C-FAR Members Identify Research Priorities for Illinois

Illinois Council on Food and Agricultural Research (C-FAR) members representing a broad range of Illinois’ food and agricultural sectors came together for several meetings from January to March to identify the state’s top priority research needs. From the development of new technologies for crop and livestock production, to investigating renewable energy sources from agricultural inputs, to establishing food safety and security programs, to protecting the state’s water supplies and other natural resources, stakeholders from across Illinois shared their expertise and experiences to identify the key research needs of the state.

“We can be highly appreciative that Illinois’ food and agricultural private sector is so dedicated to our state’s publicly-funded research programs. Having the benefit of these firsthand professional experiences enhances the value and strength of the C-FAR research priorities,” said Karen Little, C-FAR research vice chair.

At their all-working group meeting in January, C-FAR’s five working groups—focused on expanding agricultural markets, rural economic development, agricultural production systems, human nutrition and food safety, and natural resources and environment—reestablished their directives to researchers to provide clear priorities on research needed to strengthen Illinois’ food, agricultural, and related systems. During the meeting, the expanding agricultural markets and rural economic development working groups met jointly to discuss their research priorities and avoid possible areas of overlap. The natural resources working group expanded the name of their research focus area to “natural resources and environment,” to more accurately reflect the scope of their priorities.
PRICELESS: FIRSTHAND INSIGHTS

At one time, there was significant disconnect between Illinois’ food and agricultural stakeholder needs for research and our state’s research community. This disconnect was simply a matter of not having a mechanism to meaningfully bring these groups together. While individual stakeholder organizations might have been expressing their research needs, there was not a thoughtful and comprehensive forum for significant exchange of ideas among these organizations or of results from research taking place.

In December 1993, C-FAR was established to foster public participation in research program guidance. During the early months of this year (2006), this public participation was evident, and the public good for the state of Illinois was served unbelievably well by the C-FAR membership. I say so with all credit going to our members, who dedicated themselves to revising food and agricultural research priorities for our state.

Over the course of two meetings, some 200 representatives from Illinois’ food and agricultural sectors came to the same table to update and re-establish these priorities. Conservationists, livestock producers, grain farmers, dieticians, turf managers, farm managers, organic farmers, and meat processors are among the many professionals who contributed to this important process.

Picture, if you will, each of these professionals sharing his or her greatest challenges and opportunities for appropriate responses by sound publicly-funded research. While we are tremendously proud that C-FAR created this highly unique dynamic, the kudos specifically go to our stakeholder and research members who make it a reality, and to the State of Illinois for entrusting our members to appropriately guide these important research investments.

The meetings I reference were not just exercises; they were strategic opportunities in meaningfully tapping the firsthand insights and expertise of the leadership within our state’s food and agricultural industry. These private sector stakeholders volunteered their time and talents to sit with professionals from our state’s research community to refocus our state’s research directions. Absent such a process, we would likely be left aimlessly seeking research of importance to Illinois.

Our state, our state’s economy, and its citizens will benefit from representatives of 61 different organizations coming together to pinpoint our greatest research needs. Borrowing a credit card company’s slogan, the benefit of being able to do so are “priceless.” I mean that very seriously, because being able to meaningfully utilize the firsthand and professional experiences of such a cadre of interested citizens is a tremendous benefit to our state. I salute our membership for making it so.

Alan Puzey
Chairman of the Board
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The working groups met again in conjunction with the 2006 Annual Meeting in February to refine their new research focus area directives. This meeting was followed by a meeting of the Research Committee to review the new directives and provide added clarity as necessary. These directives will steer the state’s publicly-funded food and agricultural research program, guided via C-FAR, for the next four years.

“This type of input from industry stakeholders provides our researchers with clear priorities regarding the kind of research projects C-FAR is interested in funding. It helps us focus on what will maximize the benefit derived from that research for the citizens of Illinois,” said Dr. Patrick O’Rourke, chair of the Department of Agriculture at Illinois State University.

“We are extremely pleased with how our members responded to the call for reshaping our research focus areas at this meeting,” said Nels Kasey, C-FAR research chair. “The importance of communicating clear research priorities to our research community cannot be overstated. We know these priorities will result in research being conducted that specifically addresses the needs of our state.”

To view the new directives of C-FAR’s five research focus areas, visit the C-FAR website at www.ilcfar.org/research/priorities.html.

2006 Annual Meeting

C-FAR held its 2006 Annual Meeting on February 28 in Springfield. Over 100 food and agricultural stakeholders from across Illinois attended the meeting. “The backbone of C-FAR is its members who, very unselfishly and with great dedication, guide our association and research programs,” said Kraig Wagenecht, executive administrator. “The annual meeting is a key activity in providing our members the opportunity to do so, and we are very appreciative.”

At the meeting, members received updates from board members and committee chairs on C-FAR membership activities and research programs. Bylaw changes were approved to make holding a semi-annual meeting optional and to prohibit employees and members of an employee’s immediate family from serving on the Board of Directors (added as simply a good business policy). Meeting attendees also heard updates on the current three strategic research initiatives (SRIs) addressing the use of biomass energy crops for power and heat generation in Illinois, the economic and social challenges facing Illinois’ livestock industry, and the development of science-based nutrient standards for Illinois’ bodies of water.

Board members Larry Fischer, Alan Puzey, and Stephen Scates were re-elected to serve on the Board of Directors for additional two-year terms. They join David Downs, Fred Bradshaw, Nels Kasey, and Karen Little. The following officers were elected at a Board meeting on March 15: Alan Puzey, chairman; David Downs, vice chair; and Fred Bradshaw, secretary-treasurer. Committee chairs include: Larry Fischer, membership; Terry Wolf, nominating; Dennis Thompson, rules and procedures; Karen Little, legislative; Nels Kasey, research chair; and Steve Scates, research vice chair.

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Researchers at the University of Illinois at Urbana-Champaign (UIUC) are teaming up with industry partners to take a newly-developed process for converting swine manure into crude oil to the pilot plant stage. Yuanhui Zhang, a professor of agricultural and biological engineering, and his colleagues developed a system using thermochemical conversion (TCC) to transform organic compounds such as swine manure in a heated and pressurized enclosure to produce oil and gas. “The development of this new technology has the potential to boost income for Illinois swine producers, protect our environment through improved waste removal and treatment, and reduce United States dependence on crude oil imports,” said Nels Kasey, C-FAR research chair.

This project was initially funded through C-FAR’s swine odor and waste management strategic research initiative (SRI). Zhang garnered additional funding to develop the technology through the U.S. Department of Energy, the Grainger Foundation, the Illinois Pork Producers Association, and other industry sources. “C-FAR funding has been instrumental to all other leveraged funding, and it has been the foundation for the project to stand at today’s level,” said Zhang.

The process developed is different from most conventional TCC processes because there is no need for a catalyst, and it does not require pre-drying of the manure. Researchers have also engineered a continuous reactor. “With a batch reactor, you ‘cook’ one batch, empty it, then cook another batch and empty it,” said Zhang. “Now we have a continuous reactor, which means continuous pumping of feedstock and continuous output. The development of a continuous reactor brings the technology one step closer to a TCC pilot plant.”

Zhang’s team has achieved as high as a 70-percent swine manure solid-to-oil conversion rate. “Based on this conversion efficiency, the manure from one pig during the production cycle could produce as much as 21 gallons of crude oil and add a $10 per pig profit,” said Zhang. “With Illinois marketing about 8.8 million hogs per year, this has the potential to generate $88 million of additional income for Illinois swine producers.”

“We’re very supportive of this research. We see a number of advantages to producing crude oil from swine manure, which include adding value to manure products,” said Jim Kaitschuk, executive director of the Illinois Pork Producers Association.

Demonstrating successful results to this point, the new technology is being taken to the next stage through the development of a pilot plant on a commercial hog operation in Illinois. WorldWide BioEnergy is leading the effort with assistance from the UIUC research team. The company has contracted with Innoventor Engineering, Inc. and BioCrude to build and operate the first commercial-sized system.

“Billions of dollars are spent on waste transportation and treatment, and regulations continue to become more stringent and cost-intensive to satisfy our desire for a clean environment,” said Zhang. “Meanwhile, we have a growing need for biofuels that would reduce our dependence on foreign oil and on the world’s finite supply of crude petroleum. It is vitally important that we develop innovative solutions that can address both environmental and energy concerns.”
Milk Products Enhanced to Improve Consumer Health

C-FAR-funded research to enhance the nutritional value of milk products may boost income for Illinois dairy operators and provide added benefit to consumers. Amer AbuGhazaleh, an animal scientist at Southern Illinois University Carbondale (SIUC), and his research team are examining whether simple dietary changes for cows can produce substantial increases in their milk of amounts of two types of fatty acids known to protect against such ailments as heart disease, cancer, and diabetes.

Conjugated linoleic acid (CLA) and omega-3 fatty acids are essential nutrients important to cardiovascular health, brain function, and the prevention of inflammatory disease. Cows produce small amounts of CLA on their own through bacteria that reside in their rumen, the first compartment of a cow’s stomach. The known physiological benefits of CLA consumption include prevention and reduction of tumors in mammary, stomach, and skin tissues; reduction of atherosclerosis; alleviation of diabetic glucose intolerance; and promotion of fat metabolism to increase lean body mass. The daily intake of CLA necessary to achieve these health benefits is still under investigation, however, estimates of 0.25 to 3.0 g per day have been suggested. This represents a 2- to 15- fold increase over current estimates of CLA intake in the U.S. population.

Omega-3 fatty acids are found in high concentration in fish oil and flaxseed oil. They have been shown to be important to normal development of brain and visual acuity in infants and children, to regulation of autoimmunity, and to reducing risk of cardiovascular disease and cancer. The intake of omega-3 in the U.S. is 5 to 7 times less than the 650 mg/day recommended by the National Institutes of Health and the Institute of Medicine.

“To meet the proposed daily goal of 650 mg of omega-3, the Institute of Medicine recommends U.S. fish consumption be increased to approximately four servings of fatty fish per week,” said AbuGhazaleh. “Since most Americans readily consume milk products, they may also be able to attain the suggested levels through omega-3 enriched milk, cheese, or other dairy items.”

The first dietary requirement for the Holsteins used in this project was to put them on pasture to graze. Milk from grazing cows contains 3 to 5 times more CLA than milk from confined cows fed mixtures of grain and conserved forages. The second dietary change was to supplement their feed mixture of corn, soybean meal, vitamins, and minerals with fish oil and flaxseed oil. “Based on previous research, we expect to see an 8 to 10 fold increase in the amounts of CLA and omega-3 fatty acids in the milk by combining grazing with the fish oil and flaxseed oil supplements,” said AbuGhazaleh.

Researchers are also examining consumer acceptability of milk products enriched with CLA and omega-3 fatty acids.

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Last October, approximately 300 SIUC employees and students taste-tested enriched ice cream, cheese, and milk. They were then asked to complete a survey to evaluate the flavor, texture, and acceptability of the enriched products as compared to unenriched products. Based on survey results, approximately 60% of the taste-testers reported that they liked the CLA and omega-3 fatty acids enriched milk, cheese, and ice cream. Over 80% reported that they would purchase dairy products that would prevent cancer and heart disease, and 60% reported that they would pay 10% more for these products.

Another aspect of this research initiative is to establish procedures for the on-farm production of CLA and omega-3 enriched cheese and ice cream. With scaled-down pasteurizers, homogenizers, and tanks currently being manufactured and available to meet the needs of small- to mid-sized processors, researchers intend to show how dairy operators can produce enriched dairy products on-farm. This would allow them to control more of the profits and gain a larger share of the consumer’s dollar through direct marketing of the finished, enriched dairy products.

“Consumers are currently paying more than three times the price of regular eggs for omega-3–enriched eggs. By direct marketing CLA- and omega-3–enriched dairy products at such a premium, dairy operators have the potential to significantly enhance their revenues,” said AbuGhazaleh.

“The dairy industry prides itself on providing a wholesome, nutritious product,” said Jim Fraley, manager of the Illinois Milk Producers Association. “By enhancing the nutritional composition of fluid milk, consumers can obtain additional health benefits by just adding a refreshing glass of milk to their diet.”

“C-FAR funding was instrumental in providing the resources to pursue this avenue of research,” said AbuGhazaleh. “Without C-FAR funding, it would have been difficult to conduct research aimed at helping Illinois dairy farmers.”

FY06 Sentinel Program

Introduced in 1999, the C-FAR Sentinel Program at the University of Illinois at Urbana-Champaign was developed to fund creative, problem-solving research projects that would be unlikely to secure funding through traditional channels. Research projects are multi-investigator and multi-departmental, with many crossing college boundaries and bringing together investigators from a variety of disciplines.

“The Sentinel program is a scaled-down version of the highly successful Strategic Research Initiative (SR1) program operated by C-FAR for a number of years. Teamwork among scientific disciplines is emphasized in order to solve, through research, the complicated food and agricultural issues relevant to the citizens of Illinois,” said Dr. George Fahey, Jr., Assistant Dean for Research in the College of Agricultural, Consumer and Environmental Sciences. “Many strong outcomes have resulted from past Sentinel projects, and the FY06 portfolio will no doubt provide cutting edge information in a wide array of important areas.”

The following research projects were initiated via this program in FY06:

DEVELOPMENT OF A SOYBEAN CYST NEMATODE GENETIC INFRASTRUCTURE

Researchers have sequenced 80% of the genome of soybean cyst nematode. This project focuses on using the sequence data to understand the molecular genetic basis of important traits in these small, plant-parasitic roundworms in order to develop tactics to reduce their impact on soybean yield. Principal investigator: Dr. Kris Lambert, assistant professor in the Department of Crop Sciences.

DEVELOPMENT OF ENTERPRISE PROFIT MODELS FOR THE ILLINOIS LIVESTOCK INDUSTRY

This project is designed to identify financially profitable
opportunities for Illinois producers interested in livestock as a main or alternative enterprise. The objective of this research is to ultimately develop strategic profit models for the swine, dairy, and beef industries. Principal investigator: Dr. Michael Hutjens, professor in the Department of Animal Sciences.

**INITIATIVE FOR LOW-INPUT APPLE PRODUCTION IN ILLINOIS**

The overall goal of this initiative is to develop a low-input production system for the Illinois apple industry that minimizes pesticide use, coupled with economic and marketing strategies for increasing profit and diversifying income. Principal investigator: Dr. Schuyler Korban, professor in the Department of Natural Resources and Environmental Sciences.

**MULTIDISCIPLINARY RESEARCH AND DISCOVERY PROGRAM TO CONVERT RENEWABLE PLANT/CROP BIOMASS INTO RENEWABLE FUELS AND CHEMICALS**

This research initiative involves a multidisciplinary group of scientists working together to integrate and focus research on the conversion of biomass to renewable fuels and chemicals. Principal investigator: Dr. Hans Blaschek, Assistant Dean for Biobased Research in the College of Agricultural, Consumer and Environmental Sciences.

**THE SENTINEL CROP GENE IDENTIFICATION PROJECT**

The goals of this project are to develop, test, and implement new approaches to determine the biological functions for corn and soybean crop-specific genes (CSGs). These approaches will integrate the use of bioinformatics, molecular biology, and genetics to add functional information to genomes and evaluate the potential of CSGs in crop improvement. Principal investigator: Dr. Lila Vodkin, professor in the Department of Crop Sciences.

**YOUTHWORKS: YOUTH LEADING RURAL COMMUNITIES’ ECONOMIC REVITALIZATION**

This research builds on current USDA-NRI–funded research to promote the further development, evaluation, and dissemination of YouthWorks, a system of interrelated interventions designed for increasing the number of competent young adults in the Illinois agricultural and entrepreneurial systems, and for enhancing local youths’ commitment and future contributions to their community. Principal investigator: Dr. Laurie Kramer, professor in the Department of Human and Community Development.

“These newly launched initiatives at UIUC represent a highly diverse and foresighted set of research investments that can have tremendous positive impacts on the long-term future of our state’s food and agricultural systems and human capital,” said Nels Kasey, C-FAR research chair.

**Websites to Watch**

**C-FAR**

www.ilcfar.org

Your headquarters for C-FAR news and information on funded and completed research.

**NAT TOOLS FOR GOOD HEALTH**

nat.crgq.com

A source for analyzing diet and food choices.

**FARM.DOC**

www.farmdoc.uiuc.edu

Provides producers and other agricultural professionals with decision-making information and analysis tools.

**MARKETMAKER**

www.marketmaker.uiuc.edu

An interactive mapping system that locates businesses and markets of agricultural products in Illinois, which provides an important link between producers and consumers.

**ALTERNATIVE CROPS FOR ILLINOIS**

www.sws.uiuc.edu/data/altcrops

Helps producers identify and find information on potential alternative crops.

**INTERACTIVE AGRONOMY HANDBOOK**

www.ag.uiuc.edu/iah

Databases and online resources complement handbook.

**ILLINOIS IPM ONLINE**

www.ipm.uiuc.edu

An environment for learning about integrated pest management.

**ILLINOIS WATERSHED MANAGEMENT CLEARINGHOUSE**

www.watershed.uiuc.edu

Helps groups create and implement a plan to address local watershed issues.

**ILLINOIS TRAILL**

trail.outreach.uiuc.edu

Organizes livestock research, information, and expert services.
Please call the C-FAR office or check the calendar on the 
C-FAR website at www.ilcfar.org for further details.