



2011 brings 19 new research projects

Work has begun on 19 new projects in the Leopold Center's long-running competitive grants program. The grants support a wide range of activities, from research on prairie strips to retain nutrients and biochar to improve soil quality, to year-round use of high tunnels for food production and development of resources for immigrant and minority populations who want to farm in Iowa.

Funds for the first year of work on these projects total \$595,102. Six projects will be completed after one year, nine projects will run two years, and four projects span three years.

The Center also has renewed or is in the process of renewing 25 grants for multi-year projects already in progress. These projects, and the new work that will begin in 2011, bring the total amount of current grant-funded research at the Leopold

Center to about \$1.25 million.

Here's a summary of new work in each of the Center's research initiatives. See page 11 for the list of all new competitive grant projects.

Ecology: Eight new projects

Several grants support research on how different agricultural systems function within their surrounding environment, such as the effects of trees on stream water quality and the interaction of corn roots and the soil ecosystem. Two grants will expand research on the use of prairie strips within row-cropped watersheds, a new conservation practice being tested at the Neal Smith National Wildlife Refuge near Prairie City. Investigators will look at how birds use these prairie areas. The second related project considers the farmers' decision-making process for

GRANTS (cont. on page 11)

Leopold Center deals with transition: New interim appointed; Pirog heads to Michigan

By LAURA MILLER, Newsletter editor

The Leopold Center is undergoing two leadership changes with the loss of a long-time staffer, followed by replacement of an interim director.

The first transition began February 8, when Rich Pirog, 21-year staff member and associate director since 2007, announced that he had accepted a position at Michigan State University. Pirog will help lead a new center at MSU, the Center for Sustainable Food Systems.

A second transition began a month later, when ISU animal science professor and research farms coordinator, Mark

Honeyman was appointed interim director on a short-term basis beginning March 7. Lois Wright Morton, who had held the post since July 2010, stepped down to lead a regional research project on climate and agriculture (see page 4).

"I am honored to be here because I have been a long-time admirer and user of the Leopold Center and I respect everything the Leopold Center does," said Honeyman in his first meeting with staff on March 9.

"The Leopold Center has never been needed more than today. Our job is to

LEADERSHIP (cont. on page 2)

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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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LEADERSHIP (continued from page 1)

keep that beacon shining brightly.”

Honeyman has worked at Iowa State more than 30 years, including 26 years as coordinator of ISU's Research and Demonstration Farm network. He also coordinated many center-funded projects and interdisciplinary teams, including the ISU Hoop Group that pioneered the use of hoop buildings in Iowa for alternative livestock production. Honeyman recently was named associate director of ISU's BioCentury Research Farm. In 2008 he led the creation of the university's compost facility, which turns campus and farm wastes into compost and amended soil.

Honeyman said he would provide stability and focus, with a commitment to fulfilling the Leopold Center's mandated mission for research. A May 25 workshop for those interested in applying for Leopold Center competitive grants will be held as scheduled, and the 2011 Request for Pre-proposals will be issued this summer.

Wright Morton said she needed to devote more time to research, which includes a nine-state project that is just getting started. While serving the Leopold Center, she directed another multi-state watershed project and the Iowa Learning Farms, which she will continue to coordinate. Pirog handled many administrative duties at the Leopold Center as its associate director.

But it will be Pirog's other contributions that may be missed most in Iowa.

“For two decades Rich has exemplified the highest standards of service and dedication in many programs of the Leopold Center,” Wright Morton said in announcing Pirog's departure. “In local foods, he has been central to the team-building and cultivation of relationships that have developed new opportunities for growing this area to benefit farmers and communities.”

Last year Pirog led development of the Iowa Local Food and Farm Plan (see page 7) and has directed the Center's Marketing and Food Systems Initiative since its creation in 2001. Through the working groups of the Value Chain Partnerships project, Pirog coordinated 75 food system projects totaling more than \$1.25 million between 2002 and 2009. His work has been recognized by ISU's College of Agriculture and Life Sciences and Practical Farmers of Iowa.

Pirog also authored many Center reports on food system pathways, examining the distance fresh produce travels to reach the



Upper Midwest, that gained international recognition and became required reading in some college courses. And he was part of the effort that led to ISU's MBA program with a minor in sustainable agriculture that has eight graduates.

Pirog said he looks forward to building a new center from the ground up. As senior associate director, he will lead efforts in the socioeconomic aspects of food systems, including production, marketing and economic development. He joined the Leopold Center staff as education coordinator during the Center's third year of operation in 1990.

Although he will start his new job in Michigan May 23, Pirog said he'll continue to closely follow the Iowa local food scene where he has had a key role.

“I think we're at a point where business and community leaders are beginning to view local foods as a viable rural and economic development option and will start to invest in it,” he said. “The Leopold Center has helped get things started, and our work with 14 regional food groups has been a great experience.”

Craig Chase, a veteran ISU Extension farm management specialist, will assume many of Pirog's responsibilities in the marketing initiative until December 2011. He also will assist various working groups as they move to other leadership. The associate director position will not be filled at the present time.

Chase has 27 years of experience in extension programs, including food crops, niche markets and alternative agricultural enterprises. He has worked with the Leopold Center on several projects, including development of regional food systems. Last fall, Chase began working more closely on regional food systems as part of an expanded effort by ISU that included hiring two new positions with responsibilities in fruit and vegetable production.



Pirog



Honeyman

Conversations

WITH OUTGOING INTERIM DIRECTOR LOIS WRIGHT MORTON



Getting to sustainability and resilience: Let's talk water

In past columns I've introduced a new Leopold Center focus on sustainability and resilience and how 'the people factor' is both affecting and affected by complex ecological changes and adaptations. I've proposed that our challenge is to better understand interactions among humans and nature, to recognize when they are vulnerable and in danger of losing resilience.

Water is one of the most important human-ecosystem points of intersection where we need to focus our attention. Rivers, lakes, streams, and wetlands are critical sources of life, energy, economic and social well-being. We easily see that cultivated agricultural ecosystems testify to the disproportionate effects that human adaptive management and engineering have on other social and ecological systems. We see less clearly that people – you and I – are constantly constructing, destructing, and reconstructing creeks, streams, rivers and lakes by our daily actions. Some call this "making nature" (Busch 1995).

Achieving progress toward sustainability and resilience in use, conservation and enhancement of even such a necessary natural resource as water is complicated. It involves public and private land use decisions, agricultural practices and policies, natural resource rights, public supplies and disposal, lifestyle and consumption behaviors and allocation of moral and financial responsibilities. Although water is a shared resource, there is limited agreement on the magnitude of water degradation, the extent of resource loss, irreversibility and how personal and/or communal resources should be invested.

The global frames of reference that scientists, state and federal government agencies, politicians, and environmental activists bring to public discussions vary a great deal, and often contrast with local citizen frames of reference based in their personal experiences, identities of place and how their lives are impacted by their

unique local water bodies. *Yet, some level of agreement is necessary if we are to successfully manage this valuable resource in a manner that leads to greater sustainability and resilience.*

In Iowa, water quality - especially the persistent and difficult problems of nonpoint source (NPS) pollution - is a critical concern. As part of my research, I've been working with partners across the Midwest and Northeast to produce a new book, *Pathways for Getting to Better Water Quality: The Citizen Effect* (Springer 2011). This book explores the many ways people engage science, technology and each other to identify and solve their watershed problems.

The premise is that people can impact water quality when they engage each other, begin the public process of talking about their watersheds, and then take action to make their waters better – and that strong, effective watershed partnerships don't happen by accident. They must be deliberately constructed.

Chapters range from how to measure the citizen effect to applications of performance-based outcomes and technical assistance as an educational program to examples of citizen involvement in Kansas, Missouri, Indiana, Nebraska, New York, Ohio, Pennsylvania and Iowa watersheds. The book is intended to offer insights and

flexible guidance to watershed leaders and specialists as they develop their own approaches to draw out the citizen effect for improving watershed management in their own community.

Although I have stepped down as Interim Director of the Leopold Center, I will continue to work on the challenges of managing our natural resource base for sustainability and resilience. I encourage all of you in your efforts to do the same.

The more we learn together about the processes and mechanisms of our social-ecological systems, the greater our capacity to change our policies and behaviors to adapt to, mitigate, and manage our agricultural landscapes and the natural resource base on which they depend.

A handwritten signature in black ink that reads "Lois".

Busch, L., W. B. Lacy, J. Buirkhardt, D. Hemken, J. Moraga-Rojel, T. Koponen, and J. de Souza Silva. 1995. *Making Nature Shaping Culture*. Lincoln, NE: University of Nebraska Press.

About the book

Editors Susan S. Brown and Lois Wright Morton have written and compiled examples of the watershed approach, showing how individual and collective citizen involvement in watershed management can help address local water quality concerns. The "citizen effect" refers to what often is overlooked in solutions to water quality: "the human factor – the social sciences of human perceptions and actions, social relations and social organization."

Pathways for Getting to Better Water Quality: The Citizen Effect is divided into two sections, with 19 chapters written by 25 authors. Section 1 presents theoretical foundations as to why citizen involvement is valuable and how citizen influence affects local watershed management. Section 2 contains details and data of how citizens have effectively become involved within their local watershed to begin dialogues for lessening water quality problems.

The hardcover book can be purchased at www.springerlink.com

How climate change already affects farming

Iowa farmers already are dealing with the effects of climate change, and they'll need to do even more in the future to adapt to more extreme weather events.

That was the take-home message from Gene Takle, one of the nation's leading climate scientists and director of Iowa State University's Climate Science Program team. Takle spoke February 6 at the annual Shivvers Lecture coordinated by the Leopold Center. A modest but engaged audience gathered in Ames for his presentation, "Will Climate Change Impact the Sustainability of Iowa Farms?"

"Sustaining agricultural production without depleting our natural resources will be increasingly difficult in the future given changes in our climate," he said. "Farmers already are adapting to climate change. The question is whether they'll be able to continue to adapt as more changes occur."

Takle was a member of the Iowa Climate Change Impacts Committee that recently submitted its report to the Iowa Legislature. The group found that Iowa farmers have been adapting to climate change in these ways:

- **Longer growing season:** Plant earlier, longer season hybrids and harvest later.
- **Wetter springs:** Larger machinery enables planting in small weather windows.
- **More summer precipitation:** Higher planting densities for higher yields.
- **Wetter springs and summers:** More subsurface drainage tile is being installed; even sloped surfaces are being tiled to take care of excess water.
- **Fewer extreme heat events:** Higher planting densities with fewer pollination failures.
- **Higher humidity:** More spraying for pathogens, which are favored by moist conditions; more problems with fall crop dry-down; wide bean heads for faster harvest due to shorter harvest period during daylight hours.
- **Drier autumns:** Delay harvest to take advantage of natural dry-down conditions.

The report indicated that more intense rain events have led to soil erosion and affected water quality through loss of nitrate fertilizer, sediment and runoff from manure application. Waterlogged soil in spring leads to shallow root systems that are prone to disease, nutrient deficiencies and drought later in the season.

He explained that natural processes and cycles affect these changes in climate,

such as variations in the Earth's orbit, fluctuations in solar energy and gases released by volcanic eruptions. However, climate models show that natural processes cannot account for abrupt warming observed since 1965. Only when the influences of greenhouse gases and sulfate aerosols are included can the trends be explained.

Among the many examples from the lecture is the fact that global temperatures in 2010 and 2005 are tied as the warmest years on record since 1880. Eighteen different climate models predict a global temperature increase of 1.5 to 6.5° F within the next 100 years.

When looking at precipitation, fewer records are available and precipitation is difficult to simulate. However, 2010 stands out because it had the highest global total precipitation in 111 years of recorded data.

One of the expected results of climate change is that extreme weather events will become more common. Heat waves will be longer and more severe, droughts will be more frequent and severe, there will likely be an increase in severe thunderstorms (and perhaps in tornadoes), and the winter storm tracks are shifting so that the strongest storms are likely to become stronger and more frequent.

In the United States, climate models indicate that the West will become dryer while the Southeast will become wetter. "Iowa sits pretty close to the gradient between these regions, which suggests we'll have a lot of year-to-year variability in precipitation," Takle said.

To illustrate his points, Takle discussed Iowa's experience with flooding in 1993, 2008 and 2010 and reviewed weather records in Des Moines and Cedar Rapids. Iowa has experienced more frost-free days and fewer days that are very cold (-10° F) or very hot (over 100° F).

Because solar energy is expended to evaporate moisture from wet soils, less energy is available to heat air. In Iowa, that effect has kept summer temperatures from exceeding 100° F in recent years, Takle explained. "Our higher than normal precipitation is masking a warming that has been going on in Iowa," he said.

The Shivvers lecture has been presented at ISU since 1969 in memory of John Shivvers, who farmed near Knoxville. The lectures focus on ways that agriculture can sustain rather than destroy natural resources.

www.leopold.iastate.edu

About the Shivvers lecture:
www.leopold.iastate.edu/news/pastevents/climate/climate.html

Wright Morton to lead team

Climate change is the focus of a \$20 million grant to Iowa State University. Project director is Lois Wright Morton, who stepped down as interim director of the Leopold Center two weeks after the grant was announced in Washington, D.C. by the USDA's National Institute of Food and Agriculture. She will lead a team of 42 scientists from 10 land-grant universities and two USDA Agricultural Research Service institutions in nine states.

Scientists will collect data over five years at 21 sites to estimate the carbon, nitrogen and water footprints of corn-based production systems in the Midwest. The team will integrate field and climate data to create models and evaluate crop management practices.

For details, check the project website at: www.sustainablecorn.org



Gene Takle, speaking February 6 at the annual Shivvers Lecture.



TOWARD A SUSTAINABLE

Future

The debate on feeding the world

On the one hand, it is tacitly assumed that the proper goal is to intensify agriculture so as to produce as much as possible on as little land as possible, thus leaving the maximum possible amount of land under 'natural' conditions. On the other hand . . . agro-ecosystems are important components of the natural world . . . their thoughtful management should be part of both a rational production system and a worldwide plan for biodiversity conservation. – Nature's Matrix (2010)

The debate is heating up over how to feed nine billion people, the projected population by mid-century.

One side of the debate insists that the “only way” to meet this daunting challenge is to expand our current system of industrial agriculture. From this perspective, our attention is focused solely on developing new technologies to further increase yields of the few crops – namely corn, wheat, soybeans and rice – that have been targeted for breeding work and technology packages since the 1950s. Further intensification of our current system is the “only way” to conserve the remaining “natural” habitats while producing adequate amounts of food for a burgeoning human population. Failure to subscribe to this scenario, it is argued, would require us to transform our remaining forests and wild-lands into agricultural lands to meet increased demand for food.

The other side of the debate doubts that the industrial agriculture of the past 60 years can be sustained much longer, let alone further increase production. The stored, concentrated (cheap) energy, fertilizer, fresh water reserves and the unusually stable climates – all natural resources that sustained the industrial agriculture miracle for the past century – increasingly are in short supply (Cribb 2010). Furthermore, the natural sinks that absorb wastes of this modern input/output system are saturated. Dead zones at the end of modern agricultural watersheds are increasing at a rapid rate. We have overloaded the atmosphere with greenhouse gases, further destabilizing the relatively undisturbed climate that we have enjoyed for the past 11,000 years. This side of the debate questions whether the highly specialized and simplified, large-scale monocultures of industrial agriculture can sustain productivity, let alone increase production, very far into the future.

The debate confronts us with a crucial question. Since a sustainable future will require both food security and biodiversity restoration, how can we best do both?

The agro-ecological side of the debate is now demonstrating that alternatives exist. Proponents of agro-ecology argue that these alternatives may not only produce as much or more food from the same acreage, but also could do so while enhancing rather than destroying biodiversity. These new production systems, however, would require a rather significant redesign of our food system.

Peer-reviewed literature is now published regularly that envisions some of these practical new designs. Research at the Land Institute in Salina, Kansas, indicates that perennial crops could replace many current annual crops. These new perennial varieties reduce input costs, decrease environmental impact, increase food security, add to biodiversity, and improve soil health (Glover 2010). Social scientists Michael Chapell and Liliana LaValle provide important data

comparing industrial and agro-ecological systems, and demonstrate that properly designed agro-ecological systems have a much better chance of solving the dual problem of food security and biodiversity restoration than industrial systems. Ecologist Ivette Perfecto and her colleagues have produced an extensive analysis in *Nature's Matrix: Linking Agriculture, Conservation and Food Sovereignty*. They include case studies, suggesting that we could redesign agriculture socially and ecologically to successfully address the dual challenge.

A significant shift away from an industrial to an ecological food paradigm will require dramatic changes in the design of our entire food and agriculture system, and therefore significant investment in experimentation.

In the meantime, we could solve a good part of our food-security-in-the-face-of-increasing-population problem by redesigning our food system to dramatically reduce food waste. Australian author Julian Cribb writes that by some estimates we currently produce 4,600 calories of food for every person on the planet every day, more than enough to feed nine billion people. But we only consume 2,000 calories – the rest is wasted (Cribb 2010).

The challenge of climate change, and the time frame it imposes on us, make it imperative that we explore options sooner not later.

Such a monumental transition also will require that we radically rethink our relationship to Mother Earth. Since the beginning of the industrial era we have assumed that nature is a mechanistic collection of objects that humans can manipulate at will for our sole benefit. Unfortunately, that culture still rules. We need to nurture a new culture, one that recognizes nature as a complex, dynamic community of interdependent subjects, and that we are an integral part of that community. Consequently, our health and well-being depends on the health and well-being of the rest of the biotic community.

That awareness takes us back to Aldo Leopold's admonition to develop “an ecological conscience.”

Perfecto, Ivette, John Vandermeer and Agnus Wright, 2010. *Nature's Matrix: Linking Agriculture, Conservation and Food Sovereignty*. Washington, DC: Earthscan.

Cribb, Julian, 2010. *The Coming Famine: The Global Food Crisis and What We Can Do to Avoid It*. Berkeley: University of California Press.

Glover, Jerry and John Reganold, 2010. “Perennial grains: Food security for the future,” *Issues in Science and Technology* Winter:41-47. <http://www.issues.org/26.2/glover.html>

Chappell, Michael Jahi and Lilian A. LaValle, 2011. “Food security and biodiversity: Can we have both? An agroecological analysis,” *Agriculture and Human Values* 28(1):3-26.

Leopold Center, Drake partnership provides new landowner resources

Landowners who want to incorporate sustainable farm practices into land lease agreements have a new place to go for information: SustainableFarmLease.org.

The new website launched in March is one product of a two-year partnership between the Leopold Center's Policy Initiative and Drake University's Agricultural Law Center. The partnership included a review of sustainable agriculture and land tenure in Iowa and analysis of legal questions relating to Iowa farmland ownership and the transfer of land to a new generation of owners, many of whom will rent or lease farmland to others.

The Sustainable Agricultural Land Tenure (SALT) Initiative involved researching farm lease agreements and compiling resources for landowners about how farm leases can be used to encourage soil conservation, which is promoted by Iowa law and court rulings. Issues addressed through the website range from using lease contracts to increase tenure security and soil conservation to assisting new farmers and integrating livestock into crop operations.

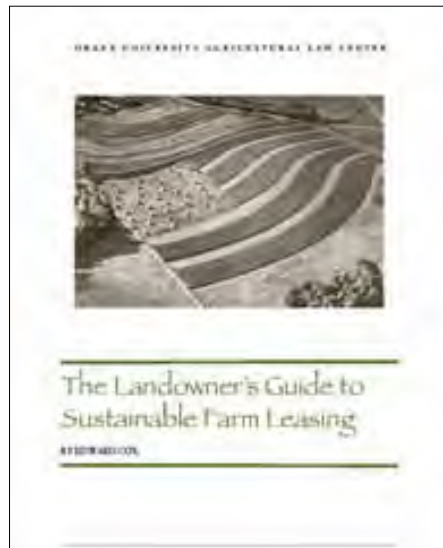
The website also includes a 56-page "Landowner's Guide," which can be printed and distributed to those who lack Internet access. In addition, the website contains links to additional information based on landowner priorities, along with explanations of important lease provisions and landlord-tenant laws through multimedia content such as videos and podcasts.

Neil Hamilton, who directs Drake's Agricultural Law Center and served for 21 years on the Leopold Center Advisory Board, noted that the new resources come at a good time. "Iowa's soil and farmland are vital resources and the changing ownership patterns for Iowa farmland present an important opportunity to inform the public about farm leases, soil conservation and other critical legal issues," he said.

Ed Cox, a fellow at Drake Agricultural Law Center, said trends in land ownership indicate that farmland will continue to change hands in Iowa, possibly with less stable tenure and decreased landlord involvement. (see sidebar)

"Increased competition for farmland, higher rents and more expensive farm inputs along with decreased landowner involvement in the farm operation can

have negative effects on soil conservation and other sustainability issues, such as community development and opportunities for new farmers," Cox said. "Creative lease agreements can be used to ensure conservation, provide sustainable tenure security and create a profitable and lasting landlord-tenant relationship."



As farmland changes hands at an increasing rate, some new owners have little or no agricultural experience and may not live in the same county or state where the farm is located. While these landowners won't be farming the land themselves, they may well have concerns about the land and the practices that are used.

The resources at SustainableFarmLease.org can assist these landowners in gaining the knowledge and confidence needed to sit with their tenant farmers and discuss how they can work together to have a productive and profitable farm operation and ensure the long-term stewardship of the land.

SustainableFarmLease.org provides a base of knowledge regarding farm lease provisions and the effects of farm lease arrangements on the activities of tenants. This fosters flexible negotiations and a cooperative relationship, based on landowner and tenant characteristics and concerns. The manner in which the information is presented on the website also addresses the increasing diversity of landowners. Traditional printable guides and quick reference materials are available, as well as interactive resources and multimedia platforms.



The SALT initiative was funded as a two-year special project of the Leopold Center's Policy Initiative. Leopold Center Interim Director Lois Wright Morton praised the project and the collaboration with Drake.

"The SALT project offers Iowa's landowners and tenants convenient, carefully researched, easily accessible resources showing the variety of options and opportunities available for them to implement more sustainable practices," she said. "The project's products dovetail very nicely with the Leopold Center's mission to research agricultural alternatives that will enhance Iowa's environmental quality."

Current trends in land tenure

- More than half the farmland in Iowa is rented, and the areas of the state containing the most fertile agricultural land have tenancy rates ranging between 61 percent and 70 percent.
- Fifty-five percent of Iowa's farmland is owned by people over the age of 65, and 28 percent of the land is owned by individuals over 75.
- Children and spouses of farmers are less likely to continue operating the farm.
- Eighty percent of Iowa's leases are year-to-year tenancies.
- Cash rent leases, which place more risk on farmers and involve less landowner input, are replacing crop share arrangements. Cash rent and crop share leases were evenly split in 1982, but now cash rent leases account for 77 percent of rented farmland in Iowa.

Sources from Iowa State University Extension: *Rented Land in Iowa: Social and Environmental Dimensions (PMR-1006)*; *Farmland Ownership and Tenure in Iowa (PM 1983)*; *Iowa Farm and Rural Life Poll (PM 2093)*; *Survey of Iowa Leasing Practices (PM 1811)*

Center presents Iowa Local Food and Farm Plan

The Leopold Center has completed the Iowa Local Food and Farm Plan designed to boost the local food economy and increase opportunities for those who want to buy or sell Iowa-raised meat, poultry, eggs, dairy, fruit, vegetable and other crops in regional markets.

The 63-page report was submitted January 10 to the Iowa Legislature, which asked the Leopold Center to develop a plan for Iowa. Details were unveiled at a January 20 event in West Des Moines featuring accolades from two state legislators and top-level representatives of the Iowa State College of Agriculture and Life Sciences, Iowa Department of Agriculture and Land Stewardship, Iowa Fruit and Vegetable Growers Association, Iowa Meat Processors Association, Hy-Vee and GROWN Locally, one of the state's largest farmer networks. More than 150 people attended the event.

The Iowa Local Food and Farm Plan calls for creation of a state-level local food and farm program, education and training for producers and local food businesses, changes in state policy to benefit local food businesses, and data collection to track growth of local food sales. The plan recommends hiring a local food and farm state coordinator whose position and seed funds to implement other recommendations would be supported by a voluntary Local Food and Farm Program Fund.

"Iowa has the potential to grow the local food economy with strategic but modest investments, incentives, and better coordination of existing resources," said Rich Pirog, Leopold Center associate director who led development of the plan.

More than 1,000 people from 95 of Iowa's 99 counties contributed to development of the Iowa Local Food and Farm Plan. Information was gathered at workshops, 15 listening sessions throughout the state and two surveys. The draft recommendations were discussed with leaders of 21 state agencies, institutions and organizations. The plan outlines why each recommendation is important, who would implement it, where resources would come from, and the benefits.

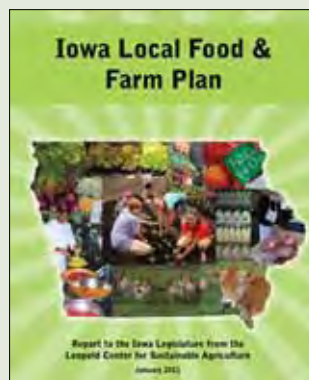
Local food plans have been developed in at least a dozen states and regions including Illinois, Minnesota, Michigan, North Carolina and the City of New York.

Only two of the 34 proposals in the plan would require state appropriations: hiring

a statewide coordinator (state support for one year) and assisting Iowa's Farm-to-School program (two years).

Other recommendations include:

- Creation of a Local Food and Farm Program Fund from the sale of collectible local food posters, bumper stickers, stamps and license plates,
- Business development and financial assistance for farmers and local food businesses,
- Food and meat processing education and training programs,
- Food safety education, and a pilot cost-share program for food safety audits,
- Business training programs that target beginning, minority or transitioning farmers,
- Data collection to assess progress and track state agency and educational institution purchases of local foods, and
- Pilot incentive programs for five K-12 school districts and five health care facilities that serve Iowa produce.



Below: Janice Cross, a farmer from GROWN Locally, explains her point during a question-and-answer session that was moved to a sunlit atrium at the Hy-Vee Conference Center when power was cut to the building.



From the plan

- Iowans spend more than \$8 billion on food each year; but only 14 percent of this food is estimated to be produced within the state.

- Although 86 percent of Iowa's total land base consists of farmland, when compared to other states, Iowa lags in fruit and vegetable production.

- An unintended but very positive part of the plan development process has been to further cement relationships among those who have a keen interest in seeing local foods contribute more to the state's economy and communities.

Only popcorn was missing

From Iowa State University Extension Flavors of Northwest Iowa blog by Laura Kuennen, January 24, 2011

The latest advice from Iowa local food leaders? Just pretend you are in a theater... with local popcorn. Because according to Rich Pirog, Associate Director of the Leopold Center for Sustainable Agriculture, "This part of the movie isn't over yet."

He was persuading a room full of people to stay and hear about a new statewide plan ...The people gathered didn't need much persuasion, as we were all ears, but all eyes had a bit of difficulty for lack of light. Just after Pirog enthusiastically listed some of the benefits of the plan including diversification of crops, expansion of job opportunities, circulation of money locally, creation of ancillary businesses, and opportunities to benefit rural communities the major question produced a reaction beyond cinematic expectation. "What is local food?" Pirog asked.

Then darkness. No more lights. No more beloved PowerPoint presentation. No more microphones.

No, the power didn't go down on local food. The power in the Hy-Vee Conference Center may have shut down, but there is nothing shutting down about local foods. ... We've rolled through some opening credits in the past decade, and are now looking for more lead roles.

Read plan on the web at:

www.leopold.iastate.edu/foodandfarmplan.html

Annual report shares year's accomplishments

Transitions is the theme of the Leopold Center's newest annual report, which echoes the Center's efforts to continually reshape its programs to meet the changing needs of Iowa agriculture.

Producers a decade ago were facing far different challenges, and the Center's research and education efforts reflect those new realities. The annual report showcases the varied and interesting work being done by the research initiatives in policy, ecology, and marketing and food systems to help farmers find new solutions and new options for making a living. In addition, the Leopold Center's varied collaborations signaled the importance of preparing farmers to adjust, survive and prosper. The report covers these partnerships and activities:

- Henry A. Wallace Endowed Chair for Sustainable Agriculture used Center funds for research on cropping systems experimenting with buffer strips.
- Practical Farmers of Iowa received support from the Center for their farmer-

directed demonstration program.

- Several students in ISU's Graduate Program for Sustainable Agriculture were funded by Leopold Center assistantships.
- Iowa Learning Farms, an important partnership, encourages farmers to join with other producers to create a culture of conservation.
- Midwest Grape and Wine Institute offered workshops and courses for Iowa vineyard owners, thanks to Center support.

The 48-page report highlights the final year at the Center for Jerry DeWitt, who retired as director in June 2010. Distinguished Fellow Fred Kirschenmann reported on his extensive outreach efforts for sustainable agriculture through speeches in Iowa and nationally, and chapters in five books. The Spencer Award was given to Francis and Susan Thicke, who had transitioned their grain farm to an organic dairy supported by rotational grazing. Also included were updates on programs to enhance water usage, organic agriculture research, land tenure options, and specialty crop production.



Printed copies are available from the Center by calling (515) 294-3711.



Workshop to explore sustainability, resilience

By *CORRY BREGENDAHL, Assistant Scientist*

While most of us have been exposed to notions of sustainability in some form or another, very few of us have a deep or even passing understanding of resilience. We may commonly regard it as an individual's ability to withstand a threat to its existence like a sapling bending – not breaking – in a strong wind, or the ability of marine life to survive a gradual warming of the oceans.

But how do we apply the idea to entire human or biophysical communities? What is a resilient ecosystem or human community? How will we recognize one when we see it? And perhaps even more challenging, how will we monitor and measure changes in both resilience and sustainability?

On May 25, the Leopold Center will host a workshop for current and future grantees to explore answers to these questions. Invited participants will discuss sustainability and resilience in terms of:

- How it applies to the work they are doing,
- How it informs desirable outcomes or results, and

- Indicators and measures used to track progress and change toward resilience and sustainability.

This workshop is one of many critical steps the Leopold Center is taking to inform the way we conceptualize and evaluate the collective impact of our investments in Iowa through the work of our partners.

Besides learning how our partners are applying the notions of resilience and sustainability to their work, another focus will be to better understand ways our partners are measuring change in this arena. Words like “indicators” and “measures” are simply ways for us to understand whether some kind of investment (usually money or labor) is making a difference on desired outcomes or results.

Indicators “indicate” or suggest whether we are making progress toward our goals. Tracking indicators helps us answer questions such as: Did farmers become more knowledgeable about conservation practices as a result of the project? Did the project help reduce on-farm soil

erosion? Did the project increase economic opportunities for vegetable growers? If yes (or no), how do we know?

Measures are multiple and concrete ways we know we are making progress. Measures provide specific evidence on how (or if) our work is making a difference and the magnitude of change.

For example, to measure increasing economic opportunities for vegetable growers (a key component of sustainable, resilient farming systems), we can track whether growers report greater on-farm income from one year to the next on their tax returns, sell farm products in more markets, or make new investments in their business. Each is just one way we can measure increasing economic opportunities for farmers, which in and of itself is simply one indicator we can use to monitor progress toward maintaining resilience and sustainability in Iowa's agricultural systems.

When your boat rocks, you want resilience not efficiency

By LAURA JACKSON, Guest Columnist

EDITOR'S NOTE: In our ongoing discussion about resilience, the Leopold Center asked University of Northern Iowa biology professor Laura Jackson for her perspective. She teaches and works in restoration ecology. She is co-author of the 2002 book, The Farm as Natural Habitat: Reconnecting Food Systems with Ecosystems, which explores how farmers can incorporate greater biological diversity into their production systems. She is a member and past chair of the Leopold Center's advisory board.

Imagine being on a boat in calm seas, and you are asked to bring a cup of soup to the captain. The task is an ordinary one, and the only question is how fast should you walk without spilling the soup? Now imagine the same cup of soup, except that the boat is being tossed by huge waves. Walking speed is now no longer an issue. Instead you are looking for solid handholds, watching for the next wave to hit, keeping your knees flexed and your senses on high alert.

The first situation is an efficiency problem. The second situation is a resilience problem. Individuals, households, cities, businesses large and small, farmers and even countries regularly provide for some level of resilience against all kinds of shocks. We buy house insurance, health insurance; wear seat belts and put money in savings; get an education to increase our options in life. These measures cost money and time, yet we usually find the investment more than worthwhile. Better safe than sorry.

The resilience idea has taken off recently and is increasingly seen alongside or even replacing established concepts like sustainability. "Resilience" is a good word that adds something new and useful to consider. What is the difference? In the context of agriculture, I think there are two big distinctions between sustainability and resilience.

First, there is the way things fail. Agricultural sustainability is about protecting nonrenewable resources; conserving what we have for future generations, renewing the health of soil and water to protect the future productivity (yield) of cropping systems. In contrast, according to authors Brian Walker and David Salt, resilience thinking involves acknowledging the potential for a system-wide breakdown, a catastrophe. Like Humpty Dumpty, some systems can never be put back together again. In nature, we see countless examples of irreversible changes, such as lakes that go from crystal clear, to perennially clouded with algae. Likewise, human civilizations (and their agricultural systems) can and do fail: the Roman Empire, Easter Island, the Mayans.

Second, there is the idea of the complex adaptive system. The idea of steady-state sustainability involves a relatively simple, closed agricultural system that behaves the same way, whether resources are abundant or

scarce. The resilience idea applied to agriculture involves complex systems that adapt and change together, linking social and ecological processes. Soil, water, plants, livestock – the basic ecology of the food chain – are connected to transportation and processing infrastructure, the market economy, and human nutrition.

Resilience theory says that we could cross a threshold after which the agricultural system would transform itself into something completely different – and not necessarily in a good way. The threshold might be a very high price for diesel or phosphorus, rapid climate change, or a combination of factors. We don't know exactly where that threshold is in agriculture, just as we don't know when that next wave is going to hit the boat.



Jackson

We have already experienced a radical shift in Iowa agriculture, a Humpty Dumpty-type moment. From the 1860s through the early 1950s, most Iowa farmers practiced a long crop rotation, with two to three years in small grains and pasture, followed by two to three years in row crops. It was integrated with livestock on the farm, cycled nutrients, managed weeds through rotation and tillage, and in the early years used on-farm energy for traction (oats-powered horses). One could say it was fairly resilient, at least for 90 years, weathering many changes in technology, crop breeding and public policy. However, after World War II the sudden availability of inexpensive nitrogen fertilizer, first-generation broadleaf and grass herbicides, and favorable government

policies, precipitated a major transformation to the corn, beans and concentrated livestock systems that we see today. Once the process was underway, there was no going back.

Is the current agricultural food system resilient? According to the research on resilience, efficiency has a dark side. Efficient, streamlined systems have eliminated unprofitable, redundant features. To translate to agriculture, there is no need to grow nitrogen-fixing alfalfa when fertilizer is cheap. Livestock can be raised more efficiently in a specialized operation. Regional differences in climate and infrastructure lead to "comparative advantage" so it simply does not pay to keep any cattle on grass in northern Iowa. However, redundancy can be a life-saver if there is a sudden change in input costs, land prices or climate. As the saying goes, "don't put all your eggs in one basket."

Resilience might be improved by investing in the know-how, tools and infrastructure to produce different varieties or species of crops and livestock, reduce dependence on inputs or find alternative markets. This is "inefficient" and certainly expensive under the current system. But like insurance, by the time we wish we carried some, it could be too late.

Other insurance policies that could provide some system resilience:

- Growing perennial plants keeps roots in the ground and limits soil erosion in the event of a severe rain event. Fields of corn and soybeans are vulnerable from October through June.
- Keeping the groundwater clean and the creeks swimmable; investing in parks and privately-owned natural areas will keep options open for future generations who may need to use the land in different ways. Areas that sacrifice their quality of life could miss out on economic opportunities.
- A diversity of people with a wide range of skills in a strong local community can help one another out in uncertain times, providing resilience. Who knows, they might let you borrow a piece of equipment.

Tremendous changes are ahead in energy, fertilizer, global commodities markets (both demand and supply) and most of all, climate. And those are just the known threats.

RESILIENCE (cont. on page 11)

Producing cattle – and nitrogen – in New Zealand

By LAURA MILLER, Newsletter Editor

Mike and Sharon Barton can tell you how many cattle – and pounds of beef – they raise every year on their 350-acre farm in northern New Zealand. They also know exactly how many pounds of nitrogen their farm produces (mostly in the form of uric acid when their animals urinate in pastures).

The Bartons and about 100 other farmers in the 65,000-acre watershed surrounding picturesque Lake Taupo are operating under a nitrogen cap. The cap is designed to limit nitrogen produced by agricultural systems because the region's porous, volcanic soil funnels excess nutrients into groundwater and directly into the country's largest lake and one of its favorite tourist attractions. The cap limits Barton's stocking rate, production and his income because New Zealand dropped its farm subsidies in the 1990s.

The Bartons traveled to Iowa in January to share their experiences and learn ways to add value to their products through market branding. Mike Barton was a keynote presenter at the annual conference of Practical Farmers of Iowa, which received a grant from the Leopold Center's Competitive Educational Support Program to pay a portion of the couple's travel costs. They also met with members of the Grass-Based Livestock Working Group and Leopold Center staff.

"The lake is about as pristine as any place on earth and it's not degraded yet – this process is to keep it that way," Mike

Barton said. "But these cycles are on a 150-year timeline and I won't see the results, nor will my grandchildren."

Barton said research in 2000 predicted the lake's future water quality problems. Although only 20 percent of the catchment was used for agriculture, 93 percent of the manageable nitrogen entering the lake was from agriculture (urban use accounted for 7 percent).

"Our farmers had been receiving environmental awards for 20 years and we thought we were doing the right thing," said Barton, whose farm has riparian plantings and conservation land. "It was a bitter pill to swallow."

The farmers formed a corporation, went to court and participated in modeling studies to get more information to show exactly where nitrogen leaks were occurring in the system. The result has been a voluntary program in which Lake Taupo-area landowners follow a nitrogen discharge allowance based on current land use. They submit nitrogen management plans annually.

The New Zealand program becomes law this year, with the goal of a 20 percent nitrogen reduction by 2018. Barton is a trustee in the Lake Taupo Protection Trust, which has a budget of \$81 million to plant trees on 30 percent of the acres now used for agriculture. Landowners in the region can buy and sell nitrogen credits -- the first nonpoint source emissions market in the world – to make changes in their operations.

Barton said it's been a big shift for farmers because they cannot increase production without increasing nitrogen output. He does not apply commercial fertilizer and extends the season by stockpiling forage in large round bales. He said he really needs more research on pastures that will survive longer than seven years before they need to be replanted, and more efficient cattle breeds.

Their business plan is to finish 300 cattle to slaughter every year. Their farm is in the final year of a four-year research trial on options for beef productivity gains under a nitrogen cap.

"I can't grow more cows per acre so I have to get more dollars per cow," Barton explained. "I need to convince people that my animal is worth buying, for its environmental aspects. We will certify that our meat has been raised in a manner that will not harm the lake."

With his story comes a warning for Iowa farmers: this could happen to you.

"I see many similarities between New Zealand and Iowa," he said. "We are doing different things on the land but the end result is the same."

"If this ever comes to you, stick together," Barton adds. "We found out early on that the devil was in the details and the only way we could understand those details was to become involved in the process."



Mike and Sharon Barton raise cattle along Lake Taupo on New Zealand's North Island. They are operating under a cap on the amount of nitrogen that leaches from their land.

Sharon Barton explains a portable fence system to ISU students who visited her farm last November during a study abroad course in agronomy and animal science.

GRANTS (continued from page 1)

adopting this new practice.

- Blurring the lines between working and conservation lands: Bird use of prairie strips in row-cropped watersheds
- Biochar and managed perennial ecosystems: Testing for synergy in ecosystem function and biodiversity
- Enhancing botanical composition, wildlife habitat and carbon sequestration of pastures in south central Iowa through soil disturbance by mob grazing of beef cattle
- Farmer perspectives on ecosystem service management, land-use targeting and the future of cornbelt agriculture
- Getting the most from Iowa's forests: Linking forest understory composition to stream water quality and enhancing nutrient capture in forest remnants in agricultural landscapes
- Quantifying eastern red cedar (*Juniperus virginiana*) in southern Iowa: A starting point for conversations with landowners about threats to grassland resilience
- Systems model and prototype development to capture and use rain water run-off from a high tunnel
- What drives corn yield stability in the context of climate variability?

Cross-cutting: Five new projects

Grants will fund activities related to the emerald ash borer invasion in Iowa,

tile drainage water, on-farm research and demonstrations with Practical Farmers of Iowa, the Iowa Farm Energy Working Group, and Iowa State University's Long-Term Agroecological Research (LTAR) in organic practices. Formalized in 2010, the Cross-cutting Initiative focuses on systems-based research for farming systems that balance competing economic, environmental, social and policy demands.

- Building social networks to capture synergies in wood-based energy production and invasive pest mitigation
- Drainage water quality impacts of current and future agricultural management practices
- Increasing Iowa farmers' resiliency through the Practical Farmers of Iowa (PFI) cooperators' program
- Iowa Farm Energy Working Group
- The Long-Term Agroecological Research (LTAR) Experiment: Ecological benefits of organic crop rotations in terms of crop yields, soil quality, economic performance and potential global climate change mitigation

Marketing and Food Systems: Six new projects

Two grants support the development of resources for people in immigrant and minority populations who want to get into farming. In southwest Iowa, investigators will explore the use of high tunnels for year-round crop production, and in central

www.leopold.iastate.edu

Description of current, renewed competitive grants:
www.leopold.iastate.edu/compgrants/compgrants.html

Iowa, project managers will research an online local food buying club. Another project will look at business structure options for a group of producers in south central Iowa who are interested in supplying local food markets.

- Developing permaculture techniques for increased production and profit in sustainable year-round agriculture for beginning farmers and ranchers in southwest Iowa
- In good company (local food distribution feasibility)
- Iowa immigrant and refugee incubator farm program
- Involving new immigrants and minorities in local food systems
- Local food in every pot: Growing farmers in northeastern Iowa through public and private partnerships
- Research and development of an online local foods buying club cooperative

RESILIENCE (continued from page 9)

Unfortunately, the market and government farm policies are largely discouraging resilience right now. The average farmer probably can't afford resilience. Likewise, most university and corporate agricultural research continues to pursue efficiency and optimization. With a laser focus on yield trend lines, will agriculture be able to flex its knees when that next wave hits?

The Leopold Center for Sustainable Agriculture can best help all Iowa farmers by laying a foundation for resilience in the face of future change. Research and extension on alternative crops, new farming and food systems, and new technologies can help our state protect its precious natural resource – sustainability – and prepare for the unpredictable – resilience.



This barred owl has taken a watchful stance in the Eastern hemlocks outside the Leopold Center's second-story offices in Curtiss Hall. ISU biologists say this resident's loud hoots are associated with courtship and nesting. Aldo Leopold appreciated hawks and owls as part of "the land mechanism."

Photo by Bob Elbert, Iowa State University.



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More details, events

Check Leopold Center Web calendar:
www.leopold.iastate.edu/news/events.htm

Spencer Award presentation

"I hate to admit that it took me 40 years to learn this: the simple idea that things go better when you don't fight nature." – Audubon farmer Vic Madsen, on accepting the Spencer Award for Sustainable Agriculture



Above: Vic Madsen holds the award plaque while his wife, Cindy (at left) holds the check that accompanies the award. Solon farmer and advisory board member Susan Jutz (center) and Leopold Center interim director Lois Wright Morton honored the Madsens during the Practical Farmers of Iowa annual meeting in January.

New documentary

Thanks to Leopold Center support, Iowa audiences were treated to a newly released 73-minute film about the life and legacy of Aldo Leopold. The first-ever Leopold documentary, "Green Fire: Aldo Leopold and a Land Ethic for Our Time," premiered in March to sold-out crowds in Wisconsin and New Mexico. More than 150 people filled an Ames Reads Leopold event at the Ames Public Library auditorium on March 6. It was shown the following day to more than 250 people at the Iowa Water Conference in Ames, accompanied by remarks from Leopold biographer and film narrator Curt Meine. More at <http://greenfiremovie.org>

