



LEOPOLD CENTER
FOR SUSTAINABLE AGRICULTURE

A NEWSLETTER OF THE LEOPOLD CENTER FOR SUSTAINABLE AGRICULTURE

VOL. 19 NO. 4 WINTER 2007

Spencer Award goes to small-market farmer

Laura Krouse, a farmer and biology instructor from Linn County, will be honored as the recipient of the 2007 Spencer Award for Sustainable Agriculture.

Krouse owns and operates a 72-acre farm near Mount Vernon, where she teaches full-time at Cornell College. She also is the proprietor of a 104-year-old open-pollinated seed corn business and Abbe Hills Garden, a Community Supported Agriculture (CSA) enterprise.

Krouse is the first small-market farmer to receive the award, established in 2002 to honor farmers, educators or researchers who have made a significant contribution toward the stability of mainstream family farms in Iowa.

"This small farm offers enormous diversity, including a restored wetland and constructed pond used for crop irrigation," said Leopold Center Director Jerry DeWitt, who administers the Spencer Award. "Although CSAs do not represent

a large part of agriculture at this time, they offer a viable alternative and help build awareness for local foods, which Laura has done through education in the classroom and among her neighbors both on and off the farm."

DeWitt said the selection committee was impressed with her participation in research. In 2002, she partnered with ISU horticulture and agronomy professor Kathleen Delate on pest management trials for squash and heirloom vegetables destined for the organic baby food market. Krouse also is a member of Practical Farmers of Iowa and hosts field days.

Active in the Linn County Soil and Water Conservation District, Krouse often speaks to groups and has appeared on Iowa Public Television and the "Now with Bill Moyers" program to promote sustainable agriculture.

Krouse will receive the award January 11 during the annual PFI conference.

Project fosters custom grazing in Iowa

By CAROL BROWN *Communication Specialist*

Thanks to new grazing tactics, a win-win situation on southern Iowa's pastures soon could be a reality. Custom grazing, or contract grazing, can be a positive solution for landowners, cattle owners and the environment.

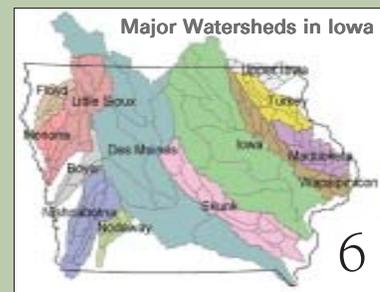
"Custom grazing means that the grazer provides grass and management but does not own the cattle," said Joe Sellers, ISU Extension beef field specialist. "The grazer is paid a per-head, per-day rate to graze, feed and manage the cattle."

On land with poor soil conditions or where the terrain makes it difficult to produce row crops, grazing makes good sense. Unlike row-cropping systems, grazing land aids in keeping soil and water

where it belongs. Grass-based agricultural systems help preserve nutrients and sediments, reduce water loss and increase biodiversity opportunities for more profitable business ventures. And as Conservation Reserve Program (CRP) contracts expire, this land may be used for grazing.

"There is a dramatic increase in demand for grass-fed meat and dairy foods, and high corn prices have raised the costs of industrial livestock production," said Jeri Neal, who leads the Ecology Initiative for the Leopold Center. "And cellulosic energy provides interesting

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LEOPOLD CENTER

LEOPOLD LETTER MISSION

The mission of the Leopold Letter is to inform diverse audiences about Leopold Center programs and activities; to encourage increased interest in and use of sustainable farming practices and market opportunities for sustainable products; and to stimulate public discussion about sustainable agriculture in Iowa and the nation.

Leopold Letter ISSN 1065-2116

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The Leopold Center for Sustainable Agriculture seeks to identify and reduce adverse socioeconomic and environmental impacts of farming practices, develop profitable farming systems that conserve natural resources, and create educational programs with the ISU Extension Service. It was founded by the 1987 Iowa Groundwater Protection Act. The *Leopold Letter* is available free from the Leopold Center at 209 Curtiss Hall, Iowa State University, Ames, Iowa 50011-1050; (515) 294-3711.



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CUSTOM GRAZING MAY HELP BEGINNING FARMERS

GRAZING (continued from page 1)

future opportunities for mixed perennials to become profitable. We finally have encouraging economic signals for grazing.”

Interest in grazing isn't limited to Iowans. The Leopold Center and Practical Farmers of Iowa (PFI) are members of Green Lands, Blue Waters (GLBW) consortium, a basin-wide initiative whose mission is to integrate more perennial plants and other continuous living cover into the agricultural landscape in the Mississippi River Basin.

“A Green Lands, Blue Waters regional working group is being organized around the topic of grazing,” Neal explained. “Both PFI and the Leopold Center will play key roles in bringing Iowa's grazing issues and opportunities to the GLBW table.”

Connecting cattle and field

Iowa ranks among the top 10 states where beef cattle are raised. For cattle owners, a shortage of available and affordable land can hinder their business growth. For young producers, purchasing large tracts of land can be financially difficult. Custom grazing can be a way to build capital for both these groups. For landowners who do not own livestock, leasing the land to graziers can be profitable as well.

“Custom grazing arrangements can help the younger, or undercapitalized producers get into the cattle business,” said Sellers. “Well-grazed pastures can compete with other land uses on southern Iowa farms.”

The Leopold Center awarded a 2007 competitive grant to Practical Farmers of Iowa (PFI) to research custom grazing in Iowa. One goal of the project is to connect landowners with existing cattle owners who are looking for grazing land. The project included an evaluation of existing grazing arrangements, distribution of tips and examples of good contracts to landowners and graziers, and facilitating networking among producers for successful business arrangements.

With help from the Iowa Beef Center and ISU Extension, PFI surveyed 50 Iowa producers who currently have livestock grazing under some form of contract. Prior to the grazing study, little was known about custom grazing in the state, except that a large number of informal or unwritten contracts existed, posing legal risks for

both parties. The survey showed that a wide range of grazing operations and agreements exist in Iowa. The results were broken down into three major areas: demographics and management practices; stocking rates, fees and services; and grazing strategies.

Getting it in writing

Contracts for custom grazing are important for both parties to protect land and livestock. Participants in a contract need to get the terms in writing. Things to consider when drawing up a contract include location of pastures, terms of payment, movement of cattle, animal care and death losses, feed, time frames, and more. There also could be third-party arrangements that include the landowner, cattle owner and a cattle caretaker. A fourth fact sheet being developed will provide information on what should be included in a contract as well as a sample agreement.

Another objective of the project was to reach landowners, livestock owners and young producers to provide information about custom grazing. PFI hosted two summer 2007 field days; one featured custom grazing on the Mike and Laura DeCook farm in Monroe County and the other showed work at the Adams County CRP Farm. ISU Extension also facilitated a panel discussion on custom grazing at the November 20 Iowa Forage and Grassland conference, which will be repeated at the PFI annual conference in January.

Sellers said one area for growth are three-party management agreements. These agreements include an absentee landowner renting the land to a caretaker, who then manages stocker cattle or cow-calf pairs owned by a third party. Several such agreements will be modeled and discussed with focus groups in 2008. Other growth areas for custom graziers include grazing on publicly owned lands, supplying markets for grass-fed beef, and use of flexible payment arrangements.



www.leopold.iastate.edu

Custom Grazing Survey fact sheets:
Demographics and Management Practices, Stocking Rates, Fees and Services, Strategies and Implications

Iowa Beef Center
www.iowabeefcenter.org

Practical Farmers of Iowa
www.practicalfarmers.org

q&a

A conversation with Director Jerry DeWitt



Q. What have been your experiences with animals and livestock in a sustainable agriculture system?

I grew up on an Iroquois County farm in east central Illinois. We had a diversified farm and that meant livestock as well as crops. We had a registered Black Angus cow-calf herd, produced eggs for the local hatchery, kept a small flock of Cheviot sheep, and managed a small farrow-to-finish swine operation. We were no different than our neighbors. If you farmed, you raised livestock.

These experiences taught me the important role of livestock on a farm. I have continued to position farm animals at the forefront of our work at the Center because without livestock, the move toward sustainability becomes far more difficult and challenging. Livestock bring economic value to the farm, recycle nutrients, and build soils and diversity.

Q. What have been the Center's key accomplishments to encourage livestock production?

The Leopold Center has had a strong record of supporting livestock as a part of Iowa agriculture. Early efforts focused on work within the Animal Management Issue

Team (1990-2002). This team looked at forage-based beef production systems, rotational grazing, use of stored feeds to extend winter grazing, and use of legume forage species for cattle grazing.

The Leopold Center also set up and supported work of the Manure Management Issue Team from 1990 to 1995. This group conducted early studies of the effects of manure applied prior to corn, the environmental impacts on surface and groundwater from the application of liquid swine manure, and economic impacts of livestock agriculture on the sustainability of family farms.

Another team of researchers studied the use of hoop structures for hogs. The Leopold Center hosted two successful conferences about these alternative systems that were attended by more than 500 people. Now we see hoop structures across the landscape, integrated into the pork industry, and under study for finishing beef cattle.

In addition to funding the work of these issue teams, the Leopold Center funded 15 competitive grants related to livestock

and 12 competitive grants on grazing, all completed between 1996 and 2007.

Q. What is the Center doing now to increase opportunities for Iowa livestock producers?

A more recent activity has been the formation of the Pork Niche Market Working Group. This group is led by Practical Farmers of Iowa and is part of the Value Chain Partnerships project coordinated by the Leopold Center. It brings together producers, industry representatives, extension staff, researchers and others interested in expanding the opportunities in alternative pork production systems.

The Leopold Center also is funding projects targeted for dairy, grass-finished beef and goats. Following a special call for proposals in 2006, we are supporting three new projects that offer promise for grass-based dairy systems in Iowa. They are designed to increase the number of Iowa producers using these systems to meet the growing demand for milk production. In 2008, we will launch an interdisciplinary team whose primary task will be to build and expand grass-based beef systems in Iowa.

Other Leopold Center competitive grants underway will develop a grassland products calculator, help small meat processors analyze operations for cash flow and profitability, create a curriculum for producers participating in branded programs and niche markets, determine comparative costs for various finishing systems, and assist producers interested in contract grazing.

These are but a few of the livestock-based programs and activities we have invested in at the Center. Livestock is needed on the landscape and we will continue to place high priority on this important and vital part of Iowa agriculture.



Paying it forward: Free conference trips for farmers

Thanks to a gift from Chipotle Restaurants, the Leopold Center is happy to offer 10 Iowa farmers an opportunity to participate in a national sustainable agriculture conference March 25-27 in Kansas City.

The farmers who are selected will participate in the 20th anniversary National Sustainable Agriculture Research and Education (SARE) conference, "Advancing the Frontier of Sustainable Agriculture." The Leopold Center will pay registration, lodging and travel expenses (up to \$750) for each farmer. To apply for this one-time offer, download a form on the Center's web site, www.leopold.iastate.edu/sare.htm, or call the Center at (515) 294-3711. Applications are due January 21; winners will be selected by January 30.

Farmers who attend will learn about how sustainable farming is rapidly changing the face of American agriculture. Read more about the conference at: www.sare.org/2008Conference/index.htm.

These farmer trips to the National SARE meeting are the Leopold Center's way of "paying it forward." Last December the fast-growing, Denver-based restaurant chain chose the Leopold Center as one of two recipients for the funds earned from selling a unique burrito-themed calendar in their restaurants. More about Chipotle and its "Food With Integrity" campaign at: www.chipotle.com.

Engaging speakers generate lively discussions

How Iowans respond to environmental and health issues formed the common ground for a series of lively discussions, the result of two lectures hosted by the Leopold Center. But that was about the only similarity between the two events, one featuring a working journalist and author of several best-selling books, and the other a scholarly presentation by a prominent physician whose Capitol Hill testimony has helped inform the next U.S. Farm Bill. Both events were part of the year-long celebration of the Leopold Center's 20th anniversary.

"I was pleased that a venue was created so that diverse perspectives could be presented and that conversations could follow, which is an important role for the Leopold Center," said director Jerry DeWitt. "As we tackle some of the more difficult challenges in our environment, we need to hear a wide range of viewpoints and ideas."

Both lecturers met informally with students and Leopold Center staff, in addition to their public presentations.

Kunstler tackles life without oil

More than 400 people heard James Howard Kunstler, author of *The Long Emergency* and *The Geography of Nowhere*, present his views about drastic changes in a post-oil world. In addition to his October 10 lecture at ISU, Kunstler spoke to audiences at the University of Northern Iowa in Cedar Falls.

Kunstler said he became interested in what he calls "our global energy predicament" when he read commentaries by top oil executives after they retired in the 1980s. "They understood that this was a story with a beginning, middle and end," he said. "It's not that we're running out of oil, it's what happens on the way down."

He said American oil production peaked in the 1970s, but we escaped the effects of the decline by increasing oil purchases from other countries. Oil production in Mexico, the third leading supplier of oil to the United States, peaked in 2006 and by 2010 there will be no surplus to sell to the United States. Oil fields in the Mideast already are in decline.

The result is that Americans are "sleepwalking into the future" and higher energy prices will change everything from transportation and housing, to education, economics and agriculture. "We'll have to downscale all of our activities in daily life, anything done on a large scale will falter," he warned.

Lawrence links health, ag

On October 22, Robert Lawrence, M.D., presented a lecture in honor of the Leopold Center's first director, Dennis Keeney. Lawrence, who directs the Center for a Livable Future at the Johns Hopkins Bloomberg School of Public Health in Baltimore, Maryland, spoke about "The Agriculture-Public Health Connection."

Lawrence said he became acquainted with Keeney several years ago when he developed an innovation grant program for public health students to study relationships that modern food production systems have with human health. Lawrence's center has funded 60 grants, as well as 11 pre-doctoral fellowships on public health issues related to livestock production systems.

Although much of his previous work had focused on preventive medicine and international health, Lawrence said he created the center in 1997 to address a gap – between public health, diet and the environment, and food production systems.

"I believe we have a public health responsibility to broaden our vision to become better informed about the impact of agricultural policies and the food system on the health of the public," he said.

He said he was very concerned about subtherapeutic use of antibiotics in livestock feed as a growth stimulant because it is creating a problem of "enormous proportions" in antibiotic resistance in bacteria capable of infecting humans as well as swine and poultry. Also contributing to the development of "super-bugs" that do not respond to common drugs is widespread over-prescription of antibiotics in human medicine.

"For many years, this antibiotic resistance in bacteria has been assumed to develop in hospitals, but we are finding that other pathways also are important," he said, noting results from studies con-



Left to right: Dennis Keeney and Robert Lawrence meet with ISU graduate student Andy Larson and Jeri Neal from the Center takes notes.

ducted by medical students.

He said conditions in confinement operations where animals receive the antibiotics are optimal for promoting drug-resistant bacteria because animals are crowded, and exposure to antibiotics is widespread, prolonged and contained in sublethal doses. Lawrence's colleagues have found classes of drug-resistant bacteria in air samples from a Maryland swine facility, and in groundwater and surface water samples taken downstream from a facility.

The obesity epidemic and high rates of Type II diabetes, which have doubled over the past 15 years, also have strong links to our food production system. Lawrence attributed some of the problem to widespread use of high fructose corn syrup in processed foods, and heavy marketing of those products to consumers. The price of the sweetener, he said, is kept artificially low due to oversupplies and subsidies offered by the current U.S. farm policy. A world market flooded with inexpensive U.S. commodities also creates a disadvantage for farmers in poorer countries.

In discussions with students earlier in the day, Lawrence posed the question of a "harm reduction" approach to agricultural issues. "In public health, there are very few single solutions so you need to weigh many competing demands," he explained.

"Many people thought that a needle exchange program among drug users, who are at high risk of transmitting HIV/AIDS, would result in increased drug use," he explained. "Instead, some of these people developed trust with the medical community and they sought help."

"What would be the harm reduction approach in agriculture? How can we help people make more informed choices, think about the consequences, measure the tradeoffs and make informed policy decisions?" he asked.

 www.leopold.iastate.edu

Listen to Keeney Lecture,
view Lawrence overheads:
[www.leopold.iastate.edu/
news/pastevents/lawrence/
index.htm](http://www.leopold.iastate.edu/news/pastevents/lawrence/index.htm)



TOWARD A SUSTAINABLE

Rethinking soil

The art of land doctoring is being practiced with vigor, but the science of land health is yet to be born. — Aldo Leopold

Soil scientist Hans Jenny reminded us that soil was not a thing, but a web of relationships. Rattan Lal, president of the Soil Science Society of America, recently reaffirmed that insight in an article he wrote for the *Crop, Soils, Agronomy News*. Reflecting on our tendency to describe crop residues as “waste” (especially in our current rush to use these residues for ethanol production), Lal warned that this was

... a dangerous trend because crop residue is not a waste. It is a precious commodity and essential to preserving soil quality. In addition to controlling erosion and conserving soil water in the root zone, retaining crop residues on the soil is also necessary for recycling nutrients, improving activity and species diversity of soil micro- and macro-fauna, maintaining soil structure and tilth, reducing nonpoint source pollution and decreasing the risks of hypoxia in the coastal regions, increasing use efficiency of fertilizers and other inputs, sustaining biomass/agronomic yield, and improving/maintaining soil organic matter content. (CSA News, Volume 52, No. 5, May 12, 2007)

This comprehensive evaluation of the importance of crop residues to soil health brings to mind the writings of Sir Albert Howard, Lady Eve Balfour and J.I. Rodale who, over half a century ago, lamented our simplistic soil management methods. They argued that simply inserting a few nutrients to achieve maximum production (what Howard called the “NPK mentality”) was, in fact, a kind of “banditry.” Without proper maintenance of health of the entire soil complex, the soil’s “stored fertility” is plundered, and jeopardizes future generations.

We have thus far largely avoided the fulfillment of such predictions because we have used cheap synthetic inputs to mask the effects of the loss of stored fertility in the soil (at least so far as maintaining yields is concerned). As Leopold observed, we have excelled at “land doctoring” but we have invested very little into the “science of land health.”

Since the inputs that facilitate production with little regard to soil health are derived from fossil resources, we may soon find the predictions of Howard and others coming true. The principal fossil resources that have created this productivity – oil, natural gas and groundwater – are now in a state of depletion, so it is imperative that we attend to the science of soil health.

We know from extensive research that when soil is managed to enhance soil quality, practices such as returning crop, livestock and other residues (preferably composted) to the soil, and crop rotations (particularly with green manure crops) will improve soil health. Such practices reduce the need for synthetic inputs and improve water absorption and retention, which decreases the need for irrigation. Now more than ever it is critical to reinvigorate the science of soil health if we wish to maintain productivity in the face of serious resource depletion. We have ignored soil health far too long.

The recent discussion by the Iowa State University Agronomy Department about a possible new Soil Science Institute is not only a great idea but a necessary one. Hopefully the vision of the institute is focused on a science of land health.

The case for a Soil Science Institute in Iowa

Soils produce plants to feed humans and animals and are critical for our hydrologic cycles and water quality. Soils hold rainwater, decrease flooding and store water for use by plants. Sunlight is converted to heat at the soil surface, so soil serves as a regulator of climate. Soils that are rich in organic matter and certain clay minerals (like those of Iowa) serve as the earth’s filters and remove many of pollutants.

The most recent average erosion estimate for Iowa is 5 tons per acre. That means every year, on average, 10,000 pounds of soil per acre move from one location to another. So, for an average corn crop of 200 bushels per acre, about a pound of soil moves for each pound of corn produced. For an average soybean crop of 50 bushels per acre, this means about 2 pounds of soil moves for each pound of soybeans produced. Iowa soils are geologically young, having only recently been disturbed by human activities. Today, many of Iowa’s soils remain incredibly productive, thanks largely to the organic

matter they contain. This organic matter was created and stored over several millennia by Iowa’s tall grass prairies.

Although the organic matter in Iowa soils is no more than 50 percent of what it was when the soils were first tilled, an average acre of Iowa soil will still mineralize 150 pounds of nitrogen through the decomposition of organic matter. Corn production requires about 275 pounds of nitrogen per acre. Only about half of that nitrogen comes from fertilizer or manure; the rest comes from nitrogen mineralized in the soil. Soil organic matter provides an unseen nutrient source for Iowa farmers and allows them to use the crop production practices they currently employ.

We believe there is nothing more important to Iowa and its future than our soil and have begun discussing creation of a Soil Science Institute to better focus our science for managing and maintaining Iowa’s most valuable resource. — Kendall Lamkey, chair, ISU Department of Agronomy

Study shows diversity needed for tackling Iowa water quality issues

By LAURA MILLER Newsletter editor

While no one expected to find a “silver bullet” that would solve Iowa’s water quality problems, an 18-month study about on-farm conservation practices added some defining numbers to the discussion and reinforced several assumptions.

- Iowans already have a huge investment in on-farm conservation practices but more can be done.
- There are many ways to improve water quality but the most efficient ones target specific areas (and all watersheds are different).
- Further improvements will be costly.

The Leopold Center partnered with the Iowa Farm Bureau Federation, Iowa Soybean Association and the Iowa Corn Growers Association to assemble a broad view of the cumulative costs and environmental benefits of conservation practices on Iowa farms. The results are contained in a new report, “Conservation Practices in Iowa: Historical Investments, Water Quality and Gaps,” prepared by a team of researchers from Iowa State University’s Center for Agricultural and Rural Development (CARD).

Findings in a nutshell

Researchers used modeling to identify seven conservation practices that contributed the most to nutrient reductions in 13 watersheds in the state. Depending on the watershed, these practices are estimated to remove 11 to 38 percent of the total nitrogen, 6 to 28 percent of the nitrate and 25 to 58 percent of the phosphorus, and altogether are valued at about \$435 million each year.

Jeri Neal, who leads the Leopold Center’s ecological systems research initiative, said the project was designed to provide a benchmark for current conservation practices to help establish viable solutions for future conservation efforts.

“We are impressed with these baseline numbers as an indicator of how much Iowans invest in conservation practices because clearly, Iowans care,” she said. “The models show we also can improve a lot more, but that it’s going to take a lot more dollars. So from the Leopold perspective, it’s important that we work past single solutions for ways to produce maximum ecological and economic benefits - yield plus, if you will.”

The estimated \$435 million annual investment includes average statewide costs of close to \$37 million for selected Iowa conservation structures (terraces and grassed waterways), annual payments of about \$175 million to farmers for acres set aside as part of the Conservation Reserve Program, plus contour farming, contour strip cropping, no-till and mulch-till conservation practices in farming operations. The data sets used in the analysis represent conservation practices and their costs in place in 1997, except for conservation tillage, based on 2004 coverage and costs.

“Our results indicate that the most cost-effective measures to improve water quality are different across different watersheds, and that targeting different pollutants will mean different land use options,” said Catherine Kling, head of CARD’s Resource and Environmental Policy Division and lead researcher in the study. “One message for stakeholders is that they must have a good knowledge of their watersheds before adopting policies to bring about change in land use.”

To determine the effectiveness of these practices, CARD researchers relied on a widely used water quality model, the Soil and Water Assessment Tool (SWAT). They looked at 13 large-scale watersheds that cover most of Iowa, and modeled the impact of seven major conservation practices on the quality of both

surface water and groundwater, measured by the predicted levels of nitrogen and phosphorus in each watershed.

The extent of the practices used, land use and environmental conditions in each watershed affected the predicted outcomes. Nitrate loadings in the western Iowa watersheds were reduced by the greatest amount.

Three research questions

- What is the value of major conservation practices currently in place on Iowa farms?
- What are the effects of these practices on water quality?
- What would it take to improve water quality to attain specific standards?

To look at costs for future improvements, researchers considered three scenarios using the SWAT model: to reduce phosphorus loadings by 40 percent, to reduce nitrate loading by 25 percent, and to reduce both phosphorus and nitrate by 40 percent and 25 percent, respectively.

They looked at a variety of land use options – from land retirement to conservation tillage and fertilizer reduction – and used computational tools known as evolutionary algorithms to search for the lowest costs of reaching targets in each scenario. The options did not include longer or more varied crop rotations, or the use of buffers or manure in place of fertilizer inputs.

According to the model outputs, a scenario that would target a 40 percent reduction for phosphorus would simultaneously result in a 31 percent reduction in nitrate loadings. However, the annual estimated cost to implement a variety of conservation practices would be \$613 million statewide. These costs are in addition to funding existing conservation practices.

Percent Reduction in Nutrient Loadings from Existing Conservation Practices

Watershed	Nitrate	Total N	Total P
Boyer	23	38	48
Des Moines	14	15	33
Floyd	19	25	42
Iowa	10	13	25
Little Sioux	20	24	47
Maquoketa	8	17	39
Monona	15	26	58
Nishnabotna	21	33	46
Nodaway	28	37	50
Skunk	14	21	42
Turkey	5	18	34
Upper Iowa	7	18	45
Wapsipinicon	6	11	40

See page 1 for map of Iowa watersheds.



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Full report at CARD web site:
www.card.iastate.edu/environment/

A farmer's view from the inside: Leopold Center leads 'quest for sustainability'

By JENNIFER STEFFEN Guest columnist



Adaptable" is the key word to describe Iowa's farmers.



Since the onset of mechanized farming at the turn of the previous century, farmers have adapted practices to meet the growing demand for food and fiber.

Unfortunately, many of these adaptations have not involved the sustainable use of our natural resources. Millions of acres of natural wetlands have been drained by ditching and tiling. Rivers, streams and tributaries have been mechanically straightened to speed the flow of water from the land. These and other adaptations have allowed Iowa farmers to coax productive farmland from what was previously considered wasteland, which can be seen by driving across the vast agricultural richness that is Iowa.

What first may appear to be a highly productive and prosperous system, however, has not come without cost. Soil erosion, diminished water quality and contributions to the hypoxic zone in the Gulf of Mexico are but a few of the costs that have not yet been fully discounted. At the same time that Iowa farmers are under increasing pressure to produce grain for export markets, livestock needs and more recently production of bio-energy, the era of cheap inputs is coming to an end. A system that has depended on cheap energy, plentiful water and a favorable climate will be forced to adapt. We must strive for new innovations that will simultaneously provide a pathway to agricultural sustainability.

As I look at my own farming experience, I see a story that starts in the late 1970s, a boom time for agriculture in Iowa. A strong farm economy sparked major changes in our landscape. Fencerows and waterways were disappearing, rotations were forsaken, maximum

tillage was occurring, and the diversified family farm with livestock was being replaced by a corn/soybean monoculture. Farmers who didn't meet efficiencies of scale were pushed aside to make way for the industrialization of agriculture. As people left the land, small rural communities began a decline that continues today.

The move to no-till

In our farming operation we recognized that these intensive management practices were causing our already fragile soil to suffer. In 1980 we took action, plunging 100 percent into no-till. A few years later we replaced the application of anhydrous ammonia with side-dressed liquid nitrogen, much to the delight of the earthworms. These innovations were supplemented by a steady stream of conservation practices encouraged and designed by our local soil and water conservation district and NRCS office. In total, these adaptations have helped stabilize soil loss and improve the soil structure of my own farm while improving the bottom line.

Looking at my efforts and those of kindred conservationists across Iowa, I have to ask myself, are we doing enough? The answer is a resounding "No!" Despite sound management practices and conservation innovations, my own acres are not all farmed to "T" or tolerable soil loss levels. Soil loss continues across the state at what looks to be an accelerated pace exacerbated by external pressures to produce more. In 2007, Iowa had a 22 percent increase in the number of corn acres, some of which was fragile land coming out of the Conservation Reserve Program.

Now I hear people talk about producing ethanol from corn stover. Government policy encourages unsustainable farming through market interference and a mandate and subsidy system that artificially encourages some types of production over

others. Farmers receive subsidy payments with little expected in return. We agree to comply with a conservation plan that is loosely interpreted and minimally enforced. Meanwhile land prices are soaring, making it even more difficult if not impossible for beginning farmers to get started.

Adapting to challenge

In my view, lots of challenges remain to be addressed before agriculture in Iowa can move very far along a more sustainable path. However, I am encouraged by the many positive adaptations and developments I see happening across the state. Alternative swine management systems (hoop barns), research on flax and other crops, Community Supported Agriculture (CSA) enterprises, farmers markets, research on various cropping systems and rotations, and managing nitrogen and phosphorous to improve water quality are but a few. These and other yet-to-be-developed strategies and innovations will be adopted more universally as energy prices continue to rise.

I mention these positive steps because the Leopold Center has been at the forefront to promote and support each one. The Center has awarded hundreds of competitive grants, and its multi-disciplinary issue teams have initiated long-term programs that are working to make farms more profitable and environmentally sustainable. The Center has been, and will continue to be, a relevant catalyst in the quest for agricultural sustainability.

As the Leopold Center celebrates its 20th anniversary, I applaud and thank those visionary leaders who saw the need and perhaps reflected on Aldo Leopold's words, "A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise." I am proud that Leopold Center programs are helping to bring us steps closer to a system that is more in line with Wendell Berry's definition of sustainable agriculture, "agriculture that does not deplete soils or people."

Jennifer Steffen operates a 522-acre farm near Birmingham in Van Buren County in southeast Iowa where she also is a soil and water conservation district assistant commissioner. She and her two sons (fourth generation farmers) raise cattle and have farmed continuous no-till since 1980. Since 2001, she has been one of two farmer representatives for the State Soil Conservation Committee on the Leopold Center's advisory board.

Traveling 'beyond food miles' crucial to local food efforts

With "food miles" becoming a hot catchphrase this past year, it's only a matter of time before American consumers start talking about a food product's carbon footprint.

So says Leopold Center Associate Director Rich Pirog. Pirog fields numerous inquiries each week about local food systems, with many citing his 2001 paper, "Food, Fuel and Freeways," the first of three "food miles" reports published by the Leopold Center.

Rather than tracking food miles – the distance that food travels from where it is grown to where it is sold – Pirog said many researchers have begun to take a more holistic approach to documenting the environmental impact of a food supply chain. A life cycle assessment (LCA) accounts for the environmental impacts of energy, materials and other inputs throughout a product's lifespan. While cradle-to-grave product analyses are not new in the manufacturing world, only recently have they been applied in U.S. food production scenarios. Measuring the carbon footprint of total greenhouse gas emissions is a type of LCA that is focused solely on climate change impacts.

In his 2001 paper, Pirog employed a statistical methodology to calculate "food miles" and to determine the greenhouse gas emissions required to transport produce and other agricultural products to consumers. He found that the conventional system of transporting food used 4 to 17 times more fuel than Iowa-based regional and local systems, and released from 5 to 17 times more carbon dioxide.

Food miles, only part of story

"Food miles have been used as one of the arguments for eating locally grown foods, because the assumption is that lower food miles mean lower environmental impact," Pirog said. "But when greenhouse gas emissions are the indicator used to look at environmental impacts, food miles are not a reliable indicator; you need to know the mode of transport, the fuel efficiency of the transport, and the emissions generated across the entire food chain."

Pirog cited a recent Belgian study published in the *Journal of Environmental Policy and Planning* (March 2007) that showed greenhouse gas emissions in local food systems may, in fact, be higher than those found in a comparable conventional food system. The study points to the need

for more research to compare greenhouse gas emissions and other environmental impacts in local versus conventional food systems.

Pirog recently participated in a three-day international symposium at the University of California-Davis to develop research strategies that would document and reduce greenhouse gases in food production. He was one of 20 researchers, government officials and food industry representatives from Europe and the United States invited to attend. The gathering will produce a white paper outlining U.S. priorities for policy, research, education and outreach regarding energy use and environmental impacts of food supply chains.

"The European Union already has carbon labels on foods and the first such labels likely will be introduced in the United States in the next year," Pirog said, adding that he is reviewing carbon calculators for use in the public and private sector.

Five questions to answer

Pirog cites these as the most often asked questions about local foods:

- Are local foods better for the environment than food from conventional systems?
- Are local foods safer than conventional foods?
- Are local foods healthier than conventional foods?
- Are local foods better for the state's economy and farmer profitability than conventional foods?
- Are local foods better for rural and urban communities than conventional foods?

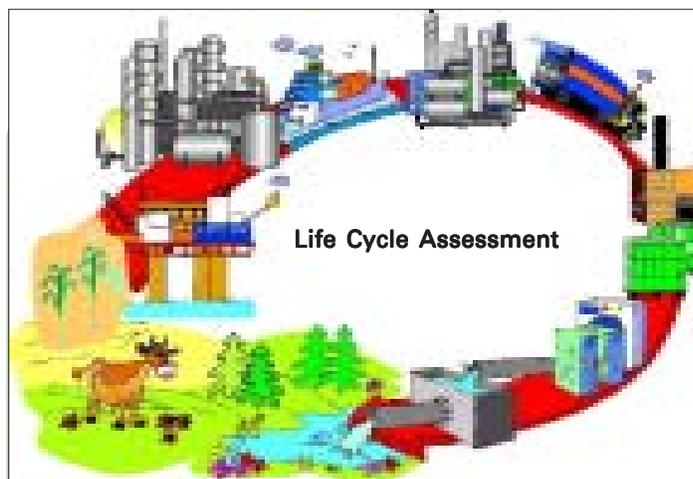
 www.leopold.iastate.edu

Find the Leopold Center's local foods research at:
www.leopold.iastate.edu/research/marketing.htm

"These are the top questions being asked, by news reporters, policy makers, investors and foundations," he said. "From a research perspective, there is information to answer the questions about the economic and community benefits, but the questions regarding environment, safety and health benefits need more research."

A number of players are getting into the local foods market, including worldwide retailer Wal-Mart. Pirog predicted that with headlines about food safety problems, rising fuel costs, global climate change, and consumer queries for information about how and where their food is grown, demand will continue to increase for local and regional food production.

The Symposium on Energy LCA of Food Systems was hosted by the UC-Davis Agricultural Sustainability Institute and the statewide Sustainable Agriculture Research and Education Program (SAREP) in California. Pirog joined representatives from the Bon Appétit Management Company Foundation that helped sponsor the symposium, plus the Department for Environment, Food and Rural Affairs (DEFRA) in the United Kingdom, the Danish Institute of Agricultural Sciences, Ecotrust, and a private energy company in Switzerland.



The U.S. food industry has begun to apply Life Cycle Assessment, shown here for an industrial product, to determine environmental impacts in the food supply chain.

[Adapted and used by permission, Akzo Nobel]

More about the Center's local food research on page 9.

Center local food projects define new frontier

It was 1997 and the request from the Leopold Center to the dining services staff at ISU's Scheman Building was highly unusual. Could they serve Iowa-grown food at the Center's 10th anniversary conference?

The Center had just started to explore the practices and values associated with organic agriculture as well as food systems that were more closely linked with the farmers who grew the crops or raised the livestock. It was time, Center staff decided, to "walk the talk" and serve food that could be sourced directly to Iowa farmers. The Center also encouraged other groups who received Center funds for workshops and conferences to do the same.

Now the "eat local" movement has its own entry in the on-line encyclopedia, Wikipedia. Sales of "local foods" in the United States are expected to top \$5 billion this year, and many trend-watchers say "local" is the "new organic."

Indeed, interest in local foods has skyrocketed, with the Leopold Center on the leading edge to conduct and support research, fund projects and work with partners who have become important players in Iowa's emerging local food system.

In 2001, the Leopold Center established Marketing and Food Systems as one of its three research initiatives. To date, the initiative has funded more than 80 grants totaling nearly \$1.6 million and leveraged funds for another 50 grants through the Value Chain Partnerships project. However, the Center's influence began much earlier with support of conferences, workshops, pilot programs, tracking sales of local foods (see example below), and op-



portunities for farmers to sharpen their skills to enter a relatively unfamiliar world of direct market sales to consumers, food service institutions and restaurants.

"The Leopold Center has funded a host of local food efforts throughout Iowa – in Johnson County, Grinnell, northeast Iowa, southeast and southwest Iowa – initially for pilot projects that helped build the case about the value of local foods," said initiative leader Rich Pirog.

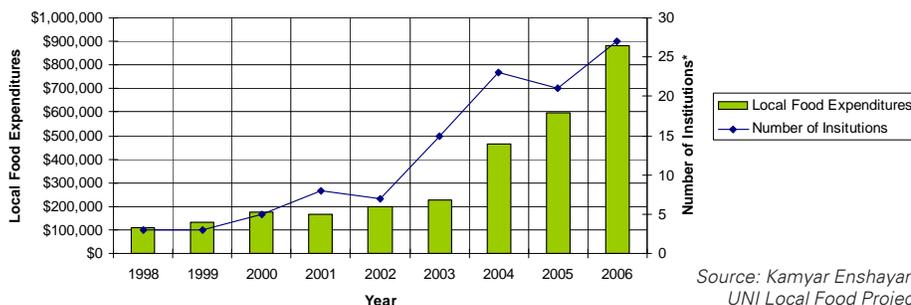
"What's happened over time is that we've gone from pilot projects to where we are now building community support for long-term sustainability of local food efforts. All of these projects need business and local community support to be sustainable over the long term."

For example, Pirog said Gary Huber from Practical Farmers of Iowa (PFI) was involved in some of the earliest efforts to link local vegetable growers with institutional food buyers in central Iowa. Now PFI has a Leopold Center grant to set up an Iowa Food Cooperative, expected to be launched in 2008. Other current projects are designed to help farmers work with larger-volume buyers.

"Many of our grants now focus on helping producers meet the increasing demand for local food," Pirog said. "We're looking at transaction costs, production and distribution challenges and other technical issues associated with building that local food system."

With so much activity, naming one or two highlights is difficult. So here's our Top 10 list of issues that have been addressed through Leopold Center projects. Collectively, they are part of a new frontier and opportunities in Iowa agriculture.

UNI Local Food Project
Local Food Purchased by Institutional Buyers in Black Hawk and Surrounding Counties in Iowa, 1997-2006



Source: Kamyar Enshayan, UNI Local Food Project

Looking to the Future: Top 10 Local Food Issues (and what the Center is doing about them)

- **Profitability** – 7 projects examining production and marketing costs of various food enterprises
- **Business planning** – 4 projects to develop training and education programs that provide farmers with the tools they need to plan and implement new food businesses
- **Transaction costs** – 2 projects, one to illustrate transaction costs for farmers who sell directly to consumers or through a network, and another on costs for restaurants that buy from local farmers
- **Food safety** – 2 projects, including on-farm safety audits and food safety training for Iowa farmers who sell to institutions
- **Economic impacts** – 3 projects examining the economic impacts of increased fruit and vegetable production as well as shifts to organic crop rotations in Iowa
- **Environmental impacts** – 3 projects on fuel use and CO₂ emissions for various scales of food systems
- **Distribution and processing** – 5 projects developing profitable business models for local food distribution, and training to understand product cost setting in small-scale meat processing
- **Access to capital** – 2 projects documenting various sources of capital and increasing technical assistance and micro-loans for food entrepreneurs
- **Local food assessment, mapping** – 4 projects understanding the demand for various food products as well as the linkages in community-based local food chains
- **Market research** – 8 projects ranging from consumer perceptions of local foods, to retailer and consumer interest in local foods and ecolabels

News & Notes

Leopold Center Director Jerry DeWitt will teach a new online course on the theory and practice of organic agriculture during the Spring 2008 semester at Iowa State University. Instruction will cover risk management tools for transitioning to organic and current concepts and research on soil quality, organic crops, livestock, markets and public policy. It is offered as a three-credit pilot course in ISU Agronomy and is available through ISU Extension offices on a noncredit basis. DeWitt is team teaching the weekly class with Kathleen Delate, associate professor of agronomy and horticulture, and ISU Extension field specialist Craig Chase. Delate also oversees organic field plots that are part of the Long-Term Agro-Ecological Research Initiative (LTAR) supported by the Leopold Center.

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The Leopold Center web site had a record number of visitors in October: nearly 30,000 visits that constituted 231,637 hits. One-third of those visits – 10,707 – occurred on October 17, when Reuters News Service posted a news report on its web site with a link going directly to the Center's 2001 "Food, Fuel and Freeways" study. The Reuters news reporter relied on Leopold Center Associate Director Rich Pirog, who wrote the food miles study, as a primary source in her report, "Do food miles make a difference to global warming?" Also during that one-month period, web visitors downloaded or viewed more than 57,000 research reports and documents, an increase of nearly 25 percent from previous months.

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Angie Tagtow, a registered dietitian from Elkhart who has worked with the Leopold Center on food systems projects, has been named a Food and Society Policy Fellow by the Thomas Jefferson Agricultural Institute. Tagtow is consultant and managing editor of the *Journal of Hunger and Environmental Nutrition*, a publication she launched to bring together experts on local, national and international hunger and environmental issues. The fellows program includes food and agriculture professionals who help to inform the public about sustainable food systems.

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The 2001 "Food, Fuel and Freeways" report is cited in a recent position statement of the American Dietetic Association. The position statement encourages food and nutrition professionals to consider ecological sustainability in the food system by supporting sustainable agriculture and community food systems. Suggestions include minimizing food waste, purchasing recycled materials and water-saving appliances, purchasing foods produced with fewer agricultural inputs, and supporting local growers and farmers' markets. The position statement is published in the June 2007 issue of the *Journal of the American Dietetic Association* (www.adajournal.org).

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Iowa State University Extension is offering niche pork producers a variety of training and online discussion groups from December to March. Online discussions are planned on niche sow farrowing, niche sow breeding and increasing niche pork profits as part of a larger research project coordinated by the Iowa Pork Industry Center. More information is available from Dave Stender, (712) 225-6196 or at dstender@iastate.edu.

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Results from Leopold Center-supported research on alternatives to sow gestation stalls have been encouraging in terms of both sow performance and economics. Group pens for pigs inside deep-bedded, naturally ventilated hoop barns have been studied for the past two-and-a-half years at an ISU-managed research farm. The system has been compared to individual gestation stalls in a mechanically ventilated confinement building with a partially slatted floor and manure flush system. Researchers found that reproductive performance could be maintained or enhanced in well-managed group housing systems for gestating sows without increasing labor, and with similar operating costs. Results of the project were reported in the May 2007 issue of *Journal of Animal Science*, "Performance of gestating sows in bedded hoop barns and confinement stalls." Funds also come from the Iowa Agriculture and Home Economics Experiment Station and the U.S. Department of Agriculture.

Leopold Center accountant named Woman of the Year

Leopold Center accountant Karen Jacobson recently received top honors at the Joint National Conference of the American Society of Women Accountants (ASWA) and the American Women's Society of Certified Public Accountants (AWSCPA).

Jacobson received one of ASWA's prestigious Balance Awards, which highlight the accomplishments of companies and individuals who successfully balance work and life. She was selected the Region 3 winner of the Balance Award for Individual Achievement recognizing leadership and accomplishments within the financial and accounting profession and commitment to work/life balance. Jacobson also was selected from the six regional winners as ASWA's Woman of the Year.

The awards were presented by the ASWA Educational Foundation during the ASWA/AWSCPA annual conference October 27-29 in Orlando, Florida. The award is sponsored by Accountemps and Robert Half Finance & Accounting.

Jacobson joined the Leopold Center staff in July 2005. She had worked as controller at Bethany Life Communities in Story City, and as an independent consultant, auditor and corporate treasurer for an Ames savings bank.

She has a degree in accounting from Augustana College in Illinois and an MBA in accounting from the University of Wisconsin-Madison. She is chartering president of the Ames ASWA chapter and is a member of the Iowa Society of CPAs, where she served as a mentor for 17 years. In addition to her volunteer work and employment at Iowa State University, Jacobson designs and produces greeting cards, and operates a small business in Story City with her husband.

Spencer Award winner plants seeds of sustainability, community

By LAURA MILLER *Newsletter editor*

Laura Krouse cut a bag of lettuce mix from several rows of ruffled, green plants.

In a few days, the 120 families who buy a share in Krouse's Abbe Hills Garden in rural Linn County would take home all the greens they could eat. Although November 1 would be the last distribution of the season, a hay wagon in Krouse's shed was heaped with the fall garden's bounty: large orange heirloom squash, acorn and butter-nut squash, onions, potatoes, garlic, mustard greens, spinach, kale, cilantro, dill, fennel, red radishes, daikon radishes, Brussels sprouts and cabbage.

"Many people think local foods stop being available in August but if you came out here and looked, you would see differently," the grower-extraordinaire said to a visitor. "Sometimes I think I may be the only fall gardener in Iowa but it's my favorite time of year to grow things because there are no weeds, disease or insect problems."

Krouse last year hosted a tour for the outgoing head of the Iowa Department of Public Health and her local legislator. She wanted them to know that it is possible to eat fresh, local produce in Iowa well into the fall, and that it could be available for school programs and for the "Iowans Fit for Life" programs if farmers would grow the crops.

"I just wanted to plant a seed for the future," she explained.

An atypical farmer

That's what Krouse has been doing all her life. She splits her time between teaching biology at Cornell College in nearby Mount Vernon and operating her 72-acre small-market farm and open-pollinated seed corn business. As a leader in her local soil and water conservation district, she is often called upon for presentations about conservation, local foods and related issues.

In January, Krouse will add another line to her resume: recipient of the 2007 Spencer Award for Sustainable Agriculture. She holds the distinction of being the first single woman honored with the award, and the first small-market farmer.

Although she grew up in the area (her father was elementary school principal in Alburnett and Toddville), Krouse took a non-traditional route before returning in 1988 as an atypical Iowa farmer.

Armed with degrees in agronomy and agricultural business from Iowa State Uni-

versity, Krouse worked two years at a Kansas feed mill, then five years managing an emergency program for migrant farm workers in southwest Florida. Deciding to work in agricultural missions, she enrolled in the master's agronomy program at the University of Florida. She earned the degree with coursework in farming systems, extension and tropical agriculture.

"At the time the farm crisis was beginning to hit the Midwest and I had an opportunity to buy a small farm back home," she said.

The land had been used to grow hay, soybeans and an open-pollinated corn variety from the 1903 World Corn Exposition in Chicago. The family had been growing the heirloom variety for seed, sold primarily to dairies for its high protein and oil content and for digestibility. The seed business came with the land.

"I had never seen open-pollinated corn before I came here," Krouse recalls. "I never saw myself as a corn breeder, either, but that's what I've been doing."

In the public eye

Krouse was in the public eye a few years later when her corn tested positive for Bt toxin, indicating contamination from genetically modified (GM) crops that resist the corn borer pest and are grown widely throughout Iowa. She lost customers and the incident generated a lot of publicity.

"I got calls from all over the world and suddenly I was a spokesperson about GM contamination," she said. "I don't blame my neighbors and I don't think GM crops are a bad thing, we just need to understand their ecological consequences since we cannot contain them."

In addition to about 15 acres of open-pollinated corn, Krouse grows nearly 30 acres of soybeans and 40 vegetable crops on 11 acres. The vegetables require the help of summer interns and her father.

"I always wanted to grow food, the row crops are just secondary," she said. "The farm has paid its own mortgage, insurance and taxes, mostly due to the garden although it requires a ton more work and time to manage."

She emphasizes that she is not an organic farmer but would like to be. "I try to follow sustainable practices but organic farming is really hard because it all depends on having excellent timing, which I can't always manage," she said.

Krouse has seen many changes in her farm, such as the appearance of additional wildlife. Early on, she built a four-acre retention pond for irrigation. The contour planting, grass terraces and cover crops also provide good habitat.

In 2002, she rerouted field drainage tiles to create a one-acre wetland surrounded by two acres of native grasses. About three-fourths of the rain that falls on her property must pass through the area before draining into Abbe Creek. A well at the foot of the dam shows no detectable traces of phosphorus or nitrate.

"I wanted to demonstrate what an upland wetland looks like," she said. "That's how we can improve water quality by treating water before it gets to our rivers."

Her favorite activities include projects for the soil and water conservation district. She is most satisfied, however, knowing that she is providing good food for families in her community. "Kids eat it on the way home," she said. "What could be better?"



Laura Krouse in her fall garden (and a cornfield with a cover crop). Below, her cat, Spin, and a bag of Abbe Hills corn.





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Highlight Events

Spencer Award Presentation January 11, Des Moines

The Leopold Center will present the Spencer Award for Sustainable Agriculture to Iowa farmer and college instructor Laura Krouse on Friday, January 11 as part of the Practical Farmers of Iowa annual conference at the Airport Holiday Inn, Des Moines. The presentation will be at 7 p.m. during the Iowa Buffet Dinner, followed by the “King Corn” documentary. Guests are welcome but they must register by January 4.

PFI is offering Friday afternoon workshops on niche pork, grazing, beginning farmers and sustainable energy on small and midsize farms. The keynote will be Saturday, followed by 10 breakout sessions and an All-Iowa Meal. The conference theme is “Come to the Table,” featuring farmers who have been successfully supplying markets for grass-fed, organic and local products. For details, contact Cedar Johnson, (515) 232-5661x101, cedar@practicalfarmers.org.

February 24, Shivers Lecture Iowa State University, Ames

John Ikerd, Professor Emeritus of Agricultural Economics at the University of Missouri, Columbia, will present the 2008 Shivers Memorial lecture at 7 p.m., Sunday, February 24 in the Sun Room of the ISU Memorial Union. His presentation is “Family Farms in an Era of Global Uncertainty.” The lecture is sponsored by the Leopold Center and the ISU Chapter of Gamma Sigma Delta Honorary Society for Agriculture.

March 11, Marketing and Food Systems Initiative Workshop March 14, Ecology Initiative Workshop

Learn what is happening in the Leopold Center’s two largest initiatives. This will be the third workshop for the Marketing and Food Systems Initiative, and the first such event in the Ecology Initiative. The March 11 workshop at the Gateway Conference Center in Ames will feature presentations by projects currently funded by the Leopold Center and the Value Chain Partnerships project (also coordinated by the Center). More information about both workshops at: www.leopold.iastate.edu.



“It’s unbelievable how little people in our generation know about where their food comes from. I think we need to do whatever we can do to narrow that huge gap that separates people from farmers who produce food. This film was an attempt to do that.” – Curt Ellis, one of the makers of the documentary, “King Corn,” at its Iowa State University premiere on November 10