



New grass-based livestock group starts work

A new statewide group will promote Iowa's grass-based livestock industry as well as the social and environmental benefits that could result from a whole-system approach to this type of livestock production.

The Leopold Center has made a three-year commitment to support a new Grass-Based Livestock Working Group (GBLWG) coordinated by Andy Larson, Iowa State University Extension's new small farms specialist. Larson will bring together a diverse group of farmers, marketers, processors, academics, not-for-profit organizations and agency professionals to tackle some of the challenges to entering this fast-growing segment of the livestock industry.

"We believe that a well-managed system of rotational grazing on perennial pastures can benefit the land, livestock and people in our rural communities," said Leopold Center Director Jerry DeWitt. "We believe

that such a system can add diversity to our landscape while providing economic benefits for producers and rural development opportunities for communities."

DeWitt explained that the goal of the new working group will be to boost viability of the grass-based livestock industry in Iowa by addressing practitioners' most pressing issues using sound research and effective knowledge transfer between participants. The working group also will identify educational programs and resources for established and beginning practitioners.

The Leopold Center is funding 25 percent of Larson's position to coordinate GBLWG activities. The group will meet at least quarterly and will be guided by a steering committee composed of representatives from the Leopold Center, Natural Resources Conservation Service Grasslands Conservation, ISU Extension,

GBLWG (continued on page 2)

Web site highlights science of organic ag

The Leopold Center has developed a new resource designed to show what the scientific community has discovered about the quality, nutritional characteristics and production practices used in organic agriculture.

Findings from more than 70 peer-reviewed, scientific articles about organic agriculture are summarized on a new web site at www.organicag.org. The site organizes the research findings by topic, from animal health and welfare issues to information about poultry, meat, grains and fruit and vegetables.

"This is not an attempt to recommend organically grown food over conventionally grown food," says Center Director Jerry

DeWitt, who coordinated the special project. "We are providing the information so that people can make their own decisions."

Over the past two years, DeWitt has worked with David Kwaw-Mensah, an ISU doctoral student in Agricultural Education and Studies, to conduct a review and summarize the scientific literature on the many aspects of organic agriculture. Research cited on the web site was selected if it was published in a peer-reviewed journal or publication, and it involved a comparison or specific trait of organic food.

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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.

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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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EXTENSION SMALL FARMS SPECIALIST LEADS GROUP, SHARES APPOINTMENT WITH LEOPOLD CENTER

GBLWG (continued from page 1)

Practical Farmers of Iowa and the Iowa Cattlemen's Association.

DeWitt said research and development funds will be made available each year to participant groups to address priority issues as determined by the GBLWG. The Leopold Center has pledged \$60,000 for the working group's first year, a portion of which has been designated for research and development projects. Other Leopold Center work that began in 2004 as part of a Grassland Agriculture focus will be incorporated into the GBLWG.

Larson began work as extension program specialist in small farm sustainability in May after graduating from ISU's College of Business with an MBA and graduate minor in Sustainable Agriculture. He had worked as graduate assistant on the Value Chain Partnerships (VCP) project for the Leopold Center.

Larson received bachelors degrees in anthropology and environmental sciences from the University of Notre Dame and a master's degree in natural resources and environmental sciences from the Univer-

sity of Illinois. Before coming to Iowa in 2006, he spent two years with University of Illinois Extension with the Initiative for the Development of Entrepreneurs in Agriculture. He grew up on a small dairy farm in Illinois.

The idea for the working group was initiated more than a year ago as part of a special call in the Leopold Center's 2007 Request for Pre-proposals. The group will be organized as a "community of practice," a concept that has been used in the VCP project to bring people with a common interest together from across the food production and supply chain. Other VCP groups focus on niche pork, regional foods, small meat processing and fruit and vegetable growers.

Individuals interested in participating in the new GBLWG should contact Larson at (515) 294-6038 or allarsol@iastate.edu. The group's first meeting will be August 14.



Andy Larson

NEW STUDIES ADDED AS THEY BECOME AVAILABLE

ORGANIC AG (continued from page 1)

"Organic food has attracted wide attention and opinions about its value vary," DeWitt said. "However, scientific studies have shown lower levels of pesticide residue in organic food, and an increase in the amount of beneficial vitamins, minerals, fatty acids and antioxidants present in organic products."

Unlike food that is labeled "natural" or "eco-friendly," the term "certified organic" is governed by uniform standards of production and processing that can be verified by independent state or private organizations accredited by the U.S. Department of Agriculture. In general, crop produce or products that qualify as organic must be free from genetic modification, grown without use of conventional fertilizers and pesticides, and processed without food additives or ionizing radiation. Organic meat must come from animals fed organic rations and raised without growth hormones and antibiotics.

The new web site is called, "Scientific Findings About Organic Agriculture."

www.leopold.iastate.edu

Scientific Findings About Organic Agriculture:
www.organicag.org

Send comments or suggestions to:
organicag@iastate.edu

Summaries of new studies will be added periodically as they become available. To suggest an article for inclusion on the web site, send an e-mail message to organicag@iastate.edu, and include the complete reference citation for the article.



q&a

A conversation with Director Jerry DeWitt

In mid-June at the request of a northeast Iowa farmer, Jerry DeWitt toured some of the agricultural areas hardest hit by heavy rains and flooding. Here are his initial impressions, and what we can learn from listening to the land.



Yesterday I cried for the land. Today I must speak for the land.

What I experienced in eastern Iowa will stay with me for a long time. I saw fields shredded by water racing to the Mississippi. I walked along new, deep and unfamiliar slashes across the landscape. And I smelled the rankness of dying green as I held soil in my hands.

Water that so nourishes and sustains life in April and May had turned on the land in June, like a wildcat leaving grave claw marks across the face of soft flesh. Drops upon drops of water striking bare ground gained force, from meanders to rivulets to gaping corridors that gave way to great carvings across the land's surface, marking it with eternal scars.

In one field where I walked, small weathered corn plants had yellowed and were tilted askew, a testament to relentless rains, wind and rivers of water gouging the landscape. An eerie peacefulness lay upon the field and my thoughts of possible recovery and healing.

Last year's residue of corn stalks, cobs and soybean stubble held back the torrent in some fields, slowing its course. I could see where the water paused, settled and began to seep deep into the land rather than tearing away its surface. But more often than not, too little residue was left to counter the water's intent. Early-spring tillage left the fields beautiful and uniform before the storms, but vulnerable to unplanned challenges of rains and gravity.

I saw fields left almost bare of residue in the spring now forever altered by the

rains. Soils that once held a high productive position upon a knoll were now lying deep upon horizontal corn plants at the base of a fence, like a drift of winter snow. The whiteness of the soil signaled a loss of organic matter, and its final trail led to the ditch and debris hanging on weeds and fenceposts.

I looked around at the uniformity of corn and soybean fields. The landscape in front and behind me held no diverse patterns in color or texture, and I pondered many questions.

Where were the fields of alfalfa and clover? Where were the buffer strips around crop fields to slow the water and ask for its load to settle at their feet? Where were the grassed waterways, planned roads of green meandering down slopes to guide rushing water? How could wetlands not be a part of this farmscape? Why was the land asked to support more row crops when a pocket of lowness could capture water, nutrients and sediment? Why did these resources morph into unwelcome gifts to Cedar Falls and Cedar Rapids?

My last walk across the remnants of a corn field led me to an unimaginable scene where I witnessed the force of water versus human intentions. Corn that was eight inches tall struggled to grow upright. Water on its surge broke across the field and for nearly a mile tore through plants and soil. With a path more than 300 feet wide, the water scoured the field and dug up rocks and soil, plants and residue, and now its hope for a harvest. I saw a battlefield, savaged and unrecognizable

with nearly two feet of soil missing, gone or displaced and pools of water with dead rotting worms. Broken tile littered the landscape.

Life, not just corn, was gone from this field. And the farmer asks, "What can I do... what can I do?"

I now see farmers disking across the scars and gouges in the soil in an attempt to replant crops. These actions may help a farmer's soul more than they soothe the soil. At this time, something more is needed in Iowa than words of comfort or shallow concern.

Every Iowa farmer – even every Iowa citizen – can walk the land. I say walk, not ride. Feel the soil under your feet. Allow the landscape to fill your eyes and set your future direction.

Kneel down and touch the soil. What can be done to protect this fragile resource? Take the time to mentally mark where water has left scars and gouges. What areas can become grassed waterways? Where could perennials be planted to safeguard against another one of Mother Nature's surges? Would a wetland make sense? Where did residue and shallow roots lose the battle against rain?

These are things we all need to consider.

Lessons learned this summer will allow us to build new permanent lines on a land of green with deep and diverse roots to meet the challenges of tomorrow.



Photos by Jerry DeWitt

Kirschenmann offers insight into livestock report

Even with a blue ribbon panel, the recent “Industrial Farm Production in America” report from the Pew Commission on Industrial Farm Animal Production was bound to create a furor. Leopold Center Distinguished Fellow Fred Kirschenmann, who had served on the commission since it was formed in March 2006, attended the Washington, D.C. press conference in April 2008 when a 124-page final report was released.

“I knew it would be a controversial undertaking,” Kirschenmann said of the commission’s task to look at problems often associated with industrial farm animal production (IFAP) and make recommendations to solve them.

“I am increasingly concerned about the fact that we are not helping farmers to prepare for future challenges such as increasing energy costs, depletions in water resources and more unstable climates,” he said. “These challenges will make our entire industrial farming system, including our industrial animal system, increasingly untenable.”

Kirschenmann was asked to write the concluding segment of the report, *Toward a Sustainable Animal Agriculture*, which looked at what the food and agriculture system could become over the next 50 years. “Future agricultural production systems are less likely to be specialized monocultures and more likely to be based on biological diversity, organized so that each organism exchanges energy with other organisms, forming a web of synchronous relationships, instead of relying on energy-intensive inputs,” the report predicts.

Here are the key recommendations, as stated in the Commission’s summary:

1. Ban the non-therapeutic use of antimicrobials in food animal production to reduce the risk of antimicrobial resistance to medically important antibiotics and other microbes.
2. Implement a disease monitoring program for food animals to allow 48-hour trace-back of those animals through aspects of their production, in a fully integrated and robust national database.
3. Treat IFAP as an industrial operation and implement a new system to deal with farm waste to replace the inflexible and broken system that exists today, to protect Americans from the adverse environmental and human health hazards of improperly handled IFAP waste.

4. Phase out the most intensive and inhumane production practices within a decade to reduce the risk of IFAP to public health and improve animal well-being (i.e., gestation crates and battery cages).
5. Federal and state laws need to be amended and enforced to provide a level playing field for producers when entering contracts with integrators.
6. Increase funding for, expand and reform animal agriculture research.

The commission was made up of 15 people in the fields of public policy, veterinary medicine, public health, agriculture, animal welfare, the food industry and rural society. The group included a former U.S. Secretary of Agriculture and was chaired by former Kansas governor John Carlin.

Kirschenmann said the commission made recommendations only after reaching consensus. “We often debated issues long and hard and listened to each other intently,” he said. “We commissioned five groups of scientists to research and write a report in each of the study areas and used their reports in our deliberations. We poured through thousands of pages of documents, visited numerous sites around the country and listened carefully to many hours of testimony by a wide spectrum of industry representatives, farmers, government officials and citizens who came to public hearings we conducted throughout the country.”

The Commission was a project of the Pew Charitable Trusts and the Johns Hopkins Bloomberg School of Public Health.



Center issues 2008 RFP

Iowans with ideas for sustainable agriculture alternatives will want to check out the 2008 Request for Proposals (RFP) now available from the Leopold Center. Each of the three initiative areas—ecology, marketing and food systems, and policy—is looking for innovative new projects to enhance the Center’s long-running competitive grants program.

The RFP contains all the information about what sort of projects the Center is looking for and how to apply for the grant funding.

Who may submit a pre-proposal to the Leopold Center?

Investigators representing any Iowa nonprofit organization/agency and/or educational institution (such as soil and water conservation districts, schools and colleges, and regional development groups). The Center strongly encourages the involvement and collaboration of farmers, landowners, and farm-based businesses in the pre-proposal process.

What is required? A one- to two-page concept paper on the project and how it fits with the Leopold Center mission and specific initiative objectives.

When is it due? Project ideas should be submitted to the Center electronically by 5 p.m. August 18, with most project funding to begin in early 2009. The pre-proposals will be reviewed by the Center’s advisory board and staff.

Where is the RFP available? The RFP can be downloaded from the Center’s web site at www.leopold.iastate.edu/research/rfp/2008.html. Hard copies can be obtained from the Center office by calling (515) 294-7311 or sending an e-mail to: leocenter@iastate.edu.

Who do I contact with questions?

For inquiries about each initiative’s interests in this round of project solicitation, contact the appropriate program leader: Jeri Neal for Ecology (515) 294-5610 wink@iastate.edu; Rich Pirog for Marketing and Food Systems (515) 294-1854, rspirog@iastate.edu; or Jerry DeWitt for Policy (515) 294-3711, jdewitt@iastate.edu.



TOWARD A SUSTAINABLE

Future

By itself, free market does not lead to sustainability

As effective as markets are, they are tools, not reality. . . . To improve on contemporary global trade . . . in hopes of alleviating poverty and addressing environmental degradation is like slitting an artery to reduce high blood pressure. There can be no sustainability when institutions whose primary purpose is to create money are dictating the standards. — Paul Hawken

We all know that the markets are very powerful tools for accomplishing certain objectives. Markets are capable of rapidly accumulating capital to achieve astonishing results. But the ideology which believes that free markets, and only free markets, can ultimately solve all problems is naïve at best.

A few years ago a friend of mine who is a strong proponent of free market primacy insisted that we did not need to worry about global warming because the market, if left alone, would eventually correct itself. I agreed that if we waited long enough that might be the case. I pointed out, however, that if James Lovelock was correct, climate change ultimately could make the arctic regions the only place on the planet that would remain habitable for humans while supporting no more than half a billion people. And that certainly would cause the market to self-correct, albeit with results we might not like.

Iowa's famed Wallace family had a different take on sustainability. In December 1898 they changed the name of their farm publication to *Wallaces' Farmer* and put a credo on the front page that summed up the values they believed were important to sustainable agriculture: "Good farming, clear thinking, right living." By implication, markets were to operate within that clearly articulated ethic.

In fact, for Henry A. Wallace care of the soil was fundamental to living sustainably. In his book, *Whose Constitution: An Inquiry into the General Welfare*, Wallace wrote eloquently about the issue of soil conservation. In the chapter, "Soil and the General Welfare," he acknowledged that "rich soil and plenty of it" was the great gift to American farmers and warned that we dare not be "prodigal" with this gift. He recognized that we were terrible stewards of this precious heritage when compared to the previous occupants of this land. "During the past 150 years we white men have destroyed more soil, timber and wildlife than the Indians, left to themselves, would have destroyed in many thousands of years," he wrote.

"Good farming" was the necessary land ethic that provided the context for the free market in the Wallace view.

It was this insight that led Wallace to become a passionate champion of "soil defense." In 1939 he wrote a one-page essay for the Association of Land Grant Colleges and Universities in which he concluded: "It is selfishness that has destroyed our natural resources, and to plead for conservation merely to stop the loss of dollars is to appeal to the same selfishness that wrought the destruction." Unbounded free markets eventually destroy the very resources on which the markets depend.

Wallace wrote a longer essay in 1941, also called "Soil Defense," wherein he observed that "When Columbus first saw the eastern fringes of this continent he found 'the fields very green, and full of the infinity of fruits.' And gold, he wrote, was everywhere, in the streams, at the very roots of the trees." Wallace then went on to point out that as explorers, hunters, woodsmen, herdsman, trappers, miners, merchants and farmers swept across this great land, it became a "great white American soil rush."

Drawing on the insights of Liberty Hyde Bailey, Wallace insisted "that there is such a thing as the ethics of agriculture, and a morality of agricultural statesmanship" and how "astonishing and humbling" it was that "we farmers and agricultural people consented to the plowup of unsuitable acreage."

Markets are never free; we the people establish the rules within which markets function. The land ethic to which we subscribe determines how we care for the soil, water, farm animals, wildlife, and all of the rest of the biotic community (of which we are "plain members and citizens," as Aldo Leopold reminded us). Markets do not care about the land community. We the people have the responsibility to establish the rules of use that ensure the land's capacity for self-renewal. Without such an ethic, sustainability is by definition unachievable.

In Wallace's time it still might have been possible to regard such a land ethic as a moral duty rather than a practical necessity. However, the stakes are much higher now — a land ethic may be critical to our very survival. Today the ethic that directs our markets not only determines how much soil we lose and how many societies are thereby ruined in the long run, but also whether the planet itself remains habitable for the human species.

For those whose only concern is short-term returns, economist Herman Daly points out that even further growth in the Gross Domestic Product (GDP) may not be making us richer. "The evidence is that at the current margin, growth increases environmental and social costs faster than it increases production benefits, making us poorer not richer."

My guess is that most farmers already know that.

Julien Krachmann

ISU professor tests new strategies to help Iowa apple growers

By CAROL BROWN Communications specialist

Iowa's apple growers will have some additional tools in their orchard management kit, thanks to a research project funded by the Leopold Center's Ecology Initiative. Mark Gleason, a professor of plant pathology and horticulture, is leading the three-year study started in 2006 at the Iowa State University Horticulture Research Station north of Ames. He also has involved several Iowa commercial apple growers in the program.

Apple growers face challenges such as the decreasing effectiveness of conventional pest management programs for disease and insects, as well as government regulations on pesticides. They also are seeing shrinking profit margins for fresh-market apples. Gleason's study, entitled *New Strategies to Enhance Sustainability of Iowa Apple Orchards*, explores pest management tactics including weed management, production standards for producing hard cider, and a grower-education program. He tested three new disease-resistant apple varieties—Redfree, Liberty and Gold Rush—that were planted at the research station in 2004.

Ground cover

To improve ground cover management, the study compared mulches against bare ground and grass. Grasses or bare ground are most common within apple orchards. But grass competes with the trees for water and nutrients, and bare ground fosters erosion.

Gleason used composted wood chip mulch, which he found to be beneficial for weed control and requiring fewer herbicide applications. The wood chips also held moisture in the soil and kept the temperature of the soil cooler than either grass or bare ground. Competition from grass for nutrients was virtually eliminated. The wood chips were placed in 2006 and reapplied this spring. As a bonus, the decomposing wood chips added organic matter, creating a healthier soil.

Pest control

When researching integrated pest management (IPM) systems, Gleason examined a disease-warning system for sooty blotch and flyspeck (SBFS) and new strategies for pesticides to control the codling moth. These problems are common for apple growers across the United States.

A disease-warning system is a weather-based tool in which the grower sprays only when weather conditions pose a significant risk of disease outbreak, as opposed to a regimented spraying schedule.

"The disease-warning system is an ecology-based pest management system," said Gleason. "We found that the warning system works well, eliminating two to three fungicide sprays per season."

The study also examined fungicide spray volume and tree pruning. Some commercial growers are experimenting with spraying more concentrated forms of fungicides, which has been shown to make a difference. Gleason noted that the reduction of spray volume and non-pruned trees can jeopardize the success of the disease-warning system.

"A modified strategy of IPM does a decent job and should take care of any pests," said Gleason. "Note that we practiced a modification, not elimination, of fungicide application."

Hard cider

ISU food science professors Cheryl Reitmeier and Lester Wilson oversee the hard cider portion of the study, aimed at helping Iowa apple growers explore the potential of hard cider as a value-added product.

Reitmeier and Wilson are testing different blends of apple varieties for hard cider production. A field day for the Iowa Fruit and Vegetable Growers Association was held at the Sutliff Winery in Lisbon, Iowa's only commercial manufacturer of hard cider. Attendees discussed fermentation and aging, carbonation and bottling for commercial hard cider.

They also are planning a one-day workshop on the ISU campus this fall. The workshop will review requirements to produce hard cider such as filtering, aging and bottling systems.

Gleason sees this research project as a holistic study, looking at all aspects of apple growth from soil health to high-quality fruit to marketable products. The Leopold Center grant has enabled him and his team to offer Iowa apple growers improved tools for orchard management, including new guidelines for spraying, applying mulch for ground cover, and the possibility of value-added products to their repertoire.



Three disease-resistant varieties in the trial are (from left) Redfree, Liberty and Gold Rush.



Here are mulched and non-mulched areas under trees about a month after herbicide application at the ISU Horticulture Farm north of Ames. The photo was taken in early June 2007.



Below, ISU sustainable ag graduate student Adam Sisson programs sensors to detect soil temperature and moisture for the project.



ISU food science student Jagrut Janis prepares hard cider from three Iowa-grown varieties. Tasting panels selected 'MacIntosh' cider as best for its sweetness and mild fruity flavor.

Where does your produce come from? Find out with new tool

Consumers who want to know where their apple or bunch of broccoli might have been grown can consult a new online resource that tracks the origins of 95 different fresh fruits and vegetables typically sold in U.S. supermarkets. Besides showing product origins, the tool allows the user to see which state is the leading domestic producer of these crops.

"Where do your fruit and vegetables come from?" was developed by the Leopold Center in collaboration with the Center for Transportation Research and Education (CTRE) at Iowa State University.

"This tool is designed to help people increase their knowledge of food geography and the origins of fresh produce typically sold in the U.S. retail or foodservice sector," said Leopold Center Associate Director Rich Pirog, who guided development of the resource.

Pirog explained that the tool uses information collected by the Fruit and Vegetable Market News Service of the USDA's Agricultural Marketing Service. An annual USDA summary shows a sampling of domestic rail and piggyback movements and imports as well as export shipments of 95 fruit and vegetable crops.

The resource also shows the percentage of shipments each month, one indication of when a fruit or vegetable crop may be in season.

"As might be expected, more than half of the tracked shipments of grapes come from California, which is our leading domestic producer of grapes," Pirog said. "But grape shipments monitored in 2007 also came from Chile, Mexico, Brazil, Peru, Egypt, South Africa and Argentina."

Pirog noted that the USDA data does not include all domestic movements of fresh produce commodities in the United States. It is possible that a produce item may come from a state or country not listed in the USDA report or this resource. Locally grown food items sold in stores usually are labeled as such, and may or may not be tracked by the USDA.

Other interesting findings:

Although Florida and Texas are leading producers of grapefruit, the United States also receives grapefruit shipments from the Bahamas, Mexico, Israel and Peru.

In 2007, the USDA tracked more kiwi coming to the United States from Chile than from New Zealand, where growers renamed the fruit after their national bird in 1959 and began to market it abroad.

China is a growing source of 17 different fresh produce items for the United States.

CTRE also has worked with the Center to develop another popular resource, the Iowa Produce Market Potential Calculator, where users can get county-level supply and demand information about fruit and vegetable crops grown in Iowa. As part of a Leopold Center competitive grant, CTRE is expanding the calculator and creating another tool for biorenewable resources.



www.leopold.iastate.edu

Where do your fresh fruits and vegetables come from?
www.leopold.iastate.edu/resources/fruitveg/fruitveg.php

Iowa Produce Market Potential
www.leopold.iastate.edu/research/calculator/home.htm

Center research results from 2007-8 available

Summaries of 25 research projects that completed their work appear in the 2008 *Center Progress Report*, recently published by the Leopold Center.

It has **Ecology Initiative** reports on:

- Bird nesting in grazing areas,
- Fertilizer and phosphorus management strategies,
- Developing insect resistance in potatoes,
- Natural seed treatments for corn and
- Observations of wildlife at Whiterock Conservancy.

Marketing and Food Systems Initiative investigators reported on:

- Agricultural entrepreneurship among immigrant populations,
- Business tips for niche hog marketing,
- Greenhouses and aquaculture in conjunction with Iowa's ethanol plants,
- Economic feasibility of pasture-based dairy operations,
- Business analysis for small meat processors and
- Organic, natural and grass-fed beef prospects.

Policy Initiative projects included:

- Survival strategy for small/medium farms,
- Fostering an effective green payment program and
- A platform for performance-based stewardship.

Summaries are condensed from final reports submitted by principal investigators, who approved them prior to publication. Contact information appears at the end of each summary for those who want more information from the principal investigator.

Support for the competitive grants administered by the Center is provided through the state of Iowa educational appropriations and from the state's Agriculture Management Account, generated from fees charged on nitrogen fertilizers and pest control chemicals sold in Iowa.

www.leopold.iastate.edu

2008 Center Progress Report
www.leopold.iastate.edu/research/grants/completed_grants.
To request a printed copy,
e-mail leocenter@iastate.edu
or call (515) 294-3711.

Study of transport options

A new Leopold Center study looked at which transportation option consumed less fuel and emitted less carbon dioxide: farmer delivery or customer pick-up of food products for an Iowa Community Supported Agriculture (CSA) enterprise. It showed that weekly farmer distribution was more efficient than a central pickup point, even if hybrid vehicles were driven.

The study, "Assessing fuel efficiency and CO2 emissions of two local food distribution options in Iowa," was conducted by Associate Director Rich Pirog and Becky Rasmussen, an Iowa State University business and sustainable agriculture graduate student.

Find it on the web at:
www.leopold.iastate.edu/pubs/staff/files/fuel0608.pdf

Project explores alternative cropping systems for the bioeconomy

By LAURA MILLER Newsletter editor

Andy Heggenstaller grew up around dairy farms in Pennsylvania, where an integrated crop/livestock system works well. The crops feed the cows, the cows fertilize the crops, and the system provides multiple economic and environmental benefits for farmers and their communities.

Since coming to Iowa six years ago, he's been hoping to find the functional equivalent of this self-sustaining system for the state's emerging biofuels industry. How can cropping systems work together to provide feedstock biomass, protect the environment and support farmers and rural communities?

"You have to look at cropping systems differently than what we have now; you need to consider a system that produces more than one crop at one time of the year," Heggenstaller explained. "We found that alternative systems could produce significantly more biomass than a lone corn crop. They also leached less nitrogen, so the environmental impacts were reduced."

Heggenstaller is a graduate research assistant on projects managed by Matt Liebman, the Henry A. Wallace Endowed Chair for Sustainable Agriculture and professor of Agronomy, and Rob Anex, associate professor in Agricultural and Biosystems Engineering. The Leopold Center's Ecology Initiative provided special grants to fund part of the research, which also was supported by the ISU Plant Sciences Institute. Andy will complete his PhD in Agronomy and Biorenewable Resources and Technology later this year.

"It's a matter of working with the growth patterns of our crops and climate," he explained. "Triticale, a cereal that is planted in the fall, is well adapted to Iowa and produces a lot of biomass by late spring, so this project was designed to find out how it could be combined with other crops to improve the system."

The project included field plots west of Ames on the ISU Agronomy Research Farm. In 2006 and 2007, the team evaluated productivity and nutrient utilization in a conventional corn production system (sole-crop corn) and three bioenergy double-cropping

systems. The alternative systems were fall-seeded triticale (a cross between wheat and rye, planted after soybeans are harvested) followed by one of three summer-adapted crops:

- corn,
- sorghum-sudangrass or
- sunn hemp (a tropical legume that can fix large quantities of atmospheric nitrogen).

In all plots, triticale was harvested for biomass in early June, prior to full maturity. Summer crops, seeded directly following triticale, were harvested for biomass in late fall after a killing frost. Sole-crop corn was harvested at normal maturity, in early October, with dry matter separated into grain and stover. Crop and soil nitrogen were assessed three times each year (mid-April, early June and early October) to determine if opportunities for nitrogen leaching would be reduced in the alternative systems.

Here's what they found:

- Triticale-corn and triticale-sorghum cropping systems produced 25 percent more biomass (on a dry matter basis) than a sole-crop corn system.
- Gross potential ethanol yield for the triticale/corn system was 15 percent greater than sole-crop corn (one acre could yield an additional 123 gallons of ethanol); of course, the double-crop system also required greater energy inputs.
- Due to increased crop nitrogen uptake by the alternative systems, leachable soil nitrogen relative to sole-crop corn was reduced by 34 percent, 78 percent and 25 percent, respectively, in April, June and October.

However, the alternative systems also produced biomass rich in nutrients. For example in the triticale/corn system, harvest of all biomass and grain resulted in the export of 265 pounds of nitrogen per acre (compared to 137 lb/acre for sole-crop corn), 42 pounds of phosphorus per acre (compared to 29 lb/acre for sole-crop corn), and 235 pounds of potassium per acre (compared to 81 lb/acre for sole-crop corn).

The researchers noted that sustained removal of large quantities of this nutrient-rich biomass would necessitate increased fertilizer inputs, or recycling the nutrients contained in the biomass.

"We're trying to figure out how much of the nutrients in the biomass we can actually recover in the process of converting it into fuel and energy," Heggenstaller explained. "If the biomass is gasified, we get a form of charcoal as a by-product that can be used as a fertilizer but also might help increase soil organic matter."

"In a lot of ways the concept is like the integrated system with dairy cows. The biomass gets converted into a product we need, but the nutrients get cycled back to the land. Whether we are making milk or ethanol, sustainability is ultimately going to be determined by how we put the system together."

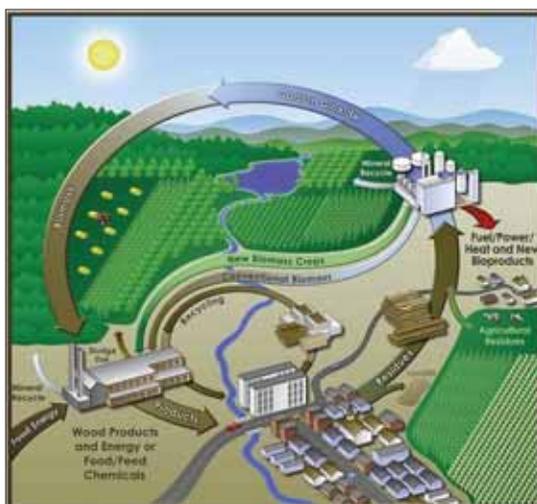


Illustration source: Oak Ridge National Laboratory.



ISU graduate student Andy Heggenstaller in sweet sorghum.

Soil: Ubiquitous, underappreciated but indispensable

By JOHN PESEK *Guest columnist*

EDITOR'S NOTE: Soil and Water is one of the six core issues that help guide the work of the Leopold Center and clarify our role and response in critical areas. Beginning with this newsletter, experts will comment on the challenges we face related to the core issues.

www.leopold.iastate.edu

Read Pesek's full column and more about core issues:
www.leopold.iastate.edu/about/core.html

Underfoot and out of mind seems to be the general attitude many have concerning soil, if they even give it a thought.

Soil naturally develops, over time, on terrestrial areas of the earth when the land surface is exposed to conditions that favor biological activity. In many cases, soils were formed thousands of years ago and then destroyed or covered by subsequent geological events.

The windblown loess-covered areas of western and southern Iowa are underlain by ancient soils once found at the surface. The latest glaciation in central and north central Iowa covered extensive forests, while the present soils in near northeastern Iowa were developed on geological material after ancient soils were stripped away by erosion. Evidence of such events appears worldwide in the wake of every flood, landslide, earthquake or volcanic eruption.

We have used soils in Iowa for less than two centuries, and soil scientists have observed profound changes over that time period. Most of these changes are directly attributable to human activities, mostly to cultivation for food, feed and fiber production. In tandem with cultivation, our soils have been drained and streams straightened, both leading to loss of wetlands.

Some Iowa soils have eroded to the point where we now grow crops in what were formerly "subsoils." In parts of western Iowa, almost all of the original organic matter has been lost from cultivated fields, along with much of the topsoil. Even in the relatively level landscape of north central and northwestern Iowa, we have lost more than half of the organic matter that had accumulated under prairie and wetland vegetation since the glaciers receded about 12,000 years ago. This loss is the result of cultivation that regularly stirs the

soil and causes organic matter to oxidize at an accelerated rate.

I learned about the fragility of the soil when I was not even nine years old. A violent rain and hail storm devastated our crops, with major gullies forming on a sandy loam rise and much of the sediment deposited on a lower-lying field. We had put the land under cultivation only six years earlier, from its virgin state of short-grass prairie and brush. At the same time, our county had its first agricultural agent who helped my father establish lines for terraces. We built terraces with mulepower and brawn, and I spent much time on a scraper filling in those gullies. My affinity for soil was firmly entrenched from that time forward. I planned and built terraces in high school and college, and considered a career in soil conservation until military service altered my opportunities and plans.

Early Iowa farming consisted of numerous farms, almost all devoted to production of both crops and animals, permitting half to be covered by sod. The ground cover attenuated erosion, the return of animal manures delayed depletion of plant nutrients, and water quality was not seriously affected.

Two world wars during the first century of Iowa statehood brought a heavy demand to increase food and fiber production to support the war effort of the United States and its allies, so more land was cultivated and exposed to erosion and depletion. Farmers also began to grow a new crop, soybean, for feed and oil. Like corn, it was cleanly cultivated with intense land preparation prior to its planting. To make matters worse, soybean plants left soils more susceptible to both wind and water erosion than did corn plants. Farmers began to grow more corn and soybean grain for use off their farms, accelerating

nutrient depletion as well as increasing soil losses.

We have compensated for losses of nitrogen in soil organic matter and the more stable plant nutrients in soils by replacing them, in the absence of livestock manures, with synthetic nitrogen fertilizers, and by mining and processing phosphorus and potassium ores for use as fertilizers. This has led us to the point where the petroleum supplies for production of nitrogen fertilizer and for the mining of the ores is ever less available and more expensive, and its coal substitute is not looked upon favorably. The ore supplies are increasingly more difficult to locate, mine and transport, thus making fertilizer increasingly more expensive. The frightening aspect is that we're using these geologic resources to rectify our casual use of soil, all of which has occurred during the past 200 of the 12,000 years that agriculture has been practiced.

The most recent challenge imposed upon our soil is its cultivation for delivering vastly more fuel for mechanical power than ever was utilized in the animal-powered agriculture of only a century ago. Currently, plant materials for fuel are predominately from annual and formerly inter-tilled crops such as corn and soybeans. Part of the additional production may need to come from putting highly erosive soils into some type of permanent vegetation.

Experience has taught us that soil losses and accompanying losses of plant nutrients are severe on many soils without major efforts to retard water runoff and soil erosion on all but the least undulating topography. How best to produce more fuel without compromising our sustained ability to produce crops in the future will require ingenuity and a willingness to adopt new practices and different crops for fuel purposes than in the past.

Are we up to this challenge? Can we rebuild the integrity of our soils and adopt the practices needed to enter the age of renewable fuel production from agriculture? Can we develop a system that is sustainable? We will have to search for the answers; no less than civilization depends upon it.



John Pesek, Iowa State University Emeritus Professor of Agronomy, chaired a national committee that published the groundbreaking 1989 report "Alternative Agriculture." He is a fellow of the American Society of Agronomy, the Soil Science Society of America, Crop Science Society of America, the Iowa Academy of Science, and the American Association for the Advancement of Science. He also helped establish the nation's first National Soil Tilth Center in Ames.

2008 Farm Bill advances Leopold Center mission

By SENATOR TOM HARKIN Guest columnist

Just as the Leopold Center looks to the future with innovative research and practical applications that promote an economically, environmentally and socially sound food and agriculture system for farmers and consumers alike, the recently passed farm bill – The Food, Conservation and Energy Act of 2008 – includes a good deal of new help toward accomplishing those important goals. The omnibus bill provides critical resources to conserve and protect natural resources, promote local and regional marketing of agricultural food products and develop needed research, market and production information to help organic farmers succeed.

The Leopold Center's work is of enduring and increasing importance as agriculture deals with challenges to conserve resources and protect the quality of the environment, especially in light of higher costs for fuel, energy, fertilizer and other elements of production.

Agricultural research, extension and education are the foundation for the success of the food and agriculture sectors and farming and rural communities. The research title of the 2008 farm bill recognizes the importance of agricultural research to both producers and consumers alike, and makes targeted investments for the research and development of critical advances in the food and agricultural sciences, including for beginning farmers and ranchers and Iowa's growing fruit, vegetable, organic and local food enterprises.

The farm bill's new Agriculture and Food Research Initiative (AFRI) sets a priority to fund research on plant and animal breeding techniques suitable for sustainable and organic agriculture that will take into account regional environmental differences.

Organic producers also will benefit from critical research funding to help them overcome production and marketing challenges. The USDA will conduct organic price reporting on a national scale, and offer further analysis and surveys so that producers have real time pricing and production information for the organic in-

dustry. Organic producers once again will have assistance to offset the annual cost of maintaining their status as USDA-certified organic.

The bill includes more help for growers of fruits, vegetables and horticultural crops. Farmers and consumers alike will benefit from the bill's grants and loans to boost distribution and marketing of foods produced organically, locally or regionally – such as through farmers' markets, roadside stands, and other direct-to-consumer channels.

Conservation initiatives and new funding in the legislation will deliver new help to farmers in Iowa and across the nation in their efforts to conserve soil, improve water quality and enhance wildlife habitat. The recent heavy rainfall in Iowa vividly demonstrates the value of good conservation practices and the need to help farmers do more. With the push to meet booming demand for farm commodities, and millions of additional acres of land coming back into production, the farm bill's added investment in conservation is even more critical.

To respond to current and mounting conservation challenges, the Conservation Security Program (CSP) has been renamed the Conservation Stewardship Program. The farm bill provides new funding and streamlines and simplifies CSP to ease the paperwork burden. Farmers will know up front what they need to do in order to receive a payment and how much they will be paid – and we have eliminated the rotation of CSP enrollment, watershed by watershed, so that all producers may apply.

The 2008 farm bill also makes a large new investment in conservation cost-share and incentive payments through the Environmental Quality Incentives Program (EQIP), including specific direction to the USDA to assist producers with conservation practices in making the transition into organic agriculture.

Across the full spectrum of agriculture, the Food, Conservation and Energy Act of 2008 looks to the future and advances sustainable agriculture in Iowa and across our nation. I am proud to have had a leading role in crafting this legislation of such importance to Iowa and our nation.

News & Notes

Three new publications target farmers and foodservice buyers and show how they can better work together. *What Producers Should Know About Selling to Local Foodservice Markets* (PM 2045), *What Retail Foodservices Should Know When Purchasing Local Produce Directly from Farmers* (PM 2046), and *Buying Local Foods for Retail Foodservices* (PM 2047) are available from Iowa State University Extension, www.extension.iastate.edu/store, or the Leopold Center Marketing Initiative web page, www.leopold.iastate.edu/research/marketing.htm. They were developed by the Hotel, Restaurant and Institution Management program at Iowa State University as part of a Leopold Center competitive grant related to food safety.

♦♦♦

A new book from the Agriculture of the Middle (AOTM) project has been published by MIT Press, *Food and the Mid-Level Farm: Renewing an Agriculture of the Middle*, edited by Thomas Lyson, Steve Stevenson and Rick Welsh. The opening chapter, "Why Worry about the Agriculture of the Middle?" is based on work by Leopold Center Distinguished Fellow Fred Kirschenmann, also a convening member of AOTM. Among the other contributors are Associate Director Rich Pirog and Iowa State University economist Mike Duffy (former associate director at the Leopold Center). The book has been cited as "a clarion call" to frame the need for a national initiative to shape a sustainable U.S. food system. Learn more about the project at the Association of Family Farms web site, <http://www.familyfood.net>.

♦♦♦

Leopold Center Director Jerry DeWitt and Associate Director Rich Pirog visited the 80-acre Stone Barns Center for Food and Agriculture in Pocantico Hills, New York and discussed ways that the two centers could work together. The Leopold Center and the New York organization are sharing the services of Fred Kirschenmann in 2008, and several collaborative projects are under consideration. For a pictorial tour, check out photographs by DeWitt on the Leopold Center web site at: www.leopold.iastate.edu/photos/index.htm.



Senator Tom Harkin (D-IA) chaired the House-Senate Conference Committee on the farm bill and chairs the Senate Committee on Agriculture, Nutrition and Forestry <http://agriculture.senate.gov/>

Study looks at critical need for capital among niche farm businesses

Once upon a time there were three entrepreneurs, each with a product and plan to sell it. The first one built hand-crafted canoes, the second one wanted to open a coffee house on Main Street, and the third raised grass-finished organic beef.

Which entrepreneur would have the most difficulty finding financial assistance? Without a doubt, it would be the farmer, says Howard Van Auken, professor of management in the Iowa State University College of Business.

Unless a local bank is willing to offer the farmer a personal loan, the farmer may have few avenues for accessing potential sources of capital. It's a widespread problem for niche producers, Van Auken discovered as part of a recent research project conducted for the Leopold Center's Marketing and Food Systems Initiative. In fact, findings showed that many of the startup costs associated with specialized agricultural operations may be charged to personal credit cards.

"Who is helping niche producers understand the process for accessing potential capital? The answer is almost no one," Van Auken said. "If I want to open a new retail business, I go to a bank because banks understand retail. If I have a new technology, or want to open a manufacturing facility, there's a process to follow. But if I'm an organic honey producer, I'm out of luck."

The project included two surveys. He mailed questionnaires to 138 organizations, potential providers of capital to niche agriculture producers in Iowa such as Farm Credit Services, RC&Ds, rural development funds, Community Development Finance Institutions, U.S. Department of Agriculture offices, rural electric cooperatives, councils of government and revolving loan fund organizations. He also mailed questionnaires to 693 niche agricultural producers in Iowa, including owners of food and fiber enterprises.

Among providers of capital, he found:

- Funding rejections are primarily due to lack of collateral, a weak or nonexistent business plan, or the applicant did not

- meet the criteria needed to receive funding.
- Two ways to improve the flow of capital to producers would be to provide more technical assistance and to have more capital available to the agency for dispersing to applicants.
- Little technical assistance is provided to applicants. The flow of capital is restricted because information dissemination appears to be limited.
- Few, if any, applicants have a comprehensive understanding of capital availability (e.g., who does what in the process). Advertising of capital availability, done primarily through economic development agencies, word of mouth, and banks, likely does not reach many producers.

Producers who responded to the survey provided information on their situations regarding capital acquisition. He learned that:

- Producers are most aware of capital available from the USDA, friends and family, community banks and savings, and are not familiar with other potential sources.
- Producers obtain capital primarily from familiar sources.
- Community banks are the most common source of technical assistance; few other agencies are asked for technical assistance.

Ways to access financial and planning services, referred to as a "money map," are commonly outlined in business sectors. Van Auken had hoped to create a similar money map for niche ag producers, showing them how to access potential sources of capital and technical assistance for creating a business plan, marketing strategies and contingency plans.

"I found it very frustrating because there is no formal or informal process and agencies did not seem to know what others were doing in this area," he said. "I'm not even sure I know the paths that farmers should take to get the information they need to start a niche business other than personal contacts, community banks and research on the Internet."

Results have been shared with the Iowa Foundation for Microenterprise and Community Vitality and the Grow Your Small Market Farm© program that might be able to provide assistance.

Local food impacts: Two Iowa stories

In 2007, nearly \$2 million worth of locally produced food was purchased by 26 institutional food buyers in the eight-county region including and surrounding Black Hawk County, more than double the amount purchased in 2006. The information was collected by the University of Northern Iowa Local Food Project (supported by the Leopold Center). In April 2008, the group announced its new name, the Northern Iowa Food and Farm (NIFF) Partnership. More at: www.uni.edu/ceee/foodproject/.

The Northeast Iowa Food and Farm Coalition has found that a five-county area could add more than 400 jobs and \$90 million to its economy if more of the fresh fruit and vegetables consumed in the region also were grown there. The study was funded by the Regional Food Systems Working Group of the Value Chain Partnerships project coordinated by the Leopold Center. A copy of the study is available on the Leopold Center Marketing and Food Systems Initiative page, www.leopold.iastate.edu/research/marketing.htm. See more about the group at: <http://www.iowafoodandfitness.org>.



Leopold Center Director Jerry DeWitt (upper left in denim shirt) meets with some of the Iowa farm and food professionals who attended a sustainable agriculture conference in Kansas City, thanks to a gift from Chipotle Restaurants. Read about what they learned at: www.leopold.iastate.edu/SARE/reports.html.



LEOPOLD CENTER
FOR SUSTAINABLE AGRICULTURE
209 CURTISS HALL
IOWA STATE UNIVERSITY
AMES, IOWA 50011-1050

Highlight Events

Cows, Birds and Wildlife

Southern Iowa landowners, cattle grazing operators and wildlife enthusiasts are invited to attend an evening workshop, "Managed Grazing for Cows, Birds and Wildlife," offered August 25 near Kellerton in Ringgold County and also August 26 near Leon in Decatur County. The workshops are part of a Leopold Center-funded grant project on custom grazing to Practical Farmers of Iowa and Iowa State University Extension. For information, contact ISU Extension specialist Joe Sellers, (641) 774-2016, sellers@iastate.edu.

Come to the farm!

There are plenty of other opportunities to see what's happening on Iowa farms. Since 1999, the Leopold Center has provided direct support to Practical Farmers of Iowa (PFI) for its on-farm research demonstration and field day program. The Leopold Center also participates in the Iowa Learning Farm project, a statewide

initiative that includes farmer cooperators, agency partners and ISU researchers working to build a "culture of conservation" in Iowa. Check our web events calendar for details of upcoming field days at www.leopold.iastate.edu/news/events.htm.

Produce field days

The Leopold Center's new Fruit and Vegetable Working Group hosted two field days for growers interested in production and marketing strategies. The field days were July 21 in Mitchell and Howard counties and July 24 in Shelby County. Participants visited greenhouses and high tunnels used to extend the growing season, orchards and the Cedar Valley Produce Auction. For more information, contact Malcolm Robertson, who helps coordinate the group, at malcolmr@iastate.edu, (515) 294-1166.



Life Cycle Assessment

The Leopold Center brought a Canadian researcher to Iowa on July 21 to talk about his experiences with Life Cycle Assessment (LCA) and to work on a joint project that looks at several beef production systems in Iowa. Nathan Pelletier (above) is a doctoral student at Dalhousie University in Nova Scotia, Canada. His presentation, "A Life Cycle Perspective on Food System Sustainability: Lessons from the Field," will be available on the Leopold Center web events page, www.leopold.iastate.edu/news/events.htm.