

Fall 2015

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Leopold Center for Sustainable Agriculture

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Local food program transitions to Extension

Like soaring consumer interest in finding and using locally-sourced food, a strategic partnership of the Leopold Center and Iowa State University Extension and Outreach is taking flight.

With continued support from the Leopold Center, the Local Foods Program has moved under the umbrella of Iowa State University Extension and Outreach. The change went into effect October 1.

“So much growth is happening right now in the local foods movement,” said Craig Chase, program manager with dual responsibilities for the program with ISU Extension and Outreach and the Leopold Center’s Marketing and Food Systems Initiative.

Since 2003, the purpose of the Center’s marketing initiative has been to both increase profitability for farmers and the number of jobs in local food production

and rural communities. As part of a program to accomplish these goals, the Leopold Center created a working group that met regularly to discuss ways to build and strengthen local food systems in communities throughout Iowa. The network, the Regional Food Systems Working Group (RFSWG), now includes 17 regional food partner groups.

“This new relationship with ISU Extension and Outreach will benefit both our clients and partners by becoming part of a much larger effort to work with a land-grant university that has offices in every county,” said Chase. The local foods team consists of 12 staff members helping to improve food systems in Iowa. Five of the team members will continue to be

LOCAL FOODS (continued on page 10)

Cost of soil erosion in Iowa, not a pretty picture

By LAURA MILLER, Newsletter Editor, and JERI NEAL, Ecology Initiative Leader

Rick Cruse is getting used to hearing a collective gasp about two-thirds of the way through his presentations these days. Cruse, who directs the Iowa Water Center and is Professor of Agronomy at Iowa State University, has made it his mission to share some startling information about soil erosion in Iowa.

His message is two-fold:

We’re losing much more soil than we think because not all types of erosion are part of the models that estimate soil loss.

If you want to keep soil in place, you’re not going to do it by growing only corn and soybeans, no matter how many conservation practices you use.

Cruse is part of the Iowa Daily Erosion Project (DEP), a team of scientists from

ISU, the National Soil Erosion Research Lab, the USDA-ARS National Laboratory for Agriculture and the Environment, the University of Iowa and Colorado State University. The team uses remotely sensed rainfall and soil and crop management practices, a web-based soil database and modeling to calculate daily estimates of rainfall, runoff and soil erosion in every HUC 12 watershed in Iowa (subwatersheds that are 15-62 square miles in size). For the past three years the team has been working to provide more sophisticated estimates that incorporate data from 230,000 LiDAR-scanned and georeferenced Iowa hillslopes.

The Leopold Center was interested in

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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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News & Notes

The Leopold Center received 50 submissions to the Summer 2015 Request for Pre-proposals, which will determine the new projects to be funded in 2016. Of those submissions, 22 fell under the Ecology Initiative, 13 in the Cross-cutting Initiative, 10 in the Marketing and Food Systems Initiative and five in the Policy Initiative. Following a review by advisory board and staff, 29 preproposals will move to the next round and investigators have been invited to submit more detailed proposals by October 30 for technical and scientific review.

Aldo Leopold's boyhood home, the Starker House at 111 Clay Street in Burlington, has been purchased by the Leopold Landscape Alliance. The group has launched a \$1.25 million fundraising campaign to pay the Starker House mortgage, buy the Leopold House (where he was born) on an adjoining property, and create a maintenance fund for both houses. The Starker House will be used for meetings this fall (tours are by appointment). Plans include establishment of an Environmental Studies and Research Residency Program using Leopold's writings to investigate the relationships between humans and nature. The group was formed by local residents to promote and implement landscape-scale conservation in Iowa and Illinois along the Mississippi River. More information and how to donate is on the group's website, www.leopoldalliance.org.

Three new Iowa communities are participating in the Agricultural Urbanism Toolkit planning process as part of a second phase of work sponsored by a competitive grant from the Leopold Center Marketing and Food Systems Initiative. The new communities are Dubuque, Cass County and nine counties that comprise Healthy Harvest of North Iowa (Cerro Gordo, Franklin, Floyd, Hancock, Kossuth, Mitchell, Winnebago, Worth and Wright counties). They join Des Moines, Cresco and Cedar Rapids that began the process in 2013 with ISU's Community Design Lab. The planning process helps communities explore their ag-related resources and needs to make fresh, local food products

more widely available to residents. Depending on the community, the process might result in more school gardens, an urban farm, food box program or shared-use kitchens.

The University of Iowa Biomass Initiative received the Governor's Iowa Environmental Excellence Award on August 4 in Des Moines. The initiative uses biomass from miscanthus, a type of fast-growing grass, to reduce the university's carbon footprint. The Leopold Center awarded competitive grants in 2012 and 2014 to set up a network of growers and to help determine a sustainability index. The Leopold Center continues to support miscanthus research via a 2015 competitive grant to ISU agronomy professor Emily Heaton.

The Leopold Center recently was featured in *Outlook* magazine, published by the Aldo Leopold Foundation that maintains "the Shack" and property once owned by the Leopold family near Baraboo, Wisconsin. Their Summer 2015 issue was devoted to soil health in celebration of International Year of Soils in 2015. The issue included an overview of agricultural research supported by the Leopold Center and an essay about Leopold's views of soil, written by Dennis Keeney, the Leopold Center's first director. The center's current director, Mark Rasmussen, attended a conference in August that was hosted by the Aldo Leopold Foundation on "Building a Land Ethic."

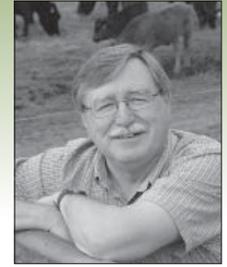
A new publication describes how emerging food hubs can grow successfully under money constraints if cash flow is managed strategically. *Managing Cash Flow for a Low-Capital Food Hub Start-up* is part of the Local Food System Toolkit series produced by the Local Foods Team, a collaborative effort of the Leopold Center and ISU Extension and Outreach. Information in the guide is based on experience of the Iowa Food Hub, a "research hub" located in West Union that is operated as a nonprofit organization. The guide is available by title on the Leopold Center's publications page, www.leopold.iastate.edu/pubs.

Conversations

WITH DIRECTOR MARK RASMUSSEN

Can independent farmers survive?

With this kind of operational complexity, where is agriculture heading? Will farmers even have time to think about conservation?



I have been pondering this question for some time. Here are my thoughts, and I really want to know what you readers think... The question is not so much about the size of a farming operation size as it is about independence in decision making, responsibility, planning and actions in regard to the operation. This question applies to all types and sizes of farming enterprises.

When you think about everything that farmers must juggle – the requirements that must be met, the new challenges that are coming at agriculture daily – you will see why my question of independence and survival is a relevant one.

Start with some of the basics in the business of farming. First is ownership and access to land. Things may be changing in a lot of ways, but success in agriculture still is tied to land and sunshine. Given the current price of land and the aggregation of land ownership into larger operations, access continues to be a significant challenge for all but the lucky few who gain access by inheritance or other favorable terms. Buying a lot of land at market prices can result in financial trouble very quickly.

Next, a farmer must understand biological and production details for each crop and livestock enterprise in an operation. Can you spot the sick calf in a group? Can you judge when soil conditions are right for planting? What fertility plan is needed for a given field or what genetics are most desirable for the cattle herd? When crop or livestock enterprises are added to an operation so does the level of complexity.

A farmer also needs strong knowledge and skills in the operation and maintenance of equipment for each enterprise. Adjusting equipment for the right planting rates, application rates or dosage is important. Many farmers are bypassing some of these details by hiring an outside contractor, especially if they can't fly a plane or do not want to deal with restricted use pesticides or manure management regulations. Contractors of course come at a cost.

Then consider how the work actually gets done. Many details can be impede a good day's work, such as managing the logistics of field operations, taking delivery on supplies when they are needed, getting livestock fed regardless of weather, or dealing with machinery breakdowns.

There also are the increasingly complicated financial aspects of a farming operation. Farming requires a lot of capital and access to sufficient capital is essential (unless, of course, you are independently wealthy). The source of financing, terms and costs are all important considerations. And for many who farm rented land, the job of maintaining a relationship with landlords can be widely variable in terms of time, effort and psychology.

Another important part of the financial picture is the need to purchase inputs that meet technical specifications, but also are priced for a farm's budget. Input costs can be a significant

expense, and with the increased market power of a consolidated agribusiness, independent farmers are finding it more difficult to find economically priced inputs. Being a price taker rather than a price maker always makes things more problematic. Mandatory license and technology usage agreements are another part of the input puzzle.

At the end of the production cycle, marketing grain or livestock is full of risks. Some try to simplify and reduce risk by engaging in contracts, but many farmers might agree that this benefits the agribusiness contract partner to a greater extent than the producer in the field. Grid pricing is fine but it is kind of hard to hold out for another day. The bottom line is that marketing whether independent or by binding contract often can be the difference between a successful or financially struggling operation.

Now let's just say it is a good year with money to be made. Who really understands state and federal tax codes? Deductions, wages paid, accelerated depreciation, crop insurance proceeds, income averaging and capital gains relate to a farm's bottom line and tax bill. Only the local lawyer or CPA is able to decipher the codes. I know few farmers who prepare their own taxes.

Farming operations also are encountering a new and still evolving bundle of requirements and oversight. Coming onto the scene are big data, best management practices, animal welfare requirements, veterinary feed directives, record keeping, third party audits, environmental restrictions and food safety regulations along with their criminal statutes.

That's how I arrive at this point: Is this more than two (or even four) people can handle? Are there enough hours in the day to manage all of this? Perhaps hiring extra help is a possibility if – and it is a big if – labor is available. And a farm with employees brings another set of complications to the operation. A second option is to buy more technology to reduce the work load, or contract with outside specialists for tasks like bookkeeping, tax planning, and even marketing or fertility management. Of course, these options add to overall expenses that must be covered by farm revenue.

I conclude, with some regret, that as farming has gotten more complicated, we are approaching a point where most enterprises cannot be handled by a few people. Dealing with complexity requires specialists; farmers cannot be generalists and specialists at the same time. With this kind of expanding operational complexity, where is agriculture heading? Who will farm? How will we farm? Will farmers even have time to think about conservation?

I believe that how we answer these questions is critical to long-term agricultural sustainability.

Mark Rasmussen

'SOIL EROSION IS COSTING MORE THAN \$1 BILLION OF LOST REVENUE EVERY YEAR IN IOWA'

SOIL EROSION (continued from page 1)

answering a question not addressed in the larger project: What has been the impact – in terms of dollars of lost yield – of soil erosion in Iowa?

To answer this question, Cruse set up a research project that included seven farms, representing each of Iowa's Major Land Resource Areas. Each farm had a six-year cropping history with corn and soybean yield maps, and similar management practices. Locations also were selected based on locally available high-quality rainfall records.

For each field in the study, at least 45 georeferenced soil cores were obtained to determine topsoil depth and soil organic carbon. Soil cores were taken across different erosion classes and within well-drained areas.

Those sampling points were paired with cells in each field's yield monitor maps, so that the information could be plotted on a graph to show both topsoil depth and yield (three corn and three soybean years for a corn-soybean rotation and six corn years for a corn-corn rotation).

The resulting curves on the graph show how changes in soil quality (in terms of topsoil depth) affect crop yields on seven Iowa farms.

Next, Cruse looked at soil erosion loss estimates from the National Resources Inventory, a survey conducted every 5-7 years since 1977 by the USDA's Natural Resources Conservation Service. The calculations use a conservative estimate of

5.5 tons per year per acre for cropland in Iowa, resulting in a total average loss of 6.8 inches of topsoil in Iowa since 1850.

So what's the impact of that loss on actual yields?



Rick Cruse

Cruse went back to the data collected from those seven Iowa farms, calculating yield based on a topsoil thinning of 6.8 inches. Results varied from no change in selected fields to 11, 18 and even 29 bushels lost yield per acre for corn. He says that a modest estimate would be an average of 10 bushels per acre yield loss from the 6.8 inches of soil erosion that has occurred in

Iowa since about 1850.

"If you look at those figures and the amount of corn acres in Iowa, you quickly surpass a billion dollars of annual lost revenue," Cruse says. "And this is a very conservative estimate."

He estimates that about 30 percent of topsoil is lost in ephemeral gullies, those channels created in fields after heavy rainfall, especially before and shortly after annual crops are planted in spring. Soil loss equation models used by the Iowa Daily Erosion Project and the Natural Resources Inventory do not include loss from ephemeral gullies.

The surprise for most audiences, he adds, is the very slow process required to develop new soils.

"The best science indicates that we can redevelop soil at a rate of only a half-ton per acre per year," Cruse explains. "You're converting raw parent materials, which in

 www.leopold.iastate.edu

Iowa Daily Erosion Project:
<http://dailyerosion.org>

More about this research grant::
www.leopold.iastate.edu/grants/e2014-17

the subsoil includes silicone and feldspar and other substances, into biologically active materials. Erosion also can remove minerals that are the product of centuries of weathering and other processes."

Cruse points out that most agencies use 5 tons per acre per year – 10 times the replacement rate – as an acceptable level of soil loss. Adding organic matter helps, but it does not match the productive capacity of the original, uneroded soil. In further clarifying this concept, he likes to share the following analogy.

"It's like a football coach who has a star quarterback who injures his ankle," Cruse explains. "The coach has two choices – tape up the ankle or put in a second-string quarterback with less experience. Either option will not give you the same performance as the original quarterback, which is what you have you try to rebuild eroded soil with soil organic matter, but replacing minerals is a very long-term proposition."

He points to cover crops, no-till, terraces, grassed waterways and any number of practices that contribute to soil conservation in row-cropping enterprises. He emphasizes that some landscapes are sustainable only under an agronomic system that includes perennial crops – trees, prairie and pasture.



These pillars at the eastbound rest stop on I-80 near Adair in western Iowa are designed to look like giant soil cores showing soil lost over time in Iowa. This display illustrates a 14-inch topsoil depth in 1850, compared to 5.5 inches in 2000. [Photo by Christopher Gannon]

Numbers in this article were prepared as part of a one-year grant, Economic Impacts of Soil Erosion in Iowa, awarded by the Leopold Center Ecology Initiative in 2014. Cruse was principal investigator and worked with Mack Shelley, ISU Professor of Statistics; Lee Burras, ISU Professor of Agronomy; John Tyndall, ISU Associate Professor of Natural Resource Ecology and Management; and Melissa Miller, Program Coordinator, Iowa Water Center.



TOWARD A SUSTAINABLE

Future

Sustainability-as-flourishing

Sustainability-as-flourishing does not depend on a technical solution or some kind of magic efficiency ... Until we recognize and accept that we humans are an integral part of the complex system we call Earth, the possibility of sustainability will be nil.

— Ehrenfeld and Hoffman, 2013

In their refreshing book, *Flourishing: A Frank Conversation About Sustainability* (2013) John Ehrenfeld and Andrew Hoffman invite us to rethink the concept of sustainability. Most of our current sustainability initiatives only serve to make our present activities a little less unsustainable – which will not lead us to sustainable livelihoods. As Ehrenfeld and Hoffman put it, “... sustainability is not about windmills, hybrid cars, and green cleaners; it is about the way we live ... It is about living authentically; it is about our relationships with nature, with each other, and with ourselves ... and goes to the core of who we are as human beings.”

Re-framing the concept of sustainability in this manner, of course, gets us beyond the reasoning we often engage in, such as “I am more sustainable because I farm organically, or because I use cover crops, or because I have higher corn yields, or because I drive a hybrid car.” While such activities may have positive short-term impacts, they often distract us from the real task of achieving sustainability – building a more resilient quality of life. Technology-driven solutions also focus on simple quantitative measures instead of engaging us in restorative relationships.

The term “flourish” derives from the concept “to blossom,” and neither humans nor nature can “blossom” apart from the self-renewing capacity of the whole.

This is not a new concept. It was deeply embedded in the writings of Aldo Leopold. He understood that we humans are not separate from nature, and certainly we are not its “conquerors.” As Leopold told us, when we operate by a land ethic, it “changes the role of *Homo sapiens* from conqueror of the land-community to plain members and citizens of it. It implies respect for his fellow members, and also respect for the community as such.”

He went on to remind us that it is ultimately in our own interest to sustain “land health,” land health being the land’s “capacity for self-renewal.” In other words, since humans are *part* of the land community, we can only flourish when the entire biotic community flourishes. (Leopold 1949)

Consequently, sustainability-as-flourishing involves much more than science and technology, it involves relationships that are grounded in love and respect. This is a concept that Wendell Berry articulated eloquently in his 2012 Jefferson lecture with a phrase borrowed from E.M. Forrester, “It All Turns on Affection.”

Given that we are part of the land community, and that all of the components of the land community are interconnected and interdependent, we cannot have a flourishing life unless we manage land to enhance its capacity for self-renewal, and work with others in our communities to achieve that goal.

Accordingly, flourishing has a “spiritual” component. In his book, *Storms of My Grandchildren*, James Hansen makes this clear. As a climate scientist, he acknowledges that he would “... prefer to just do science. It’s more pleasant, especially when you are having some success in your investigations.” Only when he began to consider relationships – especially those with grandchildren – his perception as a scientist began to change. He said, “If it hadn’t been for my grandchildren and my knowledge of what they would face, I would have stayed focused on the pure science.” (Hansen 2009)

Sustainability-as-flourishing is about relationships – to nature, to each other, to our grandchildren and to ourselves.

Julius Kirschenmann

Farm apprentice Krisan Christensen visits with one of the more than 10,000 children who come to the Stone Barns Center for Food and Agriculture in New York every year. Kirschenmann splits his time between the Leopold Center and Stone Barns, and considers all the young visitors his grandchildren.



[Photo by Ben Hider]

References:

- Ehrenfeld, John R, and Andrew J. Hoffman, 2013. *Flourishing: A Frank Conversation About Sustainability*. Stanford, CA; Stanford Business Books.
- Leopold, Aldo, 1949. *A Sand County Almanac: And Sketches Here and There*. New York: Oxford University Press.
- Hansen, James. 2009. *Storms of My Grandchildren: The Truth About Climate Catastrophe and Our Last Chance to Save Humanity*. New York: Bloomsbury Press.

Organic production improves soil, water quality, but challenges remain

EDITOR'S NOTE: We caught up with Kathleen Delate, professor in the departments of agronomy and horticulture, who coordinates the ISU Organic Agriculture program. She also has been lead investigator in the Long-Term Agroecological Research (LTAR) experiments set up

You co-authored a recent journal article that looked at the nation's six oldest experiments comparing organic and conventional farming methods (conducted in Pennsylvania, California, Minnesota, Wisconsin, Maryland and your own work in Iowa). What can we learn from these experiments?

A: These research sites provide an incredibly robust data set from across the United States, supporting the fact that organic grain crop yields can be competitive with conventional yields, and that organic systems can enhance soil quality. In the economic analyses from these sites, organic returns greatly outperformed conventional returns when organic price premiums are obtained, which is the normal practice of all certified organic farmers. At our own LTAR site, Craig Chase showed that returns were greater in the organic system even during transition because of the elimination of expensive synthetic fertilizer and pesticide costs.

In Iowa we are fortunate to have a tremendously engaged community of organic farmers who provide advice and feedback on all our research projects. Our analysis of the long-term sites also showed that when you lose connections to the farm community, you lose a valuable conduit to disseminate research results, which the University of California experienced when they started a new long-term site without sufficient farmer involvement.

You've also been involved in a 10-year study looking at organic no-till farming as part of a multi-state partnership with the Rodale Institute. You were testing the use of a roller-crimper in spring to knock down winter rye, then drilling soybean into the mulch. What have you learned and what is the significance of these findings?

A: We have learned an incredible amount from these studies, including the importance of weather conditions when practicing organic no-till. When spring and summer rains fall evenly and adequately, as they did in 2009, organic no-till soybean yields ranged from 37 to 45 bushels per acre, which is an excellent



Kathleen Delate (left) leads a tour of her research plots at the ISU Neely-Kinyon Farm annual field day in August. Weather has been a major challenge over the past three years.

in 1998 at the ISU Neely-Kinyon Research and Demonstration Farm near Greenfield, which the Leopold Center still supports. The lessons in organic farming management have application across all kinds of farming systems, so we asked her for a brief update.

We were off to a good start this year at the Agronomy Farm, but amazingly, the huge jackrabbit population ate only organic soybeans (not the conventional) and yields were decimated. We have seen this time and again: animals can apparently discern taste differences with organic crops. Some people see this as a bad thing, but organic consumers equate it with a nutritionally superior product.

Cindy Cambardella* has documented increases in soil carbon and microbial biomass carbon and nitrogen in the organic no-till system compared to the normal, tilled organic system. The challenge remains to balance improving soil quality with maintaining optimal yields. Francis Thicke, organic farmer in Fairfield, Iowa, drilled his organic no-till soybeans on 7-inch rows this year, as opposed to our 30-inch rows, and he is expecting more than 40 bushels per acre with no weed management. We hope to try this next year, but finding a drill at Iowa State University that can plant through the rye mulch will be a challenge. We may need to borrow one from our partners at the USDA-ARS, who have been doing cover crop research for over two decades.

At your annual field day at the LTAR site in southern Iowa, you note that the past three seasons have been very challenging. You've experienced drought and excessive rains that washed out soil and prevented planting on many acres. How are organic systems faring under these conditions?

A: Farmers are adapting to global climate change by switching crop varieties and planting dates, and in 2012, some farmers irrigated their corn crop, similar to Nebraska. With the tremendous rains at the beginning of the season in 2014, we noticed that the manure used as fertilizer in the organic system was not maintaining adequate soil fertility under high rainfall, so we adjusted the rate and are seeing better results this season.

Timeliness is becoming even more critical, and missing a two-day window between rains in which to complete your weed management (e.g., rotary hoeing) can make or break your weed population for the entire season. In spite of these challenges, the 4-year crop rotation organic system has been the most competitive with conventional yields, pointing out the importance of small grains and a perennial crop (alfalfa) in storing soil carbon and nitrogen to ensure healthy crops.

How have pest management practices changed in organic systems in recent years, especially in controlling soybean aphid? What new things are you trying and what has been most effective?

A: Beginning in 2000, we started seeing soybean aphid in Iowa. In 2009, we began planting an organic soybean aphid-resistant variety and experienced high yields with minimal aphid populations. Prior to the use of the aphid-resistant variety, BR29AR9, the peak aphid population averaged 337 aphids per 8 sweeps on the non-resistant variety in 2008. In addition to variety selection, aphids can be managed with organic-compliant treatments containing neem (a tree-based insect repellent), for example. Our other pest insects include bean leaf beetle, which, fortunately, has not been a big problem in the last four years, but we monitor it each year.

ORGANIC UPDATE (continued on page 7)

Iowa Nutrient Reduction Strategy, by the numbers

It might not be a household word, but the producers, educators and others who came to field days, listened to presentations and read farm newspapers over the past six months certainly are hearing more about the Iowa Nutrient Reduction Strategy (INRS).

The INRS is a science-based framework to assess and reduce nutrients to Iowa waters and the Gulf of Mexico. It was developed in 2013 by the Iowa Department of Agriculture and Land Stewardship, Iowa Department of Natural Resources and Iowa State University in response to the annually expanding hypoxic “dead zone” in the Gulf of Mexico. The Iowa Legislature created the Iowa Nutrient Research Center at Iowa State to coordinate research related to the strategy.

Among the practices listed in the INRS are the use of cover crops, as well as edge-of-field practices such as bioreactors, buffers and wetlands. Other types of land-use change, including diversification of cropping systems, extended rotations, agroforestry, perennial biofuel production and grass-based livestock, also can reduce nutrient loading to waterways.

The Leopold Center helped lay the critical groundwork for the creation of the INRS. The strategy cites its origins in an extensive body of scientific literature related to nitrogen and phosphorus use in agriculture.

- 47 percent, or 50 out of 106 articles related to nitrogen management, were authored or co-authored by a researcher receiving LCSA funding for research related to the topic of the paper
- 40 percent, or 60 out of 150 articles related to phosphorus management,

were authored or co-authored by a researcher receiving LCSA funding for research related to the topic of the paper.

- 82 percent of the practices listed in the Iowa Nutrient Reduction Strategy were informed by LCSA-funded research or projects.

Unlike the Iowa Nutrient Research Center, the Leopold Center has a broad mission to conduct research on topics ranging from maintaining productive soil and viable rural communities, to crops, livestock, alternative systems, marketing and safety and health on the farm.

A recent evaluation looked only at nutrient management projects, providing a snapshot of the body of work funded by the Leopold Center on water quality. Evaluators Arlene Enderton and Corry Bregendahl found the following impacts:

- **12,584:** people reached through workshops, presentations and field days that were part of 13 projects and one issue team
- **94:** peer-reviewed journal articles written (with another 24 in process), from 28 projects or teams
- **128:** fact sheets, newsletters or Extension publications written
- **176:** workshops or trainings that shared information from eight projects
- **31:** graduate or post-doctoral students supported by 10 projects or teams

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Get a list of more than 90 projects that look at nutrient management
www.leopold.iastate.edu/managing-nutrients

- **\$9.8 million:** Funds leveraged by 15 projects (every \$1 of investment generated \$7.16 to support related research and activities)
- **654:** Farmers who implemented or planned to implement at least one practice to reduce nutrients as a result of participating in five funded projects and three funded teams

The Leopold Center has produced an updated list of more than 90 ongoing and completed grant projects that focus on nutrient management and water quality.



Craig Fleishman explains his whole-farm conservation plan at an August 5 field day on his farm near Minburn. Strip intercropping is in the background.

[Photo courtesy Iowa Learning Farms]

ORGANIC CORN-SOYBEAN SYSTEMS RETAIN TWICE AS MUCH NITROGEN COMPARED TO CONVENTIONAL

ORGANIC UPDATE (continued from page 6)

You're also participating in a USDA-ARS Organic Water Quality project now in its fourth year at the ISU Agronomy Farm near Boone. What are some of the major findings from this study?

A: At the USDA Organic Water Quality site outside Boone, Cindy Cambardella has found that from March 2012 through December 2014, the conventional corn-soybean system lost nearly twice as much nitrogen in the tile drainage water than the organic four-year rotation C-S-O/A-A (79.2

kgN ha⁻¹ compared to 39.9 kgN ha⁻¹).

These results suggest that organic farming practices, such as the application of composted animal manure and the use of forage legumes and green manures within extended cropping rotations, can improve water quality in Midwestern subsurface-drained landscapes.

***Cindy Cambardella is a soil scientist at the USDA-ARS National Laboratory for Agriculture and the Environment in Ames. She is working with Delate on several projects and reviewed this article. Get the full Q&A in our online edition.**

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Watch a video on no-till organic methods:
www.leopold.iastate.edu/no-till-organic-farming

More about the LTAR trials:
www.leopold.iastate.edu/LTAR

Slow money, a tool for sustainable development

By PRIYANKA JAYASHANKAR, Adjunct Assistant Professor and Leopold Center Associate

Have you ever imagined how an injection of financial credit could help pollinators multiply, recycle micro-nutrients into the soil, make a family-run farm prosperous and sustain an entire community? In the realm of slow money, where sound ecology and sound economics go hand in hand, such a utopia can turn into reality.

In fact, the slow money movement in the United States is gathering momentum at the grassroots. Be it a local food coop in the Midwest, or a family cultivating an array of heirloom vegetables in the Appalachians, farmers and small food enterprises are finding alternative forms of financing for sustainable agricultural practices. Behind the scenes is an eclectic group of lenders, land-leasing companies and philanthropic organizations, which strive to make money flow more readily within rural communities.

Proponents of the slow money movement are calling for the creation of an alternative capital market system, wherein capital can be made to circulate within the local economy. The slow money movement combines socially responsible investment practices with sustainable agriculture. Investors, who are part of this movement, strive to enhance triple bottom line outcomes (i.e., people, planet and profit) by providing 'nurture capital' for organic farms and local food systems.

Novel financial inclusion and investment tools, ranging from microfinance to socially responsible investment groups, have emerged worldwide to pave the way for a more comprehensive form of capitalism. Likewise, in the United States, alternative credit market systems such as the slow money movement provide small farmers and agricultural enterprises with access to finance. These alternative systems also enable them to network with key value chain actors in agriculture and acquire knowledge about sustainable agricultural practices. Slow money investors, who strive to increase environmental, economic and social returns on investment, provide 'patient capital' in the form of equity or debt to revitalize the local economy. Unlike venture capitalists, slow money investors have a long time frame for generating financial returns on investment and avoid quick exit strategies.

The slow money movement also has drawn the support of certified B-Corps, which offer investment opportunities for accredited investors. Impact investors are further strengthening the movement by purchasing and leasing agricultural land for organic food production.

Slow money maintains a strong emphasis on local enterprises, whereby investors can be brought closer to investees. In many cases, community development financial institutions, which promote local enterprises, are becoming key players in the slow

money space. There is an inflow of slow money into artisanal enterprises in the services sector as well.

A host of agricultural investment funds and community development financial institutions are active in the slow money movement in the United States. For example, the investment fund Iroquois Valley Farms, which is a B-Corp, has helped promote organic, family-run farms in seven states including Illinois, Indiana and New York. The investment fund North East Farm Access has been active in the sustainable agriculture community in New Hampshire.

Community development financial institutions (CDFIs) such as CEI, Craft3 and Natural Capital Investment Fund back a diverse range of socially and/or environmentally inclined businesses. While agricultural investment funds may provide financing in excess of \$500,000 to \$2.5 million to facilitate land leasing for farmers, CDFIs may extend loans or provide equity financing from \$1,000 up to \$500,000.

Slow money investors provide the following inputs to investees:

- patient capital, which combines the rigor of venture capital with the social impact of pure philanthropy,
- social capital, and
- managerial expertise to small food enterprises and organic farms.

The investees deploy the patient capital (provided by slow money investors) to attain triple bottom outcomes:

- Environmental returns encompass enhanced soil fertility, the ecological impact of organic farming and the reduction in food miles due to the propagation of local food systems.
- Social returns pertain to the socio-economic impact of slow money on small food enterprises, local food systems and organic farmers. The formation of social capital also is considered a social return on investment.
- Financial returns include the returns on investment through the deployment of patient capital.

There is a need for establishing standardized triple bottom-line metrics in the slow money sector. Also, it would be of interest to both sustainable agriculture practitioners and researchers to determine how the slow money movement could benefit farmers in developing countries.

NOTE: This article is based on Jayashankar's study of five U.S. organizations that offer private investment funds for small-scale farmers and local food enterprises practicing sustainable agriculture. The work is outlined in "Slow money in an age of fiduciary capitalism," published in the August 2015 issue of *Ecological Economics*.



Taconic Ridge Farm is a 163-acre farm New York, purchased by Iroquois Valley Farms in 2013 and leased to a young farm family. The couple and three sons moved their organic dairy herd to this farm after renovating the barn, farmhouse and pastures. As part of an ownership transition plan, they have purchased 29 acres and continue to lease the remaining acreage.

[Photo courtesy Iroquois Valley Farms]

Continuing the conversation for Iowa agriculture

By LAURA MILLER, Newsletter editor

She grew up in the rolling hills of southern Iowa. Tagging along with her father, this middle daughter of three learned much as she watched him check sheep and survey his crops. He had just purchased more land and had a large operation by 1950s standards. Yet he used to tell his family that “the land isn’t ours; it’s ours to use and to pass on better than when we got it.”

Now at age 83, Martha Shivvers Skillman recalls those days as if they were yesterday.

“I can remember Daddy saying, there’s got to be a better way to do this,” she said. “And then usually he would go on and just do it, often the first one to try something new on our farm.”

But it’s more than nostalgia that has brought Skillman and her sisters, Charlotte Shivvers and Marietta Shivvers Carr (now deceased), back to Iowa after long and active careers. They want their family’s land cared for in a way that will have long-term sustainability in terms of a farm business, environmental quality, soil productivity and vibrant rural communities.

Martha and Charlotte share strong convictions about caring for the land, akin to Aldo Leopold’s land ethic. They describe it as “a generational thing” that has been passed from their grandparents to their father John, their mother Vera and on to them.

“Our parents didn’t just repeat it from time to time, but it was obvious in the way we saw farming done,” Charlotte said. “My father was a leader in contour farming, terraces, rotating crops, new crops – and I

can remember his joy coming to the side door and calling, ‘Vera, get the girls, come see, the flax is in bloom!’ It was more than a mission to take care of the land; there was joy in it – joy in this relationship with the land.”

With the death of their mother in 1990, the sisters came into responsibility for the land near Knoxville. “We decided at her funeral that we wanted to keep the land together,” Martha says. They formed a partnership, Shivvers Fair Acres, and each sister took a turn as managing partner.

She says there was a lot to learn and do, but the most difficult part was finding a farmer who resonated with their goal of sustainability. Several years ago they began working with Jim Petersen, the son of their first cousin and a great-grandson of their grandparents.

However, the sisters’ conversations about conservation extend well beyond their own land.

Since 1969, the family has sponsored an annual lecture at Iowa State University. It was set up by their mother several years after her husband died from lung cancer at age 68. Although he had never attended Iowa State or even finished grade school, he had a strong relationship with the land-grant university.

“When my father had a problem with sheep, he would turn to Iowa State and – this says so much about the University – when they had questions, they would come down to see him,” Martha recalled. “This lecture was a way for Mother to honor Daddy and spread new ideas and good practices to other farmers.”

 www.leopold.iastate.edu

Shivvers Memorial Lecture
www.leopold.iastate.edu/news/calendar/shivvers

In recent years, the lectures have been coordinated by the Leopold Center. Featured speakers have included authors Wendell Berry and David Mas Masumoto, USDA soil guru Ray Archuleta and World Food Prize laureate Hans Herren. The most recent lecture was presented in April by New York chef and author Dan Barber, talking about how future food production and consumption need to be part of an ecologically-based system.

Martha said a Barber video presented a great example. He described a 27,000-acre sustainable fish farming enterprise in southern Spain with canals and marshes populated by more than 250 bird species as well as aquatic life. The ecosystem is so healthy that sea bass can be harvested judiciously, and no external inputs are required.

“It’s all about relationships, our relationship with each other and with the land,” Martha explained. “I want to know what kind of system could work in a place like Iowa, to support our farmers and rural communities while restoring the ecology of a region.”

She added that this approach is quite similar to her father’s notion that “there’s got to be a better ways.” The sisters with the Leopold Center have decided to change the lecture series with the idea of inviting local farmers to participate in the conversation every other year. They also have asked Martha’s son, John Skillman, a biology professor at California State University, to help carry on the Shivvers Lecture Series.

“We have had some wonderful speakers from a national perspective but we need the farmer’s voice,” Martha said. “We want to hear from people who are doing conservation, not teaching it or consulting about it, but actually bringing something together on their own land for their own use.”



Martha Skillman Shivvers (left) and Charlotte Shivvers oversee an annual lecture on sustainability, something they are seeking for their family’s farm near Knoxville. [Photo by Kathryn Gamble]

PARTNERSHIP CONTINUES

LOCAL FOODS (continued from page 1)

housed in the Leopold Center office suite in Curtiss Hall.

Nearly a year ago, Leopold Center Director Mark Rasmussen began working with John Lawrence, director of ISU Agriculture and Natural Resources Extension and Outreach, to plan a transition for the local foods team. Rasmussen explained that the ongoing mission of the Leopold Center is to develop, grow and promote partnerships that help make Iowa farms profitable and to strengthen the state's rural communities.

"By nurturing these grant-funded projects, they become full-fledged programs to stand alone," Rasmussen said. "The Leopold Center's advisory board and I feel the Local Foods Program is ready to take flight and soar on its own."

Lawrence recognizes this transition as a continued partnership for ISU Extension and Outreach, which is committed to healthy people, environments and economies.

In 2010, the Leopold Center worked with partners and more than 1,000 individuals to create the Iowa Local Food and Farm Plan. The Iowa Legislature in 2011 created the Local Food and Farm Initiative based on that plan and provided funds to hire a coordinator at ISU Extension and Outreach.

"When the Leopold Center began working in local foods, it developed similar principles and partnered with Iowa State," said Lawrence, who also is associate dean in the College of Agriculture and Life Sci-



ences. "It funded research and education of the economic viability of regional food systems and resources on production and food safety for our producers to support food systems in Iowa communities," Lawrence said. ISU Extension and Outreach is committed to continuing these programs across the state.

Chase was hired as Local Food and Farm Program coordinator in 2011. At that time he also became interim leader of the Center's Marketing and Food Systems Initiative.

When asked about the timing of the local foods move from the Leopold Center to Iowa State, Chase explained, "We are responding to an increasing amount of information, technical assistance and programming requests from our clients. Our position in the larger extension network allows us to support an interdisciplinary approach to food systems. The team will seek to promote open and honest conversations, build quality relationships and create safe spaces for all people involved in the local food system. Our work will support community-based learning and decision making, helping Iowans make informed decisions about their health, their businesses and their communities through local foods."

Center editor to retire

In addition to changes in the local foods program, Laura Miller announced her plans to retire on November 6 after more than 17 years at the Leopold Center and 25 years at Iowa State University.

After working as an editor for ISU Extension and Outreach, Miller was hired in 1998 by the Leopold Center to produce its quarterly printed newsletter, *The Leopold Letter*. Her appointment was increased in 2000 to include writing and distributing news releases, working with news media and staffing exhibits. Within the next two years she assumed all duties related to the Center's website.

During Miller's tenure, the Center's website has undergone two renovations, which included moving all Center research reports to online access in 2004. Currently she is working on a third re-design that will make the site more easily viewed on mobile devices. The Center has added three electronic newsletters and maintains a Facebook page with about 3,500 followers.

"It has been a pleasure to work with Laura at the Leopold Center," Rasmussen said. "She possesses a rare combination of knowledge, enthusiasm and a 'nose for news.' Although she will be greatly missed, I wish her well in retirement."

Miller said she is looking forward to spending more time with her four grandchildren and gardening on an acreage outside Ames where she keeps three hives of honeybees. She plans to become more involved in pollinator awareness and education activities.

Resource addresses city zoning issues

A new resource offers practical guidance and sample zoning code language related to local food production and sales, from aquaculture and bees to front-yard gardens, farm stands and food trucks. *Municipal Zoning for Local Foods in Iowa* is a 114-page guidebook produced by Gary Taylor, interim director of the ISU Extension and Outreach Community and Economic Development Program.

The project was funded by a 2014 competitive grant from the Leopold Center's Policy Initiative. Taylor worked with Andrea Vaage, a graduate student in community and regional planning and sustainable agriculture, to collect zoning code language from 84 municipalities across the nation on a variety of urban agriculture activities. Each chapter has science-based information on standards and best practices associated with each activity; public health, safety and welfare concerns; a summary of the commonalities found among municipalities' codes; and



sample code language taken from municipalities that vary both in size and location. Taylor is preparing a similar guidebook on county zoning regulations as part of a 2015 Leopold Center Policy Initiative grant.

The guidebook is available on the Leopold Center website at: www.leopold.iastate.edu/municipal-zoning-for-local-foods

New member joins Leopold Center Advisory Board

It is International Year of Soils this year, so it's only logical that the newest member of the Leopold Center Advisory Board proclaims a love for soil.

"Our soil is one of Iowa's finest resources," says Gail Hickenbottom, who joined the board in June to represent Practical Farmers of Iowa.

Hickenbottom is retired and living in West Des Moines, having taught agricultural education in Illinois for more than 19 years, and then spent 25 years as commodity market analyst for Pioneer. He maintains partial ownership in his family's corn and soybean farm in Fulton County, Illinois.

Concerned about the large number of older farmers in Iowa, Hickenbottom has been active in a PFI program to help rural families transition ownership and management to another generation. Farm transfer and ownership issues – along with soil health – were the focus of PFI's annual meeting in January that Hickenbottom helped plan as PFI treasurer and member of its board of directors.

"Everyone should be concerned with whom land is transferred to, since land is one of our most precious natural resources," he said. "Now, as in the future, the capability of soils will help determine the successes for generations to come. If the land is turned over to the right individuals, a nurturing environment will be produced which will benefit all humanity."

He also sees a big role for the Leopold Center.

"The Leopold Center can have an active role in maintaining the proper

sustainability of agriculture (soil, water, environment and profitability) for years to come through the research it supports," he said. "Agriculture in Iowa is becoming a very diverse combination of farming and agricultural enterprises that may vary greatly in scope. All of this diversity is needed to keep Iowa a strong agricultural state."



Gail Hickenbottom

He said he brings a unique, three-fold perspective to the board: "I was reared on a grain livestock farm, then worked in education and finally finished my professional career in the corporate world. I feel this has given me a great background for brainstorming the ever-

changing agricultural world in which we are living today."

He said he hopes that he can help increase awareness among producers and agribusinesses about new opportunities that may present themselves – in soil conservation, crop rotations and nutrient reduction. "At the same time, we need to focus on the shifting public attitude demands for growing, processing and consuming various products," he added. "There are so many possibilities for food, feed and energy than even 10 years ago."

Hickenbottom has an undergraduate degree in ag education from Western Illinois University and a master's of education from the University of Illinois. He is a lifetime member of PFI and the Seed Savers Exchange, and a member of the Illinois Farm Bureau.

He said he first read Aldo Leopold's *Sand County Almanac* many years ago, but still comes back to it for new ideas.

New service

Beginning in July, the Leopold Center switched from a free public software to a commercial firm to distribute its electronic newsletters. The service, Constant Contact, offers faster delivery, viewing on mobile devices and better security. The Leopold Center distributes three e-newsletters: an electronic version of the quarterly *Leopold Letter*, notices when new research reports are available, and a monthly *Notes* newsletter about ongoing activities at the Leopold Center. To sign up, go to: <http://bit.ly/IDeTWdU>

New accountant has long-time ties to ISU

Kim Vo is the Leopold Center's new administrative specialist. She handles all accounts and budgeting duties for the Center, and has more than 25 years of experience at Iowa State University.

She received a degree in accounting from Iowa State in 1989, beginning a professional career that would lead her to working with University researchers and granting agencies.

Her first position was at the Center for Nondestructive Evaluation shortly after it was established at ISU as a National Science Foundation Industry/University Cooperative Research Center. She worked several years for the ISU Department of Industrial and Manufacturing Systems Engineering, and in 2001 joined the Institute for Social and Behavioral Research (later renamed Survey and Behavioral Research Services) at the ISU Research Park. In 2007, Vo's peers nominated her for the CYtation Award from the ISU Professional and Scientific Council.

When the research services office closed in 2015, the position at the Leopold Center appealed to Vo.

"I've never been in a position where the agency awards the grants, so that aspect of this position has been very interesting," she said. "I like to learn new things."



Kim Vo

We want to hear from you!

Dear Reader,

The Leopold Center is conducting an audit to find out how our readers want to receive this newsletter. Postage costs continue to rise, and we've offered electronic delivery of the *Leopold Letter* since 2004.

If you have subscribed to the *Leopold Letter* newsletter and live in the United States, please complete an online form here: www.leopold.iastate.edu/verify-newsletter-subscription

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Your response will help us keep our mailing lists current. We look forward to hearing from you!

Sincerely,





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Highlight Events

More details, events

Check the Leopold Center web calendar:
www.leopold.iastate.edu/news/calendar

October 8

The first Leopold Center director, Dennis Keeney, will read from his memoirs, *The Keeney Place: A Life in the Heartland*, at the Ames Public Library.

November 6-7

The Leopold Center is a co-sponsor of the Women, Food and Agriculture Network's annual conference in Davenport. The theme is "Women Protecting Pollinators, Protecting Food."

November 19-20

"SOIL: Sustaining Our Iowa Land Legacy," a statewide conference hosted by the Drake University Agricultural Law Center, will look at soil and water conservation policies in Iowa and is supported by a Leopold Center Policy Initiative grant.

November 20-21

The Iowa Farmers Union celebrates its 100th Anniversary Convention at the Airport Holiday Inn in Des Moines. National radio commentator and Texas author Jim Hightower will keynote the event.

November 22-23

The Iowa Organic Conference celebrates its 15th year with the theme, "Celebrating the Biodiversity of Organic Farming: People, Animals, Pollinators and Plants."



Agricultural innovation

Iowa State University water engineer Matt Helmers (left) explains how water is collected and tested at the ISU Agronomy Farm west of Ames. The Leopold Center hosted a two-day meeting of the DuPont Advisory Committee on Agricultural Innovation and Productivity in August. They discussed sustainable agriculture and food systems as they relate to current research, the developing world, size and scale of farm operations, and the food value chain.