improving the technical efficiency of production and increasing the number of cattle that are grazed on wheat pasture in Oklahoma. By increasing profitability and growth of dual-purpose wheat enterprises, this project contributes to sustaining (a) the livelihood of wheat and cattle producers, (b) the economic viability of grain elevators and cooperatives throughout the state and region, and (c) jobs associated with allied industries such as the fertilizer, herbicide, feed, animal health, trucking, and marketing industries, etc. Therefore, this project impacts hundreds of thousands of jobs in the southern Great Plains.

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- ***Food Safety Research Center***

- **Organization:** Oklahoma State University
- **Amount Requested:** \$1,000,000
- **Purpose:** This research initiative will develop rapid and efficient methods for detecting and controlling food borne pathogens throughout the food supply chain from farm to table. This is a priority for ensuring safety of the nation's food supply. The team will specifically focus on methods to control *Escherichia coli* in cattle and *Salmonella* in swine, develop new rapid methods for detecting food borne pathogens, and improve cultural methods for detecting *Campylobacter jejuni* in foods. The project itself hires and trains graduate students, post-doctoral researchers, and industry personnel, who do the work of the project, interact with the greater food industry and trade groups where grassroots education occurs, new practices are implemented, and where current local, county, state and regional manufacturing is stabilized.
- **Justification:** The project is focused on helping industry find solutions to prevent food borne illness and food safety recalls, both of which place an enormous economic burden on the U.S. population in terms of health care costs, food costs, and productivity. The short term impact of this project is enhanced knowledge about the methods and means to increase the safety of the U.S. food supply. This project conducts research and testing to develop rapid and efficient methods for

detecting and controlling food borne pathogens and toxins throughout the food chain from point of origin to consumption. The long term impact is increased safety of the food supply in the United States through well-trained industry personnel and the implementation of new food safety science and technology. When new practices from the funded research are implemented in manufacturing, hundreds of jobs are stabilized and created. The immediate result will be the impact to create new jobs for 10 to 100 people for each year the project is funded.

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- ***Integrated Production Systems for Alternative Crops***

- **Organization:** Oklahoma State University
- **Amount Requested:** \$320,000
- **Purpose:** The project investigators conduct research to develop and refine crop management techniques that enable environmentally sound and economically feasible production of alternative crops that will best utilize natural resources as they produce organically grown vegetable crops and crops for the bio-fuel industry. The research and educational program includes organic production practices, pest management strategies and weed control using organically approved practices and chemical agents. The work is conducted at the Agricultural Research and Extension Center in Lane, Oklahoma.
- **Justification:** The research proposed complements other programs such as Farm-to-School, School-Lunch, and Buy-Local programs. The national school lunch program fed 30.5 million children in 2007. This program will create opportunities for farmers to provide locally grown organic and traditional vegetable crops to school children. It will promote the sale of locally grown, nutritious vegetables to schools and will thus improve nutrition for American children. It will provide educational contacts between school children and farmers, which in the long term will encourage children to pursue careers in food production. It will promote long-term environmental quality and economic sustainability by encouraging practices such as the use of legumes for nitrogen fixation in the soil. This project will be used to directly provide support for 6-10 research technicians, graduate students, and student assistants. In addition, we anticipate that over 1,000 farmers in Oklahoma and over 50,000 farmers in the USA will maintain their jobs or obtain new jobs, and increase their incomes because of research generated by this project.

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- ***Pilot Technology Transfer Program***
  - **Organization:** Oklahoma State University and Rural Enterprises of Oklahoma, Inc.
  - **Amount Requested:** \$500,000
  - **Purpose:** This research initiative provides technology transfer services and engineering assistance to small rural manufacturers, with the goal of improving their profitability and thereby sustaining wealth-producing industries in rural communities. It includes the Technology Transfer Project, which supports an integrated extension program that works closely with OSU Applications Engineers, the Oklahoma Alliance for Manufacturing Excellence, and Rural Enterprises of Oklahoma, Inc. The focus is on providing a suite of relevant, high quality, and timely services to small manufacturers so that they can more effectively compete in the marketplace.
  - **Justification:** The jobs associated with the manufacturing sector are considered to be critically important factors in America's economic recovery. Many small manufacturing firms are located in rural areas and are extremely important to their local economies. The Oklahoma State University Technology Transfer Project provides support to a team of engineering professionals that deliver focused technical assistance to small manufacturers across Oklahoma. During FY 2008, this program provided more than 4300 hours of direct engineering assistance to more than 100, mostly rural, manufacturers that employ thousands of individuals. In 2008, nearly 400 jobs were either created or retained. In 2007, the total was about 430 jobs. These figures are based on data provided by the manufacturers themselves.
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education, and extension programs in the Land-Grant University System and other partner organizations.

- ***Sun Grant Program – Group Letter***

- **Amount Requested:** \$10,000,000
- **Purpose:** The Sun Grant Program (SGP) engages all of the nation's land grant institutions to conduct bioenergy research and education at the regional and local level. There are five regional Sun Grant centers, including Oklahoma State University, which have conducted and coordinated research since 2001. The SGP also coordinates research and education through effective working relations with the Department of Energy (DOE), and the Department of Transportation (DOT). With support from DOT, the SGP administers a national program of competitive research projects on biobased transportation fuels. With a scope of work set by the Office of Management and Budget, the SGP administers the DOE-Sun Grant Regional Feedstock Partnership. The partnership examines the sustainability of bioenergy feedstock production, as well as research on feedstock logistics and energy conversion technologies.
- **Justification:** To meet the nation's renewable energy goals, there must be breakthroughs in American agriculture which the land-grant university system is well positioned to help bring about. Biomass production for energy use is limited by regional and local climate, soil types and production resources. Research and outreach will be essential to develop the bioenergy production potential of the country in ways that are environmentally sustainable and economically viable in the context of local production conditions. As required in the 2008 Farm Bill, the SGP implements programs through rigorous competitive processes that are peer-reviewed to ensure that efforts address the highest priorities and that the work is scientifically sound.
- **Authorization:** Section 7526 of the Food, Conservation and Energy Act of 2008 (P.L. 110-246)

- ***Preservation and Processing Research***

- **Organization:** Oklahoma State University
- **Amount Requested:** \$500,000
- **Purpose:** This initiative focuses on developing integrated cropping, harvesting, handling and processing systems to support growth of the horticulture and related agriculture industries in Oklahoma and the southern U. S., with the overall goal of maintaining and improving profitability for Oklahoma horticultural and related agricultural industries.
- **Justification:** Preservation of quality crops are increasingly dependent on economically sound technological improvements in order to supply domestic markets and improve our ability to compete in international commerce. Short term impacts involve graduate training and involvement in associated projects, providing opportunities for education and experiential learning in cutting edge integrated production, harvesting, handling and processing systems. Bio-sensors, storage systems and extraction processing technologies have resulted in new business development and industry-university cooperative programs in the county

and state and are expected to continue to spur business and economic development for the state and region. New biosensor development could result in new techniques to monitor insect infestation and non-destructively assess product quality, with long term benefits of enhancing precision farming applications and improving marketability of commodities grown in our State. Continued expansion of the joint ATEP (Ambient Temperature Extraction Partners) research and development project will locate a 'state of the art' piloting/small scale commercial production center in the state, providing new value added processing capacity for both in-state and out-of-state crops and agricultural products. Directly associated with project funds is one technician and one research engineer position, in addition to three graduate assistantships at the Stillwater campus. If this technology is commercialized, approximately 1,000 jobs would be created.

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- ***University Center for Biomass-Based Energy***

- **Organization:** Oklahoma State University
- **Amount Requested:** \$1,200,000
- **Purpose:** A Consortium of three universities (Oklahoma State University, University of Oklahoma, and Mississippi State University) is developing a unique gasification-fermentation process that utilizes all of the plant biomass, including the lignin, to produce liquid fuel. This bioconversion process has a greater net energy gain and significantly lower cost of production than the standard corn starch fermentation process. The ultimate goal of this research is to move this bioconversion process to commercialization. Funds from this special grant will be used to improve the sustainability and cost effectiveness of the process leading to the establishment of bioenergy conversion facilities across the U.S.
- **Justification:** Short-term impacts resulting from the completion of these objectives include preparing stakeholders, from the local community level to decision makers at the state level, to assess opportunities and implement strategies to attract bioenergy production industries. Long-term impacts include the establishment of small to large-scale biorefineries throughout Oklahoma improving the communities' economies, especially in rural settings. Over 250 jobs will be created for and directly related to each 50 million gallons per year (MGY) of cellulosic biorefinery. Additional jobs will be created in the goods and services sector in support of each facility. Economic impact resulting from each 50 MGY plant is estimated at over \$40 million per year.

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