C-FAR Receives $5 Million Appropriation for FY04

FY04 C-FAR Appropriation

A C-FAR appropriation of $5 million has been approved by Governor Rod R. Blagojevich and the Illinois General Assembly for FY04. C-FAR recognizes the difficult financial situation of the state and is grateful for the support received from Governor Blagojevich, members of the General Assembly, and other state officials during the FY04 budget development process. This level of funding is less than C-FAR’s FY03 appropriation of $6.968 million and is significantly lower than the FY00 to FY02 annual appropriations of $15 million.

As would be expected, the reductions in the C-FAR appropriation have had and will continue to have a significant negative impact on food, agricultural, and related research programs in Illinois. “As the C-FAR appropriation has been reduced the last two years, a result of the state’s budget deficit, it has become crystal clear just how vital this research funding is for our state,” said Larry Fischer, chairman of the C-FAR Research Committee. “Our priority during these difficult budget years has been to preserve, to the extent possible, ongoing research endeavors so that we can benefit from work that has already begun. Secondly, we have worked to be responsive to the C-FAR membership’s research priority-setting process.”

Two years ago, C-FAR was able to fund more than 92 research initiatives that addressed important concerns and opportunities for Illinois’ food, agriculture, and related systems as identified by industry stakeholders. Thirty projects were funded through the External Competitive Grants Program and 57 through the partner university internal programs. For FY04, only six projects can be funded through the External Competitive Grants Program, and very few will be funded through the partner university internal programs. In addition, C-FAR’s five major strategic research initiatives (SRIs) officially ended last fiscal year; the current appropriation allows for only three new SRIs to be started, and at significantly lower funding levels.

The C-FAR appropriation is the core of funding for food, agricultural, and related research in Illinois. The 67% reduction in funding over the past two years has thus shut down much of the research that supports this important industry. “It is critical that we begin, as soon as possible, rebuilding and then growing funding to provide the necessary support for our state’s top industry,” said Alan Puzey, chairman of the C-FAR board of directors. “We look forward to working with Governor Blagojevich, members of the Illinois General Assembly, Agriculture Director Chuck Hartke, and others over the coming year to do just that.”

C-FAR members dedicated countless volunteer hours over the last year and a
Foresight at our Founding

Ten years ago, C-FAR was only a vision. In mid-1993, there was no formal C-FAR organization, only an idea of how a stakeholder-based organization could conceivably partner with our public research institutions and the State of Illinois to ensure a viable food and agricultural research program.

Who helped transform this idea into reality? The answer is that many people did. Individuals from many professional facets of our industry realized that coming together as one voice was much more important than standing alone with individual voices.

The evolution from idea to reality was no small feat—some probably thought it impossible. Remember, there was no other such organization in the U.S. to be a model. There was no precedent within our industry for a coalition to have such diverse membership, let alone to work together for a common cause.

Our founding members, however, realized that if C-FAR’s mission could be steadfastly pursued, it would guide us to action and results. Despite the lack of precedent, the optimism to create such a unique coalition never wavered. Even after C-FAR became a legal nonprofit association in December 1993, there were still significant hurdles and challenges. There was no legislation to pave the way for even a potential appropriation, there were hardly any funds to operate, and there certainly was no road map to follow. Hindsight confirms that the task before these founders was unbelievably daunting.

Fast-forwarding 10 years, we find a highly robust organization and a set of research programs that have yielded incredible benefit to our industry and all citizens of Illinois. But C-FAR is certainly not without challenges. Our single greatest challenge today is securing a public investment in stakeholder-driven research which can appropriately support our state’s number one industry. And while this is a challenge, it is also an opportunity. It is an opportunity for us to continue working side by side with Governor Blagojevich and members of the Illinois General Assembly. It is an opportunity for us to pinpoint just how important this investment in our industry is. I know from first-hand experiences that these elected officials understand and support a viable public research investment.

Just as our founders had foresight with the establishment of C-FAR, may the work we do today be seen 10 years from now as visionary and foresighted. This should be the goal of all of us. Let the next decade’s journey begin.
half identifying the highest priority research needs of the industry. Working group participants met multiple times to discuss and revise research priorities in each of their focus areas. These priorities were shared with researchers in the issuance of requests for proposals for the FY04 External Competitive Grants Program and SRI Program.

**FY04 External Competitive Grants Program**

The External Competitive Grants Program receives 15% of the C-FAR appropriation each year, as mandated by its enabling legislation, the Food and Agriculture Research Act. This year, 110 pre-proposals were submitted to the program, requesting a total of $12.1 million. Only $500,774 was available to fund new research projects after previous program commitments were accounted for. The following six projects were chosen by the C-FAR membership for funding.

**Evaluating the Beneficial Health Effects of Conjugated Linoleic Acid**

**PRINCIPAL INVESTIGATOR:** WILLIAM BANZ, SOUTHERN ILLINOIS UNIVERSITY AT CARBONDALE

There is mounting evidence that synthetic or highly purified conjugated linoleic acids (CLA) may exhibit novel antidiabetic, antiobesity, renal protective, and immunosuppressive effects similar to those of cutting-edge pharmacological drugs (e.g., Avandia, Lipitor). This study aims to test the effects of dietary CLAs in models of obesity, diabetes, renal disease, and organ rejection.

**High Quality Protein Enhances Diet Control of Type 2 Diabetes**

**PRINCIPAL INVESTIGATOR:** DONALD K. LAYMAN, UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

This study will examine the effects of increased use of high quality protein in adult diets for treatment of the blood glucose and insulin abnormalities associated with type 2 diabetes and obesity.

**Strategies for Management of Vegetable Diseases in Organic and Traditional Farms**

**PRINCIPAL INVESTIGATOR:** MOHAMMAD BABADOOST, UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

This research will evaluate the effectiveness of plant resistance induced by red-light treatment and integrated approaches using red-light treatment, calcium, an organic fungicide, and seed treatment to protect vegetables against diseases.

**Effect of Milling Parameters on Fiber and Its Removal from the DDGS**

**PRINCIPAL INVESTIGATOR:** VIJAY SINGH, UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

This study will investigate the removal of fiber from distiller dried grains with solubles (DDGS). Removal of fiber as a co-product would reduce the net corn cost and can potentially diversify the use of DDGS as a feed for non-ruminants.

**Identification of the Sources of Nitrate in the Upper Illinois River**

**PRINCIPAL INVESTIGATOR:** SAMUEL PANNO, ILLINOIS STATE GEOLOGICAL SURVEY

Both the upper and lower Illinois River will be sampled, from the Chicago area to the confluence with the Mississippi River. Nitrate isotopes will be used to identify and quantify the sources of nitrate in the river and denitrification.

**Development of High Lauric Acid Cuphea Varieties**

**PRINCIPAL INVESTIGATOR:** WINTHROP PHIPPEN, WESTERN ILLINOIS UNIVERSITY

This initiative supports the development of a plant breeding and production research program aimed at introducing high lauric acid Cuphea varieties. Cuphea will enable growers to capture a segment of the fatty acid market for detergents without competing with current crops.
FY04 Strategic Research Initiative Program

Recognizing that the current SRIs would close on June 30, 2003, C-FAR issued a request in October 2002 for pre-proposals for new SRIs that would address research priorities identified by the C-FAR membership or other initiatives that would benefit Illinois’ food, agriculture, and related industry.

Forty-one pre-proposals requesting $43.4 million over the next five years were submitted to the FY04 SRI program, with $9.4 million requested for this fiscal year. Due to the limited available funds of $800,000, only three new SRIs could be funded through this year’s program. Unlike past SRIs, these new initiatives will not be assigned to a particular working group but will be monitored by the C-FAR membership as a whole. The following SRIs officially began on July 1, 2003.


PRINCIPAL INVESTIGATOR: STEPHEN LONG, UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Dr. Stephen Long is providing leadership for a multidisciplinary team of 12 researchers who are contributing to this five-year SRI. The research initiative aims to provide Illinois with the foundation and technology leadership for large-scale cultivation of biomass crops. Researchers will focus on the use of miscanthus, a perennial rhizomatous grass, as a potential renewable energy source for Illinois and profitable alternative crop for Illinois producers.

Illinois First Livestock Focus Initiative

PRINCIPAL INVESTIGATOR: MICHAEL HUTJENS, UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Dr. Michael Hutjens is leading a multidisciplinary, multi-institutional team of nine researchers on this SRI, which focuses on addressing the economic and social challenges facing Illinois’ livestock industry. The four-year initiative will focus on livestock facility siting in Illinois, using Illinois byproduct feeds in livestock feeding programs, pasture-based forage systems to sustain Illinois livestock producers, and animal identification for enhanced food quality and monitoring livestock health.

Water Quality with a Focus on Total Maximum Daily Loads

PRINCIPAL INVESTIGATOR: GEORGE CZAPAR, UNIVERSITY OF ILLINOIS EXTENSION

This three-year initiative continues the efforts of the former water quality SRI with a new focus on total maximum daily loads (TMDLs). Dr. George Czapar is leading a team of 15 investigators from across the state. The goals are to help develop the scientific basis for nutrient standards in the surface waters of Illinois and to assist in the appropriate development and implementation of TMDLs. The research team works closely with the Illinois EPA and the Illinois Department of Agriculture.

Drs. Long, Hutjens, and Czapar will provide a brief overview of their SRIs at the C-FAR semi-annual meeting on August 19, to be held at the Northfield Inn, Suites & Conference Center in Springfield.
C-FAR Historical Reflections

DID YOU KNOW?

In March 1995, C-FAR members held a two-day retreat at Eagle Creek Resort near Findlay, Illinois. A strategic plan was developed for the formation of working groups to get public/stakeholder input and to communicate back to the C-FAR research committee and to university researchers. These working groups would be focused around five general areas: expand markets for agricultural products; promote economic development in Illinois; increase agriculture’s capacity to meet changing world food demands; improve nutrition, food quality, and food safety; and advance sustainable use of natural and human resources.

Today, the visionary nature of this strategic plan has resulted in C-FAR’s working groups’ being the foundation of the organization. It is the working groups which provide the critical mechanism for seeking stakeholder-based input.

Original Strategic Research Initiatives Close

In 1998, the C-FAR membership established five strategic research initiatives (SRIs) to implement a targeted, multidisciplinary, and multi-institutional team approach to addressing major concerns and opportunities for Illinois’ food, agriculture, and related industry and consumers. This approach was unique and bold. Never before had such a program for food and agricultural research at our state universities been tried. While researchers from the same departments and possibly the same university had worked together, the degree of collaboration that the SRI program sought was unprecedented. The prediction was that bringing together the “best minds” from across the state would result in a new dynamic of synergy not previously realized. With five years of experience now established, the SRI program has proven that researchers can work together, and quite effectively, for a common cause.

The five original SRIs focused on information systems and technology, rural community development, swine odor and waste management, food safety (functional foods was initially also part of this SRI), and water quality. While several SRI components have received no-cost extensions to complete work, these first five SRIs officially closed on June 30.

Information systems and technology — Dr. Sarahelen (Sally) Thompson, University of Illinois at Urbana-Champaign, provided leadership for this SRI from FY’99 to FY’01. In FY’02, Dr. Gary Schnitkey, University of Illinois at Urbana-Champaign, served as interim SRI leader before assuming the role of leader. The SRI focused on aiding deci-
sion making by increasing the availability and use of information in the global food and agricultural systems, with particular focus on Illinois agriculture. A wide range of useful information and decision tools are now available on the IT-SRI website at http://web.aces.uiuc.edu/sriit.

**Rural community development** — Dr. Raymond Lenzi, Southern Illinois University at Carbondale, provided leadership for this SRI, also known as I-FARRM (Illinois Farming Alternatives and Rural Revitalization Methods). The SRI focused on promoting the economic development and management of agricultural and food systems in rural and urban communities in Illinois. Research and outreach efforts have resulted in new rural development opportunities, improved farm incomes through specialty farm products and value-added processing, the startup and expansion of alternative agriculture enterprises, and the development of an online community development toolbox. More information can be found on the SRI website at www.siu.edu/~i-farrm.

**Swine odor and waste management** — Dr. Michael Ellis, University of Illinois at Urbana-Champaign, led this SRI effort, which focused on addressing how to reduce swine odor and process swine waste in support of a viable swine industry in Illinois. Researchers established the equipment, facilities, and methodologies necessary for odor sampling and analysis. New and unique technologies have been developed for odor reduction and swine-manure processing, and several potentially viable options are undergoing on-farm evaluations. Researchers have also examined community concerns about the siting of swine facilities and legal and regulatory aspects of swine odor and waste in Illinois. Additional information on this SRI is available at http://sowm.outreach.uiuc.edu.

**Food safety** — Dr. Jeannette (Jan) Endres, Southern Illinois University at Carbondale, provided leadership for this SRI, which focused on developing new tools and technologies to protect our food supplies and on educating consumers on food safety protocols. Research was centered around three primary areas: pathogen detection and epidemiology, Hazard Analysis Critical Control Point (HACCP) methodology, and food safety education and outreach. More information on this SRI can be found at www.siu.edu/~foodsafe.

**Water quality** — This SRI focused on evaluating the impact of agriculture to better understand watershed dynamics and identify best management practices to protect our water supplies. SRI leaders over the life of this SRI were Drs. Michael Hirschi, University of Illinois at Urbana-Champaign; Derek Winstanley, Illinois State Water Survey; James Westervelt, University of Illinois at Urbana-Champaign; and George Czar, University of Illinois Extension. The research team addressed four integrated components: best management practices that reduce nutrients in water resources; mass balance to understand the sources and movement of nutrients through Illinois watersheds; developing computer models at the state level, watershed level, and field scale; and outreach to make research results readily available to the agricultural community, policy makers, and Illinois citizens. This SRI will continue at the direction of the C-FAR membership with a focus on total maximum daily loads (TMDLs). More information on the water quality SRI can be found at web.aces.uiuc.edu/sriwq.

The overall SRI effort received annual allocations of $5 million from FY99 to FY02. In FY03, State of Illinois budget challenges resulted in a reduction of C-FAR’s appropriation from $15 million to $6.968 million. As a result, the total SRI allocation was reduced to $2.75 million. These five-year initiatives have resulted in tremendous benefits for Illinois’ food, agricultural, and related industry and for the citizens of Illinois. Final reports on the achievements and outcomes of the SRIs will be produced by each SRI leader and shared with C-FAR members and other interested individuals later this year.

C-FAR would like to acknowledge the SRI leaders for their outstanding coordination and leadership of these important research initiatives. Thank you for your outstanding commitment and leadership and for jobs well done!
Researchers Use Tomato to Produce and Deliver Vaccine

C-FAR-funded researchers have developed a plant-based edible vaccine against one of the most serious human respiratory diseases—the human respiratory syncytial virus (RSV). The research team of Drs. Schuyler Korban, Dennis Buetow, Leslie Domier, Sergei Krasnyanski, and Jagdeep Sandhu from the University of Illinois at Urbana-Champaign has taken advantage of an agricultural crop, tomatoes, to produce an antigenic protein of the virus in the fruit. This research should allow tomatoes to be used to produce and deliver an edible oral vaccine that protects humans in the U.S. and around the world against this potentially deadly virus.

“It is critical that a vaccine is both produced and delivered in a safe and cost-effective manner,” said Korban. “Plants used as ‘bioreactors’ for producing and delivering this RSV vaccine are ideal systems, as they bypass mammalian cell cultures, commonly used for vaccine production, maintained in large fermentors, and they avoid the use of needles for vaccine delivery.”

RSV causes pneumonia and bronchiolitis in infants, young children, and the elderly, with those living in nursing homes being especially vulnerable. Nearly 100,000 children in the United States alone under the age of two are hospitalized each year due to RSV infection, at costs of over $300 million. Some 4,500 infant deaths a year in the United States are associated with RSV. These figures are much higher in other parts of the world, especially in Third World countries. Although the importance of RSV has been recognized for over 30 years, there is no vaccine for it currently available.

In addition to the tomato, researchers are exploring the apple for an edible vaccine against RSV. Both tomatoes and apples are grown in Illinois and can serve as ideal crops for developing a “biopharming” industry here. Both crops produce fruit that can be consumed fresh, in juice, or in sauce. Both fruits can serve as vehicles for producing high-value antigenic proteins that can be used as edible oral vaccines, bypassing all disadvantages of current vaccine production protocols. They also would not require refrigeration or administration by hypodermic needle, which is especially important in countries where refrigeration is scarce and sterile needles are in short supply. Recent concerns over potential health hazards from the chemicals used in vaccine production and worries over vaccination side effects, including autism and cancer, have underscored the need to identify alternative systems.

C-FAR funding has allowed the research team to conduct critical experiments that proved the concept of developing a plant-based edible vaccine against RSV. As a result of this work, both U.S. and international patents are pending. Drs. Korban and Buetow have also received a 3-year grant for $186,000 from the USDA-NRI to continue this work. They want to increase the amount of antigenic protein produced in tomato, will study the impact of fruit development and post-harvest on the stability of levels of antigenic protein, and will investigate glycosylation of the antigenic protein in plant cells. Private industry has also expressed interest in this RSV vaccine.

“This novel and original research offers Illinois agriculture a new and exciting opportunity to grow crops for the purpose of biopharming—growing specialty high-value crops for pharmaceutical use,” said L. Art Spomer, professor of plant physiology and associate head of the Department of Natural Resources and Environmental Sciences at the University of Illinois at Urbana-Champaign. “This work will also significantly contribute to a leading role for Illinois in the agricultural revolution being led by the expansion of biotechnology in agriculture.”
Foodborne illnesses affect 76 million people a year in the United States; and Illinois currently ranks third in the nation for illnesses that can be traced to eating unsafe food. Food service workers, many of whom are young, part-time employees, are considered major contributors to the problem. Food service employees, including teenagers who make up approximately 28 percent of the industry workforce, may not wash their hands or may undertake other unsanitary practices prior to handling customers’ food.

To help address this major health concern and educate young food service employees on the importance of proper food safety practices, Marti Barclay, Karen Greathouse, Sue Tellefson, Lynnette Cale, and Barbara Koukol of Western Illinois University (WIU) have developed lessons for kindergarten through grade 12 and are developing additional lessons for a food safety curriculum for teenagers. “According to the Illinois Restaurant Association, at least one out of every nine teenagers in Illinois is employed in a food service operation,” said Barclay. “And many of these young people enter the food service industry with very little education or training about safe food handling.”

Food Safety Training for Teenage Food Service Employees

Funded in part by C-FAR’s Food Safety Strategic Research Initiative (SRI), Barclay’s team has also promoted food safety through public service announcements which have aired on NBC, Primestar, and Starnet. Over 43,000 fourth-, fifth-, and sixth-graders in and around Chicago have participated in “Food Safety: It’s a Life Science,” a program supported by C-FAR in cooperation with the Chicago Tribune, the Illinois Restaurant Association, GOJO Industries, the Illinois State Board of Education, the Illinois Department of Public Health, and Western Illinois University. The program helps students learn to apply food safety concepts and information to daily life.

In July 2002, Barclay’s research team was awarded a $274,904 grant from the Illinois Attorney General’s Office, from funds made available as part of a settlement in a vitamin antitrust case, to continue their work on food safety curriculums. This three-year grant will let the team look at food safety issues with three population groups: teenagers, people...
The newly developed food safety curriculum for high school students has received national recognition. The National Environmental Health Association and environmental health professionals in the states of Wisconsin, Minnesota, and California are reviewing the curriculum and considering it for adoption.

Barclay and her team are at work developing "near-wordless" instructional materials to teach safe food handling. It is anticipated that these materials will be disseminated for use with food service employees and high school students throughout the nation. "The development of more visual, multimedia, near-wordless training materials in food safety is strongly encouraged and needed," said Jim Bloom, food program manager of the Division of Food, Drugs and Dairies at the Illinois Department of Public Health. "The wordless materials eliminate language barriers regardless of an individual's background."

A food safety curriculum was developed for use by high school teachers and county health departments. The lessons also might be taught through local park districts, after-school programs, and other organized programs. A curriculum is being pilot-tested in a west-central Illinois high school and a Chicago area school district. The Illinois Restaurant Association has indicated that its members would give hiring preference to young people with sanitation training. Barclay said, "New health laws require at least one person per shift at a restaurant to be certified in food sanitation, so now it's even more important for many establishments to have teens that are trained in safe food handling."

Food Safety Fact:

According to the Centers for Disease Control and Prevention, handwashing is the single most important thing people can do to stop the spread of infection and disease.
Remote-Controlled Helicopter Generates Maps for Precision Agriculture

With technological advances in agricultural remote sensing, Illinois farmers should some day soon be able to use computerized systems on their tractors to automatically vary the delivery of pesticides and other chemicals to their crops according to field needs.

Researchers at the Illinois Laboratory for Agricultural Remote Sensing (ILARS) at the University of Illinois at Urbana-Champaign have constructed a 4-foot by 3-foot remote-controlled helicopter to generate maps for precision agriculture. A camera mounted on the front of the helicopter takes color and infrared field-map images. Farmers will be able to use these maps to determine nitrogen stress or weed infestation in their crops so that application equipment can automatically adjust chemical application accordingly. This will allow farmers to fine-tune the management of their fields, reduce chemical application costs, and better protect the environment by avoiding unnecessary applications.

“Precision farming has been slow to reach its full potential. One of the reasons is that the sensing systems weren’t advanced enough yet to create good maps of the fields,” said Lei Tian, associate professor of agricultural engineering and director of ILARS. “Once it is refined, companies should be able to use this or a similar system to scout fields and create aerial maps for farmers.”

ILARS, officially opened in April 2001, was established through a five-year grant of approximately $1 million from the University of Illinois C-FAR Sentinel Program. The laboratory brings together research experts in crop sciences, agricultural engineering, biotechnology, precision farming, and information systems. Its mission is to conduct applied research with industry and government agencies, with the goal of developing “real world” applications of remote sensing for agribusiness. ILARS research ranges from “on-farm” production applications to large-scale agribusiness uses such as regional yield estimates.
Tian and his research team began using the remote-controlled helicopter to generate field maps to increase their flexibility in collecting images. Prior to using the helicopter, they used satellite or airplane images, which were dependent on weather and other uncontrollable factors. Because timing is critical when evaluating nitrogen stress or weed infestation, satellite images often yielded data either too early or too late for ideal crop management. Researchers also found it difficult on occasion to secure airplanes and pilots. The remote-controlled helicopter provides greater flexibility since aerial images can be taken at any time.

Tian is currently developing an autopilot system so that only one person will be needed to control the helicopter. At present, one person controls the helicopter and another controls the camera. The autopilot design is based on an “idiot-proof” aerial imaging system for the industry. Once fully developed, the operator will only need to input the GPS locations of the field to be sensed. Then the onboard computer will plan the flight and carry out the data collection automatically with the guidance of GPS, optical gyro, and other sensors. The autopilot system will also land the helicopter at a designated spot at the end of the mission.

The camera on the helicopter is a high-quality, multi-spectral digital model that can take both visible and color near-infrared images. The hyperspectral imaging system will be implemented in the near future.

“We are still in the early stage on this project,” said Tian. “This summer we are getting a second helicopter with a turbine engine that has more payloads and better performance.”
calendar
2003-2004

August 19  Semi-Annual Meeting (Northfield Inn, Suites & Conference Center, Springfield)
September 10 Board of Directors Meeting
November 12  Board of Directors Meeting
        January  Board of Directors Meeting
February 17  Annual Meeting (Northfield Inn, Suites & Conference Center, Springfield)
        February  Board of Directors Meeting
        March 8  Agricultural Production Systems Working Group Meeting
        March 9  Rural Economic Development & Expanding Agricultural Markets Working Group Meetings
        March 10  Human Nutrition and Food Safety & Natural Resources Working Group Meetings
        July    Board of Directors Meeting

Please call the C-FAR office or check the calendar on the C-FAR website at www.ilcfar.org for further details.