



annual report

30
1987-2017
YEARS



LEOPOLD CENTER
FOR SUSTAINABLE AGRICULTURE

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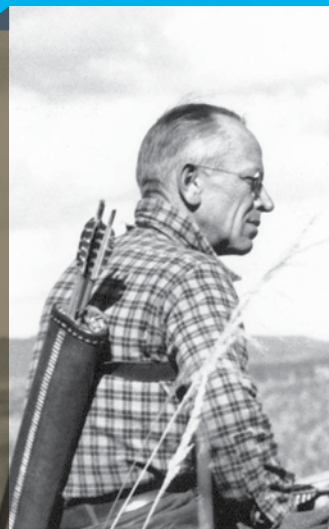
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Aldo Leopold (1887–1948), the conservationist, ecologist and educator for whom the Center was named.



THANK YOU to our friends at julsdesign

Information for this report was compiled by Leopold Center staff with the help of its researchers and educators, who are committed to improving Iowa agriculture and the lives of Iowans.

Written and edited by Mary Adams

Design by julsdesign, Ankeny, Iowa

Photos by Leopold Center staff except where noted.

This edition of the Leopold Center annual report marks two decades since we began our partnership with julsdesign of Ankeny, Iowa. Julie Mangels and her incredibly talented staff (including designers Lindsay, Josh and Beth) have created attractive and compelling publications to highlight the last 20 years of life at the Leopold Center. We are grateful to Juls and the other staff at julsdesign for their superb performance each year, as well as their concern and support. And, we are proud to recommend them wholeheartedly as excellent designers and collaborators.

Mary Adams, Editor

Mission: The Leopold Center was established by the Iowa Legislature as part of the Iowa Groundwater Protection Act of 1987. Its legislatively mandated goals are to identify and reduce negative environmental and socio-economic impacts of agricultural practices, contribute to the development of profitable farming systems that conserve natural resources, and cooperate with Iowa State University Extension to inform the public of new findings.

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seasons

To every thing there is a season and a time
to every purpose under heaven. *Ecclesiastes 3:1*

Spring, 2017. The Leopold Center staff and stakeholders were planning how to honor the Center's 30th anniversary. This would mark three decades since the passage of the Iowa Groundwater Protection Act by a band of bipartisan legislators with foresight, good intentions, and strong environmental principles. Instead, the 2017 Iowa Legislature voted, in the last week of the session, along straight party lines, to defund the Center and eliminate it from the Iowa Code. Then-Governor Terry Branstad on May 12 signed the bills removing all state funding from the Center, but issued a line item veto that preserved the Center's elementary structure. Branstad also had signed the Groundwater Protection Act creating the Leopold Center in 1987.

The three legislators most responsible for the creation of the Center (David Osterberg, Paul Johnson and Ralph Rosenberg) affirmed that they set up a dedicated line of funding for the Center through an Agricultural Management Account and hoped that would ensure its survival. The founders could not have foreseen the actions of the 2017 Iowa legislature and various interest groups, some of which had long resented the Center's mandated focus on finding alternatives and more sustainable options for farmers.

The Center's state funding ended June 30, 2017, which meant that the investigators involved in nearly 50 grant projects at various stages faced considerable uncertainty. This affected their work in the field and the lab, the graduate students whose stipends were to be paid by the grants, the outreach they planned to conduct, the farmers they hoped to reach....the ripples were washing across the state just like the eroded, nitrate-laden soil that clogs Iowa waterways. Ultimately, some projects were transferred to the Iowa Nutrient Research Center, which was the recipient of the \$1.5M in state tax funds that previously had been allotted to the Leopold Center.

The legislation charged the ISU College of Agriculture and Life Sciences with managing the transition or cancellation of Leopold Center grants currently in progress by December 31, 2017. The college also will oversee the termination of staff members and other programs. A modest amount of interest income remains from the Leopold Center Endowment Fund held by the ISU Foundation and this will be used for some remaining levels of project support. Center Director Mark Rasmussen and Distinguished Fellow Fred Kirschenmann will be the only employees retained after the dissolution of the Center's operations.

The last few months have been extremely difficult for all of us who have worked at the Center, served on the advisory board, received support for projects or education, or believed in the Center's study of alternative agricultural practices that were environmentally sound, profitable and meant to make Iowa a healthier place. Organizations (like most things in nature) have life cycles, and winter has come for the Leopold Center.

Mary Adams, Editor, 1996-2017

**2016-2017
LEOPOLD CENTER
ADVISORY BOARD**

DENNIS DAHMS, professor of geography, University of Northern Iowa

BILL EHM, director, Environmental Services Division, Iowa Department of Natural Resources

DALE FARNHAM, State Soil Conservation Committee, Ames

DOUG GRONAU, farmer, Iowa Farm Bureau Federation, Vail (board chair)

GAIL HICKENBOTTOM, Practical Farmers of Iowa, West Des Moines

ERIN IRISH, associate professor of biological sciences, University of Iowa

JODY KERNS, farmer, State Soil Conservation Committee, Edgewood

CATHERINE KLING, professor of economics, Iowa State University

PAUL LASLEY, professor of rural sociology, Iowa State University

AARON HELEY LEHMAN, farmer, Iowa Farmers Union, Polk City

MARC LINDERMAN, associate professor of geography, University of Iowa

MICHAEL NAIG, deputy director, Iowa Department of Agriculture and Land Stewardship

JOHN OLTHOFF, professor of agriculture, Dordt College, Sioux Center

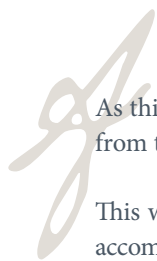
ALICIA ROSBURG, assistant professor of economics, University of Northern Iowa

KEITH SUMMERVILLE, Deputy Provost, and associate professor of environmental science and policy, Drake University, Des Moines

U. SUNDAY TIM, professor of agricultural and biosystems engineering, Iowa State University

No representative was designated by the Agribusiness Association of Iowa.

PERSEVERANCE



As this era of the Leopold Center comes to a close, I want to share some observations from the past year.

This was a time when we thought we would be celebrating three decades of scientific accomplishments and leadership in sharing information with Iowans — all made possible by the Center's investments. Instead, that celebration is muted because we face uncertainty and stand on the edge of an unknown future.

We expected our celebration to be a remembrance of Aldo Leopold's "Land Ethic." A concept based on respect, rationality and understanding, and a reminder that our place in the natural world requires restraint, discipline and limitations. Although he was referring to his own time, the patient values that Leopold sought to instill continue to compete against the urge for immediate gratification in our era.

Leopold's message may seem unfashionable and out of place in today's world. It struggles to be heard above the din and turmoil that surround us. Leopold once said: "Everybody worried about getting his share; nobody worried about doing his bit." This statement links his era and ours.

We live in a time that often seems dominated by self-interest, misinformation, anxiety, and mistrust. Sociologists describe such behavior with the term "base instincts." These emotions impact all of us including our neighbors, our leaders, our rural and urban communities and consumers everywhere. It is an unfortunate reflection of the society that we live in at the present time.

How does the Leopold Center fit in such a time? I have had some time to think about the Center's mission and future recently. My best response is that we move forward with persistence, perseverance and dedication. Persistence to keep moving forward when some ask, "What's the point." Perseverance to remain true to the mission of sustainability in spite of the challenges. And, finally, dedication to continue the journey even when the destination seems so far away.

Even though the center will no longer operate in the same mode it has for the last three decades, the needs it was intended to serve in 1987 still exist and need to be addressed. Iowa's soil and water still need protection and revitalization, farmers still need new production and marketing options and researchers still need the ability to investigate innovative ideas and provide science-based information that has the potential to advance sustainability in Iowa.

The season of failure is the best time for sowing
the seeds of success. ~Paramahansa Yogananda

That is where the Leopold Center stands as we close out FY2017. I want to publicly thank the staff of the Leopold Center, both present and past. Their dedication and hard work over the years on behalf of the Center and its mission have not been given the credit deserved. I also want to extend gratitude to the faculty members, scientists, farmer-cooperators, graduate students and others who have supported the Center for the past 30 years. Everyone's commitment to innovation and discovery has yielded many important results.

In the coming months, Doug Gronau, a member of the Center's advisory board, and I will co-chair a Visioning Task Force that will be collecting ideas on how the Leopold Center can move forward. We will hold several public listening sessions in various parts of Iowa, and prepare a report on what we hear and learn.

As Director, I will continue to do my best with the resources that remain. Center-related projects will be supported to a limited extent using funds available. We will continue financial support of the H.A. Wallace Endowed Chair for Sustainable Agriculture and the ISU Graduate Program in Sustainable Agriculture. We will seek out new avenues for external funding support. Other worthy opportunities in keeping with the center's mission may come up as we move forward.

Personally, I will spend more time conducting research projects as part of my faculty-based appointment because I value this work for its importance to agriculture and the public interest. Among these projects are studies on soil carbonate/climate, nitrate/health, pesticide-drift tracing technology, and new analytical methods for milk.

Just as when one season turns to another, and we watch for the changes in nature, the Leopold Center awaits its next chapter. We will keep in mind Leopold's admonition to "enhance to the capacity of the self-renewal of the biotic community." The principles behind Aldo Leopold's "land ethic" will remain a perennial touchstone of inspiration and encouragement, and worthy for not only agriculture, but for the rest of society. Please stay tuned and keep in touch.

Mark Rasmussen
Director



**2016-2017
LEOPOLD CENTER
PROFESSIONAL STAFF**

MARK RASMUSSEN
Director

FREDERICK KIRSCHENMANN*
Distinguished Fellow

MARY ADAMS
Outreach and Policy Coordinator

CAROL BROWN
Communications Specialist

CRAIG CHASE*
Marketing and Food Systems
Program Manager

PRIYANKA JAYASHANKAR*
Research Associate

BLUE MAAS
Secretary

MALCOLM ROBERTSON*
Cross-Cutting and Ecology Initiatives
Coordination and Outreach

KIM VO
Administrative Specialist

**part-time or shared appointment*

FINANCES

FOR THE YEARS ENDED APRIL 30, 2017 AND JUNE 30, 2016

The format of the financial statements in this annual report reflects the on-going efforts for more transparency begun in prior years. The state Agriculture Management Account (AMA) receipts are presented on an accrual basis and the Competitive Grants and Grant Infrastructure funds expended include only the cash paid out during the year (not the amount awarded).

COMPETITIVE GRANTS AWARDED BY INITIATIVE (FIRST YEAR TOTALS ONLY)

	2017	2016
Ecology	\$166,428	\$294,942
Policy	64,414	37,500
Marketing	150,795	111,261
Cross-Cutting (XP)	271,134	152,000
Total	\$652,771	\$595,703

	2017 (10 mos)	2016 (12 mos)
FUNDS RECEIVED		
State AMA Receipts	\$2,080,559	\$1,393,960
ISU Allocations	411,173	432,562
Foundation Funds	208,481	212,215
External Grants Activity	0	(168)
Incentive/Discretionary Accounts	0	2,981
TOTAL FUNDS RECEIVED	2,700,213	2,041,550
FUNDS EXPENDED		
Personnel	626,836	782,131
Operations	99,490	121,790
Competitive Grants & Grant Infrastructure:		
Ecology Initiative	315,624	228,188
Policy Initiative	70,046	95,935
Marketing Initiative	143,792	170,536
Cross-Cutting Initiative	164,548	133,412
Special Commitments	5,524	1,894
Monthly Competitive Education Program	9,475	9,540
Total Competitive Grants & Grant Infrastructure	709,009	639,505
Foundation Accounts	164,529	181,799
TOTAL FUNDS EXPENDED	1,599,864	1,725,225
INCREASE/(DECREASE) IN FUNDS	1,100,349	316,325
FUNDS, BEGINNING OF YEAR	2,908,108 (*)	1,986,325
FUNDS, END OF YEAR BEFORE ADJUSTMENT		
Adjusted AMA Revenue:	\$4,008,457	\$2,302,650
The 1st Quarter payment of FY17 was received on 06/28/2016. It was not included in FY16 and it was added to the beginning of FY17	(608,957)	608,957
FUNDS, END OF YEAR AFTER ADJUSTMENT	3,399,500 (*)	2,911,607

(*) 2,911,607 - 2,908,108 = 3,499 belonged to Local Foods Team and was removed at the end of FY2016



	FY2013	FY2014	FY2015	FY2016	FY2017 (10+ mos)
PROGRAMS					
Active Grants	81	114	98	76	69
New grants	40	35	17	20	22
Number of Pre-proposals	54	48	56	40	55
Active working groups	10	10	10	12	4
Iowa counties with active projects	47	47	45	40	99
Principal investigators	64	76	74	50	51
OUTREACH					
Publications (papers, books, etc.)	73	74	58	60	49
Website unique visitors (monthly average)	6483	7043	7250	5297*	3510
Website activity (monthly average) *	18773	19046	18250	14706*	7843
ISU Digital Repository downloads (May and June 2016) *				2477*	15,364
Educational events	164	253	138	147	155
FINANCES					
Funds received					
Ag Mgmt Acct (AMA) revenue (accrual)	\$1.291M	\$1.722M	\$1.922 M	\$1.394 M	\$2.081M
State appropriations revenue	\$430,927.00	\$431,682.00	\$432,335.00	\$432,562.00	\$411,173.00
Gift revenue	\$191,749.00	\$199,596.00	\$209,588.00	\$212,215.00	\$208,481.00
Staff Leveraged external grants	9,649.00	\$17,007.00	\$54,678.00	\$0.00	\$0.00
Funds expended					
Center staff and operations	\$889,792.00	\$956,637.00	\$928,057.00	\$903,921.00	\$726,326.00
Competitive grants	\$885,309.00	\$1,220,332.00	\$482,438.00	\$587,862.00	\$657,584.00
Strategic investments	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Program infrastructure	\$54,421.00	\$113,504.00	\$86,457.00	\$80,676.00	\$87,878.00
Other					
Reported leveraged funds by LC projects	\$5.2M	\$5.7M	\$5.3M	\$3.3M	\$2.7M
CENTER STATS					
Employees	13	14	14	8	7
Interns/students	4	4	3	3	0

* New website went live May 20, 2016, moving archived material to the ISU Parks Library Digital Repository. Archived documents include completed grant reports, publications and papers, annual reports and quarterly newsletters. Downloads indicate a total of all categories from May 20-June 30, since the new site went live.

EVENTFUL 2017 AT THE LEOPOLD CENTER

Between July 1, 2016 and April 30, 2017, the Leopold Center sponsored several events celebrating the many good things achieved in sustainable agriculture.

The 2016 **SPENCER AWARD FOR SUSTAINABLE AGRICULTURE** was given to a southwest Iowa farm couple, David and Corinne Williams, and to a USDA-ARS researcher, Tom Kaspar. The Williamses have been heavily involved in conservation and environmental activities in the state. David helped found the Iowa Environmental Council, served on numerous board and committees and was engaged with work of the Cattlemen's Association, while Corrine was active in the community and school district. Kaspar has been a longtime, passionate proponent of cover crops. He first studied cover crops in the early 1990s through a Leopold Center grant and continued to research and promote cover crops in the years since. The joint award was presented at the Iowa Water Conference in Ames on March 23, 2017.

The 2017 **SHIVERS MEMORIAL LECTURE** was framed as a commemoration of the 30th anniversary of the Leopold Center's founding. The three former legislators, who served as "godfathers" of the Groundwater Protection Act bill, came together on a panel where they discussed the past, present and future of the Leopold Center on March 28 at ISU. Ralph Rosenberg, David Osterberg and Paul Johnson have retained their keen interest and passion for Iowa's environmental health and the event gave them a chance to reminisce and offer their collective wisdom on the current situation of environmental health in the United States and Iowa.

AMES READS LEOPOLD, the annual opportunity to draw in the community to read portions of Aldo Leopold's classic *A Sand County Almanac*, was held April 30 at the Ames Public Library. Citizens of all stripes turned out to read selections from Leopold's seminal collection of essays and a recent article assessing the land ethic's place in contemporary conservation thinking. Readers included an agronomy professor, a city council member, an ornithologist, and an Ames High School ecology teacher and his charming eight-year-old daughter. Jeri Neal, former longtime Leopold Center staff member, assisted with the coordination for this community-wide event by the Ames Public Library.



*Top Photo: 2016 Spencer Award Ceremony. Corrine Williams (L), Elaine Spencer (Center), David Williams (R)
Middle Photo: Gail Hickenbottom (L), Spencer Award winner Tom Kaspar (R)
Bottom: 2017 Shivers Lecture panel. Ralph Rosenberg (L), David Osterberg (Center), Paul Johnson (R).*

Mike Todd and his daughter read "A Sand County Almanac."





SPECIAL IOWA EVENTS WITH LEOPOLD CENTER SPONSORSHIP IN 2017

The Leopold Center funded a Competitive Educational Support Program (CESP) to provide modest support (up to \$1,000) for Iowa educational events not covered under the competitive grants program. Communications specialist Carol Brown managed the CESP with input from a review committee.

Here are the events that the Center assisted during FY2017:

SUMMER 2016:

SEED SAVERS EXCHANGE ANNUAL SUMMER CONFERENCE AND CAMPOUT. Experts and amateurs in the world of gardening and seed stewardship convened in Decorah. Workshops were held on seed saving, gardening, sustainable agriculture, healthy food and preserving biodiversity.

IOWA STATE FAIR HEIRLOOM VEGETABLE DIVISION CONTEST. The Leopold Center continues to support this interesting and educational event at the Iowa State Fair.

LOCAL FOODS FESTIVAL, ISU, Ames. The ISU Extension Local Foods Team hosted the second annual local foods festival on the ISU campus for students, faculty and staff, and the community to connect consumers and growers in Story County.

FALL 2016:

LOCAL FOOD CYCLE. The third annual bicycle tour consisted of 10 stops in Story and Boone Counties including a produce farm, a conventional farm using cover crops and a CREP wetland and other conservation practices, a microbrewery, greenhouse, and a state park.

VETERANS IN AGRICULTURE ANNUAL CONFERENCE,

Ames. The Leopold Center staffed a display table at this conference to let veterans know of sustainable practices they could incorporate into their farming operations, as well as to provide information on rental agreements with landlords, all based on previous research sponsored by the Center.

DR. ROBERT WALLACE, author of *Big Farms Make Big Flu*. Wallace spoke to students and the public at Ames Public Library; coordinated by the ISU Graduate Program in Sustainable Agriculture.

WOMEN, FOOD AND AG NETWORK ANNUAL

CONFERENCE. The CESP grant helped provide scholarships for women to attend this informative event. A Leopold Center exhibit contained materials on sustainable farming practices developed through the Center's research projects.

NORTHEAST IOWA DAIRY TOUR.

The two-day tour, sponsored by ISU Extension and the Northeast Iowa Dairy Foundation, visited dairies in Iowa and Wisconsin. Diverse dairying methods and ways to operate sustainably were on display for tour goers.

Two Seasons, it is said, exist — The Summer of the Just, And this
of Ours, diversified With Prospect, and with Frost ~Emily Dickinson

Ethnic Market & "Vang" Play



SUSTAINABLE IOWA LAND TRUST (SILT) ANNUAL DINNER. The CESP grant funded scholarships for young farmers and students to attend the annual dinner and landowner recognition event. They were able to network with landowners, policymakers, activists, and others with the common goal of protecting land to grow healthy food.

WINTER 2017:

IOWA FORAGE AND GRASSLANDS CONFERENCE. Graziers, beef producers, ISU Extension field staff and agribusiness representatives attended to learn about improved grazing management and protecting soil and water for successful ruminant production. The Iowa Forage and Grasslands Council and the Iowa Beef Center sponsored this annual conference.

PRACTICAL FARMERS OF IOWA ANNUAL CONFERENCE. This PFI conference offered 53 sessions for nearly 900 farmers. With topics ranging from ways to conserve soil and water, to sound record keeping, to marketing their crops, attendees learned from one another as well as from experts in the industry.

IOWA SMALL FARMS CONFERENCE. The second annual conference focused on smaller producers who are looking for the most efficient ways to be successful. Topics covered included niche pork, alternative energy sources such as solar and wind, establishing windbreaks, cover crops and more. ISU Extension and Outreach Small Farms Program hosted this conference.

ETHNIC MARKET AND "VANG" PLAY. Ethnic Minorities of Burma Advocacy Resource Center (EMBARC) and the University of Northern Iowa-Center for Energy and Environmental Education sponsored an eight-week workshop to connect women refugees of Burma to local farmers markets. The series culminated with a Community Producers' Market and presentation of the play "Vang," at the Waterloo Center for the Arts.

SPRING 2017:

2017 PIERRE SOIL SCIENCE LECTURE. The ISU Agronomy department's annual Pierre Soil Science Lecture featured David Myrold, professor of crop and soil science at Oregon State University. He spoke about recent investigations of nitrogen cycling in soil. He also met with ISU faculty and staff as well as staff at USDA-ARS National Laboratory for Agriculture and the Environment.

PRACTICAL FARMERS OF IOWA 2017 FIELD DAYS. The PFI field days began in early June and run through November all across Iowa. Topics covered included grazing, cover crops, grafting and pruning of fruit trees, CSAs, goat production, and more.



WALLACE CHAIR FOR SUSTAINABLE AGRICULTURE ENCOURAGES GRADUATE RESEARCH



The Leopold Center and the U.S. Department of Agriculture have provided support for a long-term experiment at the ISU Marsden Farm that has investigated the effects of adding oats, red clover, and alfalfa to corn-soybean rotations.

Courtesy: David N. Sundberg

The Henry A. Wallace Chair for Sustainable Agriculture, currently held by ISU Agronomy professor Matt Liebman, received \$20,000 of support from the Leopold Center in FY2017.

Funding from the Leopold Center during the past year contributed to the support of a graduate student, Ms. Huong Nguyen, who completed an M.S. degree in Sustainable Agriculture. Her thesis project focused on weed dynamics in conventional and more diverse crop rotation systems managed with full rates or reduced amounts of herbicides. Expenses covered by the funding included salary (stipend) and associated benefits. Nguyen is continuing her graduate work at Iowa State University and currently is developing a Ph.D. project focused on the management of multiple herbicide resistance in weed populations through cropping system diversification.

Additional funding from this Leopold Center account supported a portion of the salary and benefits of an Agricultural Specialist in Dr. Liebman's research group who conducted field activities (planting, harvesting, soil and biomass sampling) and lab analyses for the Marsden Farm and Comparison of Biofuel Systems (COBS) research projects.

Liebman's research, teaching, and outreach activities focus on ways to use ecological processes to create farming systems that are productive, profitable, resilient, and environmentally sound. His specific interests include comparisons of different crop rotation and crop management systems; weed ecology and management; and the use of native perennial species for soil and water conservation and biofuel production. He is a team member of three cropping systems projects in central Iowa: the Marsden Farm rotation experiment, the Science-based Trials of Row-crops Integrated with Prairie Strips (STRIPS) experiment, and the COBS experiment.

SUSTAINABLE AGRICULTURE STUDENTS PURSUE VARIED STUDY PATHS



Maritza Pierre

Leopold Center funding has supported the ISU Graduate Program in Sustainable Agriculture (GPSA) since it was established in 2003. Matthew O'Neal, ISU entomology professor, serves as the faculty administrator for the program, and Angela Stone is the program coordinator.

In FY2017, Leopold Center financial assistance funded portions of several GPSA research assistantships. Some of the recipients of those grant awards describe their work:

GUANG HAN

Ph.D. in Sustainable Agriculture (Agricultural Education and Studies)

Agriculture is more than crop and livestock production; people are the center of agricultural activities. My research, focused on human behaviors in agriculture, included two research projects and one outreach project this year. My major professor, Robert Martin, and I developed an operationalized framework of agricultural literacy. This framework helps agricultural educators and advocates develop more effective public agricultural educational programming. The second project is a hybrid of rural sociology and agricultural education. Through interviews and surveys, I am trying to identify factors that drive conventional grain farmers to convert to organic farming systems. The outcomes of this project will provide guidelines for ISU Extension and other agricultural organizations to develop organic agriculture educational programs and inform conventional grain farmers on how to convert to organic operation. This project also aims to improve the supply of organic grain. I also worked with the CenUSA Bioenergy team on its STEM education product: the C6 BioFarm curriculum and game. I took the curriculum and game to the National Bioenergy Day event where we offered students experiential learning activities regarding renewable carbon.

MARITZA PIERRE

M.S./MCRP in Sustainable Agriculture (Community and Regional Planning)

My research focuses on agroforestry adoption in Haiti with a gendered perspective. The possible value of agroforestry appealed me as a Haitian citizen. It has the potential to alleviate desertification and erosion endemic in a country where half of the population's livelihood is linked directly to agriculture. My work explores the relationships among gender, farmers' attitudes, and agroforestry adoption using Haiti as a case study. I am interested in answering the following question: How do farmers' attitudes (towards themselves, their community, the environment, and agroforestry practices) affect agroforestry adoption and how does gender shape those attitudes? My objectives are to: a) understand how gender influences farmers' attitudes and agroforestry adoption in the country, b) map the decision-making processes leading to adoption of agroforestry by gender, and c) inform policy on gender-sensitive approaches favorable to agroforestry adoption. I spent this past academic year (2016-2017) developing my research proposal. I will travel to Haiti to conduct interviews in summer 2017.



Guang Han

ADAM WRIGHT

M.S. in Sustainable Agriculture (Journalism and Mass Communication)

After completing an MFA in Creative Writing and Environment at Iowa State last year, I pursued a second graduate degree in Sustainable Agriculture to research methods (such as art, journalism, and other modes of storytelling) by which food issues are communicated. Although I understand the importance of relaying new information regarding technology, policy, and profitability to farmers and consumers, I also believe that we must craft stories that offer solutions to industrial agriculture and its ties to social and environmental justice issues. My thesis centered on an original children's play, "Magically Modified Grimm's." It aims to spark meaningful dialogue about food among adults and children. My thesis also included chapters about Iowa's agricultural education system and science communication in the "post-truth" era. With generous funding from the ISU Focus: Artist Grant Program, I was able to collaborate with a director, seven actors, and six designers from the Story County Theatre and ISU Theatre Department to premiere "Magically Modified Grimm's" at the Ames Public Library on April 8-9, 2017. Set in the world of 21st Century agriculture, the comedic fairy tale mash-up follows Jack, Goldilocks, Hansel and Gretel as they grow "magically gigantified orbs" sold to them by the mysterious Mr. Wolfe. We also presented the play at Colo-NESCO Community School on May 12, where I worked with a group of sixth-grade students who wrote their own stories related to fairy tales, agriculture, and healthy eating.

Two other GPSA students who received support from the Leopold Center, Ivan Gaikowski and Morgan Bradley, were M.S./MCRP candidates in Sustainable Agriculture and Community and Regional Planning.



Adam Wright

Ah, when to the heart of man
Was it ever less than a treason

To go with the drift of things,
To yield with a grace to reason,

And bow and accept the end
Of a love or a season?

~Robert Frost





IOWA LEARNING FARMS USES CENTER FUNDING FOR YOUTH CONSERVATION EDUCATION

Whatever you do, do it with all your might. Work at it, early and late, in season and out of season, not leaving a stone unturned, and never deferring for a single hour that which can be done just as well now. ~P. T. Barnum

College students like Hannah Corey, a junior in agronomy from Lake City, IA, gain hands-on experience with field research related to cover crops, soil health and water quality as part of their internship.



Iowa Learning Farms (ILF) and Water Rocks! (WR!) engaged with a record number of Iowans on water, soil, and conservation issues. A \$25,000 grant from the Leopold Center for Sustainable Agriculture helped to match federal and state funding sources for the Iowa Learning Farms and Water Rocks! programs in FY2017, as well as contributing to the youth and community outreach efforts conducted by ILF and WR! across the state.

The team received a 2016 Iowa Governor's Environmental Excellence Award in Environmental Education, the East Pottawattamie Soil & Water Conservation District Soil and Water Conservation Education Award, and an Iowa State University Professional and Scientific Council Cytation Team Award.

Among the activities that benefitted from Leopold Center funding were:

YOUTH OUTREACH (CLASSROOM VISITS AND NEW SCHOOL ASSEMBLIES)

The Water Rocks! team continues to offer its very popular classroom visits to schools across the state, inspiring the next generation to think about, care about, and act towards protecting the state's water and soil resources. In order to help meet the increasing demand for these youth outreach programs, the interactive Water Rocks! School Assemblies were launched in October 2016. Targeting grades K-8, these assemblies use music, plays and audience participation to engage students with watersheds and water quality concepts — a great option to reach multiple classrooms, even multiple grades, at one time. Leopold Center funds were used to get the new assemblies "up and running" this year, including printing of educational signs, posters, banners, promotional swag for youth peer mentors, and take-home educational materials for teachers. Over the course of 2016, the Water Rocks! team conducted a total of 119 youth education events (including classroom visits and WR! assemblies), reaching 15,324 young people across Iowa.

TEACHER OUTREACH (PROFESSIONAL DEVELOPMENT SUMMIT WORKSHOPS)

Three professional development Water Rocks! Summits were held in 2016, targeting teachers as well as extension and environmental educators. Each Water Rocks! Summit included a mix of knowledge-building for the teachers along with numerous hands-on activities, videos, songs, and instructions for how to target these lessons to students of different ages. Attendees also had the opportunity to enhance their technical understanding of agricultural and environmental issues with a field tour of multiple conservation-related agricultural sites around central Iowa. ISU faculty guest speakers presented on the big picture of climate change and soil erosion.



Rock Your Watershed! game online.



Students with ILF Rainfall Simulator.

With seed funding from the North Central Region Water Network, the Water Rocks! Multi-State Youth Water Education Summit was held at ISU on November 1-2, 2016. Twenty-one extension service and environmental educators from Iowa, Missouri, Nebraska and South Dakota came together for this unique professional development workshop. Leopold Center funds provided for facilities rentals, meals, and materials for the take-home Water Rocks! activity kits for the three Summit workshops held in 2016.

STUDENT INTERNSHIPS

Student interns are at the heart of Iowa Learning Farms and Water Rocks! operations during the summer months, assisting with community and youth outreach efforts across the state. The Water Resources Internship Program offers amazing work experience to exceptional college and high school students interested in water, soil, agriculture, and the environment. This builds ILF/WR! program capacity for additional youth and community outreach, helping to enhance STEM and environmental literacy statewide. Leopold Center funds paid for four high school summer interns as well as a portion for one college summer intern in the program.

COMMUNITY OUTREACH

ILF/WR! outreach efforts are not limited to youth outreach events. The team visits county fairs, community festivals, farmers markets, and other events across the state, as well as spending 11 days at the Iowa State Fair educating citizens about critical water quality and soil health issues. Many of these outreach events also include one of the three Conservation Station trailers, with the trailer fleet collectively traveling 18,000-24,000 miles annually. Leopold Center funds supported the Conservation Station trailer maintenance and upkeep, printing of educational signs and banners, as well as consumables for various games. During 2016, the Water Rocks! team participated in 59 community outreach events, reaching 16,137 people across the state.

VIDEO AND ELECTRONIC OUTREACH

Water Rocks! takes a multi-faceted approach to its outreach efforts, including but not limited to music videos, educational PSAs, and an interactive web-based game called Rock Your Watershed!. Leopold Center funds helped to support these outreach efforts by covering video production expenses and web development fees for the new version of the Rock Your Watershed! game.



College interns Amanda Marlin and Hannah Corey spent the summer traveling across the state of Iowa delivering hands-on, engaging conservation-based outreach at county fairs, festivals, farmers markets and more.



ECOLOGY INITIATIVE STAYS FOCUSED ON CORE ECOLOGICAL RESEARCH

GRANTS COMPLETED IN FY2017:

DEVELOPMENT OF FIELD MOBILE SOIL NITRATE SENSOR TECHNOLOGY

David Laird and Natalia Rogovska, ISU agronomy; Chein-Ping Chiou and Leonard Bond, ISU Center for Nondestructive Evaluation

The PIs sought to develop a robust and rapid spectroscopic soil NO_3^- sensor system to be attached to a fertilizer applicator and used to measure soil NO_3^- status, allowing the operator to modulate N fertilizer application rates in real time. Such a sensor system would facilitate precision sidedress N fertilizer applications based on the established late-spring nitrate test protocols. It would replace the need for hand sampling and delayed laboratory analysis of soil NO_3^- status with on-the-go real time sensing.

The results of this study demonstrated that the sensor technology is capable of measuring nitrate concentrations in moist field soils in less than one second. The results also demonstrated that the sensor is accurate enough to facilitate precision N fertilizer management in corn fields. A new startup company has been formed to explore commercialization of the sensor technology.

WINTER RYE COVER CROP EFFECT ON CORN SEEDLING PATHOGENS

Tom Kaspar and Tom Moorman, USDA-ARS, National Laboratory for Agriculture and the Environment, Ames

Farmers have seen evidence that cereal rye cover crops occasionally cause yield decreases in a following corn crop but the reason for this decrease is not fully understood. One possible explanation is that the decrease may stem from corn seedling root pathogens that originate from the roots of dying rye cover crop plants sprayed with glyphosate shortly before corn planting.

The project team provided new insights into the effects of rye cover crops on the following corn crop. The PIs found corn seedling pathogens on rye roots that could infect corn seedling roots. They noted that other cover crop species like winter canola or hairy vetch did not cause as much infection of corn seedling roots as rye did. They also found that spraying a rye cover crop with glyphosate 10 to 14 days before corn planting could reduce the risk of corn seedling root infections following a rye cover crop. These findings point the way to more effective management tools or strategies for cover crops.

The Ecology Initiative concluded its first full year under the leadership of Malcolm Robertson. During this transition year, the initiative remained focused on its core areas of soil and water research:

SOIL: with a primary focus on soil health and systems; knowledge and practices that positively affect the self-renewing capacity of soil.

WATER: with a primary focus on water quality, hydrology, use and management.



INTEGRATING PROJECT KNOWLEDGE AND MODELS: THE NEXT STEP IN DEVELOPING A PAYMENT FOR ECOSYSTEM SERVICES SCHEME FOR THE BIG CREEK WATERSHED

Lisa A. Schulte, ISU natural resource ecology and management

Payment for Ecosystem Services (PES) schemes provide the social infrastructure to formalize an existing relationship between watershed level ecosystem service providers (farmers) and ecosystem service beneficiaries (e.g., local and/or regional surface and ground water users, watershed recreationalists, regional wildlife enthusiasts). The core idea of PES is a mechanism that allows downstream ecosystem service beneficiaries to make direct, contractual, and/or conditional payments to landowners/farmers in return for adopting land use practices that secure desired/demanded and measurable ecosystem service outputs.

The investigators explored development of an effective and enduring PES framework in Iowa and evaluated the potential of a spatially targeted PES approach to enhance water quality in the Big Creek watershed in central Iowa. This watershed is an ideal Iowa location because of the proximity of ecosystem service providers (farmers) to a large number of beneficiaries (water users).

The PIs suggest that significant reductions (i.e., 48 percent) in nitrate loss at the watershed level can be achieved through coordinated placement of conservation practices on high contributing parcels (i.e., 2 percent of acres), resulting in relatively high ecosystem service outcomes (i.e., enhanced water quality for recreation, drinking, and aquatic life achieved at a relatively low economic cost. Iowa Department of Agriculture and Land Stewardship staff are employing project results to help spatially identify and prioritize conservation efforts in Big Creek Watershed. The impetus for this research reflects increasing social demand for a broader suite of ecosystem service outcomes from the agricultural landscape.

A time to be reaping,
a time to be sowing.
The green leaves of summer
are calling me home.
It was good to be young then
in the season of plenty

~ The Brothers Four

MARKETING AND FOOD SYSTEMS INITIATIVE SUPPORTS FOOD RESEARCH AND OUTREACH



Craig Chase directed the Marketing and Food Systems Initiative (MFSI) in FY2017, with support from the Local Foods Team (LFT). The Local Foods work became part of Iowa State University Extension and Outreach in October 2015 while the MFSI remained as part of the Leopold Center research portfolio. Chase, who has a partial appointment with the Leopold Center, coordinates MFSI research with LFT activities.

LFT members included Carrie Chennault, Chelsea Krist, Arlene Enderton, Hannah Fisher, Lynn Heuss, Kayla Koether, Courtney Long, Leigh Rigby-Adcock, Caitlin Szymanski, Alice Topaloff, and Teresa Wiemerslage. All are supported by ISU Extension, federal, state and local grants and contracts rather than Leopold Center funds.

IOWA HORTICULTURE SURVEY COMPLETED

The Iowa Department of Agriculture and Land Stewardship, in partnership with the Local Foods Program at Iowa State University Extension and Outreach, released the Iowa Commercial Horticulture Survey in May 2017. The survey, which uses data from the 2015 growing season, is the first comprehensive statewide look at Iowa horticulture in more than a decade. Local Foods Program evaluator Arlene Enderton had worked on an earlier horticulture survey and acted as the lead in collecting and analyzing the data.

Researchers surveyed 882 horticulture producers across the state. Results showed that Iowa's horticulture industry generated more than \$48 million in direct sales in 2015, with an additional \$32 million in value-added commerce. The most popular crops grown in 2015 were tomatoes, pumpkins, cucumbers, green beans and winter squash. Melon production had declined since the last survey, while grape production significantly increased.

Financial and in-kind contributions from the Iowa Farm Bureau Federation, ISU Extension and Outreach, the Leopold Center for Sustainable Agriculture, the Iowa Farmers Market Association and the Iowa Fruit and Vegetable Growers Association made the survey possible. Additional input for the survey came from Eat Greater Des Moines and Practical Farmers of Iowa.

WORKING GROUPS CONTINUE TO THRIVE

The two statewide working groups facilitated by the Local Foods Program continued to provide strategic direction and professional development opportunities to food hub managers and local food practitioners around the state. The Regional Food Systems Working Group (RFSWG), with direction from a diverse steering committee, continued to hold quarterly meetings with discussions and learning opportunities around farm to school programs, policy education, diversity and inclusion and other topics.

The Food Hub Managers Working Group is a new collaboration between the Local Foods Program and Iowa Valley Resource Conservation and Development. A growing number of food hubs have formed in Iowa over the past few years. These aggregators and distributors of local food vary in their size, geographical area and marketing strategies, but they are key pillars and players in local food system development. They are relatively new; Iowa food hubs have been operating less than 10 years. The quarterly working group gatherings give Iowa's food hub staff opportunities to learn from each other, share best practices, see each other's facilities and systems and collaborate on projects.



Staff field day: Members of the Local Foods Program staff take part in the summer 2016 RFSWG field day.

After 20 years as a corn, soy and cattle producer, Chris French of southwest Iowa "retired" to grow tomatoes. Last year, his greenhouses produced a ton a week, delivered to grocery stores within a 60-mile radius.



GRANTS COMPLETED IN FY2017:

INCREASING THE CAPACITY OF A LOCAL FOOD HUB TO SERVICE THE PUBLIC SCHOOL MARKET

Teresa Wiemerslage, ISU Extension and Outreach, Waukon

The Northeast Iowa Food and Fitness Initiative has a seven-year history of supporting rural school districts with their Farm to School efforts. This project leveraged the momentum built in school classrooms, gardens and cafeterias to increase local food purchases by schools. Funds were used to provide assistance to schools to procure local products, create weekly delivery routes and investigate costs to provide minimally processed food items for schools. Four school districts served as pilots for this grant; however, the services and products developed were offered to any school district that chose to participate.

In two years of the project, Iowa Food Hub made over 220 deliveries to schools. The pilot schools increased their purchases from \$10,451 to \$52,401. Data suggests that access to a local food hub contributed to the increase. A similar result was observed across the region. Local food purchases by schools in the six counties increased from \$20,236 to \$71,761.

INCREASING LOCAL FOOD CONSUMPTION IN RURAL COMMUNITIES BY PARTNERING WITH NON-TRADITIONAL FOOD RETAILERS

Nick Mabe/Georgia Windhorst, Allamakee New Beginnings (dba Iowa Food Hub), West Union

Many rural communities do not have grocery stores. Residents in those communities may need to travel 15 miles or more to find a store where fresh food is available. However, some of these rural communities may have other businesses that might be willing to be a sales outlet for local products. This project provided food hub staff time to develop and manage these alternative sites, investment in refrigerated coolers and displays at these sites, and creative marketing strategies to attract and retain new customers. Working with non-traditional retailers requires creativity, innovation and local partners to assist with customer recruitment and sales. These partnerships can help meet food access objectives in a community, but will not be major revenue streams for food hubs.

SMALL-FARM BUSINESS DEVELOPMENT INCUBATOR FOR REFUGEE FARMERS

Nicholas Wuertz, Lutheran Services in Iowa (LSI), Des Moines

Many of the newest groups of refugees being resettled in Iowa were farmers, hailing from the rural areas and farming communities of Burma, Burundi, Rwanda and Bhutan. They farmed sustainably in their home countries and show a strong desire to farm in Iowa. Over the last six years, Lutheran Services in Iowa (LSI) has worked with a wide array of community partners, volunteers, and individuals from the refugee community to help make their desire to return to the land a reality.

Individuals or programs engaged in helping refugee farmers start small farm businesses need training to help farmers find what markets suit them and what is feasible for their families. Language and cultural barriers still present obstacles for farmer connections with outside parties who are willing to help. There needs to be a significant amount of relationship building and in-person time among staff, farmers and other networks; training must continue to be adapted to farmers' needs and levels of experience.



Meskwaki tribal members cut squash from their farm for a harvest meal as part of the Meskwaki Food Sovereignty Initiative.

LATINO GROCERIES IN THE RURAL MIDWEST: AN EXAMINATION OF FOOD SECURITY, CULTURAL IDENTITY, AND ECONOMIES

Lisa Bates, ISU Community and Economic Development

Researchers examined existing relationships in three rural communities between grocery store (tienda) owners, local food producers, and economic development specialists. Special attention was given to the existing and potential barriers and opportunities for stores to carry locally grown produce. The research uncovered the three components necessary for success and support of new business ventures: access to a customer base, community promotion and awareness, and availability of product — these existed in relative isolation from one another. None of the stores surveyed had staff dedicated to maintaining, stocking, and marketing produce; there was limited on-site storage and the aesthetic and taste profiles of the produce that make up Mexican and Central American cuisines are culturally specific. The research findings demonstrate an opportunity for further relationship development between tiendas and local food producers to increase the availability of locally grown fruits and vegetables.



POLICY INITIATIVE CONTINUES COLLABORATION WITH DRAKE AGRICULTURAL LAW CENTER

The Leopold Center's Policy Initiative supports research on local, state or regional policies that affect the sustainability of natural resources and Iowa agriculture. Initiative activities were managed by Mary Adams, outreach and policy coordinator.

SPECIAL PROJECTS WITH POLICY INITIATIVE BACKING

"Iowa Landowners Legal Guide," Neil Hamilton, Drake University Agricultural Law Center, \$9,700. Drake staff produced educational materials related to the landowners guide to help Iowa landowners and their advisors and to enhance partnerships with other organizations using resources from the SALT project.

SALT Initiative Policy Project (videos), \$19,000. Neil Hamilton and Kent Newman, a Des Moines filmmaker, developed a series of films to accompany the "Iowa Landowners Legal Guide." The first three videos are "Fence Law and Straying Animals," "Water Law" and "10 Basic Principles of Iowa Property Law."

SUSTAINABLE AGRICULTURAL LAND TENURE (SALT) INITIATIVE

The Sustainable Agricultural Land Tenure (SALT) Initiative is a long-running joint project of the Leopold Center and the Drake University Agricultural Law Center in Des Moines. SALT uses a variety of tactics to educate landowners, farmers, their advisors and policy makers on sustainable land tenure arrangements and conducts research on developing land tenure issues that affect Iowa's sustainability and resilience. Leopold Center support for SALT has been provided through previous strategic investments, competitive grants and Policy Initiative infrastructure funds.

Drake's Law School collaborated with Harvard Law School to host a national Food Law Student Leadership Summit at Drake on September 30-October 2, 2016. Conservation policy and a farm tour to the Jackson family farm in Mahaska County were part of this summit. Visiting students had the chance to experience the type and scale of farming and food production found in Iowa <http://www.drake.edu/law/about/news/index.php?article=16926>

Sustaining Our Land 2017. The Drake University Agricultural Law Center hosted this conference on July 27, 2017. It was intended to educate landowners about conservation and stewardship. The Leopold Center was a sponsor of the event.

"Earth Friendly Agriculture for Soil, Water, and Climate: A Multijurisdictional Cooperative Approach" appeared in the *Drake Journal of Agricultural Law*. Co-authors are Todd Edwards and Matt Russell. The article featured findings from the SALT team projects.

PROJECTS COMPLETED IN 2017:

EVALUATING HOW PRIVATE CONSERVATION INITIATIVES MAY INCREASE FARMER ADOPTION OF CONSERVATION PRACTICES

Neil Hamilton and Matt Russell, Drake University Agricultural Law Center, Des Moines

The Private Conservation Initiative (PCI) is a relatively new tactic to encourage landowners and their tenants to consider changing or adding to their conservation toolbox. This project took a closer look at the availability, mechanics, and potential effects of PCIs in Iowa. The project leaders identified a series of decision points for farmers when entering agreements with private conservation providers. The project also identified both costs and benefits for farmers to consider. The implications of PCI regarding federal farm conservation programs will be particularly important as Congress develops the 2018 Farm Bill.





CROSS-CUTTING INITIATIVE RESEARCH FOCUSED ON LANDSCAPE-LEVEL ADOPTION

WATERSHED STORIES: GRASSROOTS EFFORTS IN IOWA'S RACCOON RIVER WATERSHED

*Betty Wells, ISU sociology and Angie
Carter, Michigan Technological University,
Houghton, MI*

Women farmland owners in Iowa's Raccoon River watershed were engaged in a community-based project using PhotoVoice, a participatory research method, to take photos and tell the stories of how those photos show their connection to the watershed. This participatory approach to water quality conversations was an effective method of engagement, and contributed to a sustained dialogue. The photographers and PIs organized an ongoing series of exhibits around Iowa. They continue to engage in conversation with media, community members, and one another about water quality in their watershed. This demonstrates effectiveness in building community among the participants and inspiring project ownership.

Systems agriculture and research results that can be adopted readily at the farm level remain a key part of the Cross-Cutting Initiative focus under the leadership of program coordinator Malcolm Robertson. He believes that knowledge gained through the initiative's research and demonstration projects and then transferred to the Iowa farms and landscape is key to the success of Leopold Center mission. The Cross-Cutting Initiative specifically concentrated on:

INTEGRATED FARMING SYSTEMS: projects investigating crop-livestock production systems (mixed or integrated farming systems) designed to demonstrate improvements to the quality of soil, water, air, wildlife habitat and the landscape.

ENERGY: projects related to the production and utilization of energy in agriculture and food production.

LIVESTOCK SYSTEMS: projects examining livestock enterprises, nutrition, grazing, housing and other practices used in livestock husbandry.

GRANTS COMPLETED IN FY2017:

BUDGETING FOR ORGANIC DAIRYING

Larry Tranel, ISU Extension and Outreach, Dubuque

Over the past 10 to 15 years, organic agriculture has grown rapidly. Milk production plants accepting and processing organic milk have seen the increased consumer demand and cited a need to raise organic production. The PI for this project pointed to one major milk cooperative where both organic milk sales and dairy producers have averaged double-digit growth annually for the past 12 years, an indication that organic dairy production is here to stay.

This project aimed to create sound financial management resources for Iowa's organic dairy industry to better solidify its successes. These resources are similar to those available for conventional dairy production and included financial budgets for different management and herd structures along with factsheets

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and presentations for use by producers and industry. The budgets also are an important part of an enterprise analysis, which helps to allocate the limited resources of land, labor, and capital of an operation to specific enterprises to determine its profitability and contribution to the whole operation. These new ISU budgets can act as a benchmark for average enterprises in Iowa, comparison between system types or production levels, or analysis for current or future planning.

The budgets are now available on the ISU Extension Dairy Team website for public use and are promoted through the e-newsletter and mailed newsletter to all dairy producers in the state of Iowa. Furthermore, these budgets will be used by ISU Extension personnel to help individual producers make a decision to begin or transition to an organic dairy operation. See the budgets on the web at <http://www.extension.iastate.edu/dairyteam/content/iowa-dairy-budgets>

ENERGY MANAGEMENT FOR AGRICULTURAL PRODUCTION

Mark Hanna, ISU agricultural and biosystems engineering


Part of the answer for the long-term sustainability of current agricultural production systems is more efficient energy consumption at the farm level. Fluctuating energy prices or distribution issues in the global marketplace can affect Iowa farm profits, but at the same time can motivate farmers to consider more on-farm energy management if improved strategies are available. The implementation of energy management practices allows farmers to maintain productivity while minimizing consumption of fossil fuels and adoption of improved energy management techniques will support Iowa's sustainable farming practices in the long run.

The PI collected and presented practical information on solar photovoltaic (PV) energy systems suited for the Iowa farmer. The project examined the adoption of solar PV for agricultural energy given that the costs of distributed solar PV energy have declined to the point where payback frequently occurs in 10 to 15 years or less (at times < 5 years) depending on circumstances. Iowa farmers have shown an interest in this opportunity now that it has become more affordable, but questions arise on how to assess economics, placement of panels, reliability, safety, insurance, whether to participate in a "group" solar garden or on-site installation on the farm, etc. Information is available on general commercial business use, but this project assembled data explaining the details of an investment for farm solar systems.

The case study featured the experience of a southeast Iowa Extension livestock specialist in adopting solar PV for his farm operation. The specialist, who had a couple of years of experience with his on-farm solar generation system, carefully evaluated factors from the PV project. A second publication alerted potential solar PV adopters on important items to consider when deciding whether to invest in solar PV adoption. Topics include how to assess current electrical use and potential for payback, whether to install on-the-farm or offset farm electricity by participating in a group solar project, roof or land installation of solar panels, buy back potential and tax impacts.

Two ISU Extension bulletins that used information from this grant are online at <https://store.extension.iastate.edu/>

- 1) A case study of solar PV development on an Iowa farm (PM3063F).
- 2) Pro and con factors for development of solar capacity on Iowa farms (PM2089Y).



If we had no winter,
the spring would not
be so pleasant; if we
did not sometimes
taste of adversity,
prosperity would
not be so welcome.

~Anne Bradstreet

CENTER COMPETITIVE GRANTS PROGRAM FY2017

The Leopold Center funded a wide variety of research, education and demonstration projects aimed at increasing the sustainability of Iowa agriculture. Projects were selected after a competitive process including a Request for Pre-proposals (RFP) in June, multiple reviews and assessment of full proposals submitted in November and awarding of funds in January.

2017 Leopold Center Grant and Demonstration Projects



Following the Iowa state government's defunding of the Center in May 2017, some of the existing projects were transferred to the Iowa Nutrient Research Center for completion. Some projects slated to finish their activities at the end of 2017 were allowed to complete their work, and others were cancelled. **Four of the cancelled projects will be completed using alternative funds.**

ECOLOGY INITIATIVE

Bio-based antibacterial seed treatments to improve soil and plant health, 2 years

R. Cademartiri, ISU chemical and biological engineering, materials science and engineering; S. Goggi, ISU agronomy

Bacteriophages are viruses that attach to specific receptors on the surface of bacteria. This specificity means a bacteriophage can infect only certain receptors to which they can bind, allowing them to target and destroy harmful bacteria and not beneficial bacteria. This project will test the efficiency and survivability of bacteriophages when combined with common polymers used for seed treatments. **Ending in 2017.**

Blurring the lines between working and conservation lands: Enhancing bird and pollinator habitat using prairie strips, 3 years

L. Schulte Moore and M. Harris, ISU natural resource ecology and management
This project will look at bird and pollinator response to prairie strips planted on commercial farm fields: for the farmland area converted, do the prairie strips actually provide a measurable, positive bird and pollinator response? Data on bird response will be collected via autonomous recording units, auditory and visual bird surveys, and nest searching and monitoring. Bee species richness and diversity data will be collected using pan traps, blue vane traps and sweep netting. Partners include the Des Moines Water Works, ISU Research and Demonstration Farms, the USDA Farm Service Agency, Whiterock Conservancy and 16 private farmers who are implementing prairie strips on their land. **Transferred to Iowa Nutrient Research Center.**

Building the soil immune system: Do cover crops increase soil health and resistance to climate change? 2 years

M. McDaniel, ISU agronomy
This research project will provide added knowledge of how cover crops affect soil health and resistance to climate change disturbances including freezing-thawing and drying-wetting cycles, and will engage Iowa farmers in the scientific process. The project will determine if cover crops are universally beneficial to soil health and yield, investigate if adding a cover crop makes soils more resistant to extreme climate events, and test a new, cheaper and more scientifically robust soil health indicator. **Transferred to Iowa Nutrient Research Center.**

Does increasing landscape diversity in farmed closed depressions (potholes) increase profitability and ecosystems services? 2 years

A. Kaleita, M. Soupier, ISU agricultural and biosystems engineering;
A. Van Looke, E. Heaton, ISU agronomy
Within the Prairie Pothole Region of the upper Midwest, there are a significant number of farmed wetlands and drained potholes. This project aims to stimulate farmer consideration of "retiring" farmed potholes into land cover that both improves water quality and saves money. The

project will measure key pothole and plant production metrics, and model pothole hydrology and productivity comparisons of farmed vs. perennial cover. **Transferred to Iowa Nutrient Research Center.**

Impacts of landscape and on-farm diversity on the abundance and health of bee pollinators, 3 years

A. Toth and A. Dolezal, ISU ecology, evolution and organismal biology; M. O'Neal and E. Hodgson, ISU entomology



The goal of this project is to understand better how agricultural landscape diversity and approaches to pest management affect the health of native bees and other pollinators. The experiment considers bee health in the context of landscape diversity, examining bees in both conventional row-crop systems

and farms growing fruit and vegetables for Community Supported Agriculture (CSA) enterprises. **Ending in 2017.**

Improving soil health and water quality through better soil phosphorus assessment and management practices, 2 years

A. Mallarino, ISU agronomy and M. Helmers, ISU agricultural and biosystems engineering

This research assesses the value of no-tillage and subsurface-banded applications of phosphorus fertilizer, especially as they relate to surface runoff. The information can improve soil test recommendations for farmers. **Completed June 30, 2017.**

Improving soil health and water quality through better soil phosphorus assessment and management practices, 2 years

A. Mallarino, ISU agronomy and M. Helmers, ISU agricultural and biosystems engineering

This project is a continuation of the study to assess soil health, sustainability of the corn-soybean rotation, and risk of water quality impairment by phosphorus. It will provide science-based information to develop better guidelines to improve water quality and help stakeholders understand how soil P assessments in soil health tools relate to existing methods currently recommended in Iowa for crop production and assessment of risk for phosphorus loss. **Transferred to Iowa Nutrient Research Center.**

Integrating rye seed production and red clover cover into corn systems and nitrogen management, 3 years

J. Sawyer and A. Mallarino, ISU agronomy

This project will focus on a cropping system that can incorporate three important nitrogen reduction practices: cover crop, longer rotation/ small grains, and nitrogen rate. Specific objectives are to determine the nitrogen fertilization rate for cereal rye seed production, effect of under-sown red clover on the rye optimal N rate requirement, impact of red clover cover crop on corn optimal N fertilization requirement and yield, and influence of the cropping system on soil nitrate-N. **Transferred to Iowa Nutrient Research Center.**

Investigation of bacterial community structure and antibiotic resistance and genetic mobility gene abundance in soils fertilized with swine manure, 1 year

S. Hinsa-Leasure, biology, Grinnell College, Grinnell



The spread of antibiotic resistance from concentrated animal feeding operations (CAFOs) to soil, crops, and waterways is an issue of concern in agriculture. Working with a local swine farmer, the researcher will build on previous work, studying *E.coli* levels in soil fertilized with swine manure, quantifying the amounts of seven antibiotic-resistant genes in manure and soil samples, pre- and post-manure application. **Transferred to Iowa Nutrient Research Center.**

Micro-algae-based fertilizer for nitrogen and phosphorus loss reduction, 2 years

D. Jarboe, ISU Center for Crops Utilization and Research; D. Grewell, ISU agricultural and biosystems engineering; J. Schrader, ISU horticulture; Z. Wen, ISU food science and human nutrition; A. Mallarino and J. Sawyer, ISU agronomy

The grant will develop new bio-based, slow-release fertilizers that use microalgae produced from wastewater treatment systems. The researchers will produce algae feedstock using municipal and industrial wastewater, then formulate and manufacture fertilizer pellets composed of various levels of algae biomass, biochar, and polylactic acid (PLA). Lab testing will evaluate the nutrient release characteristics. **Transferred to Iowa Nutrient Research Center.**

Prairie contour strips: Demonstrating the importance of custom seed mix for biological integrity, 2 years

L. Jackson, Tallgrass Prairie Center, University of

Northern Iowa, Cedar Falls
This project seeks to create a community of practice among prairie

restoration specialists, technical service providers, landowners and land managers focused on prairie contour strips. Through its Prairies on Farm Project, the Tallgrass Prairie Center hopes this network can establish demonstration sites on farms and develop educational materials, including an online seed mix calculator, that will lead to broader use of prairie and prairie contour strips. **Completed June 30, 2017.**

Prairie pothole soils: Hotspots of nitrogen losses from Iowa agricultural landscapes? 2 years

S. J. Hall, ISU ecology, evolution and organismal biology

This research project expands ongoing work to examine how nitrate leaching and nitrous oxide emissions vary from well-drained upland soils to poorly-drained pothole depressions under three different land cover types: conventional corn-soybean cultivation, *Miscanthus* (a perennial grass), and the Conservation Reserve Program (CRP) mixed perennial vegetation. The researchers will test to see whether 1) potholes represent hotspots of nitrous oxide emissions and nitrate leaching and 2) potholes with perennial *Miscanthus* or CRP vegetation will lower nitrate leaching and nitrous oxide emissions. **Transferred to Iowa Nutrient Research Center.**

Quantifying nitrogen credits and impacts of cover crops on soil biology and health in vegetable cropping systems in Iowa, 1 year

A. Nair, ISU horticulture extension; K. Delate, ISU horticulture and agronomy; C. Bregendahl, Annandale, MN; G. Artz, ISU economics



The study will collect data on cover crop nitrogen credits, nitrogen scavenging capacity, biomass generation capability, weed suppression properties and effects on soil quality and health in vegetable cropping systems. It will survey traditional crops (cereal rye, oats) and nontraditional cover crops (brassicas, mustards, peas, clovers, etc.). Cost-benefit analyses and

enterprise budgets will be created for different cover crop types. **Completed. Final report due.**

Scaling up the use of native perennial vegetation for water quality and landscape diversity, 3 years

A. Kittle and L. Jackson, Tallgrass Prairie Center, University of Northern Iowa, Cedar Falls

This research project will measurably increase the understanding and capabilities of conservation professionals and producers involved with planting prairie on farms. This will be done through demonstration sites designed for teaching, two field days per year, production and dissemination of technical information tailored to the needs of an agricultural audience, expansion of the use of the Iowa Prairie Seed Calculator, and creation of a working group involved in prairie restoration on farms. **Transferred to Iowa Nutrient Research Center.**

Soil health in biofuel cropping systems, 3 years

M. Thompson, M. Liebman, ISU agronomy; M. Helmers, ISU agricultural and biosystems engineering

This project explores the impacts of both annual and perennial feedstock production systems on soil health, and whether soil health tests will help producers to make better management decisions that promote both crop production and sustainable landscapes. This research will take place at the Comparison of Biofuel Cropping Systems (COBS) site at Iowa State University, which is designed to compare lignocellulosic biomass production and environmental impacts for continuous corn grown for grain and stover. **Transferred to Iowa Nutrient Research Center.**

What will it take to restore organic matter to Iowa's soils? 3 years

R. Dietzel, S. Archontoulis, and M. Liebman, ISU agronomy

High levels of soil organic matter (SOM) in Iowa soils have made it one of the most resilient and productive regions in the world. There are many strategies aimed at restoring SOM in Iowa, but science's fundamental understanding of SOM dynamics is inadequate for designing agricultural systems that will contribute to SOM levels. Through modeling and actual test plots, this project aims to expand basic understanding of organic matter in Iowa. **Transferred to Iowa Nutrient Research Center.**

MARKETING AND FOOD SYSTEMS INITIATIVE

Agricultural Urbanism Toolkit, Years 2+3, 2 years

N. Anderson, ISU Extension and Outreach; C. Rogers and C. Long, ISU Community Design Laboratory
This project will expand use of the Agricultural Urbanism Toolkit created in 2014. Team members worked in three Iowa communities – Cedar Rapids, Cresco and Des Moines – in a one-year strategic planning process to understand and create a holistic food system that connects urban, rural, local and regional efforts to promote food accessibility in each community. The team will continue to work with the three pilot communities and establish the program in three new Iowa communities. **Completed. Final report due.**

Building producer capacity for institutional food distribution, 2 years

J. Huegerich, University of Northern Iowa, Cedar Falls



Investigators will plan and develop a series of workshops to build the capacity of Cedar Valley producers to supply institutional markets in the region such as the University of Northern Iowa, supermarkets and a new Cedar Falls food co-op. The workshops will cover price negotiations, identifying crops, online ordering systems, food safety training, business planning and management. They hope to engage Burmese refugees with agrarian backgrounds who have settled in the region and have expressed interest in farm business development. **Ending in 2017.**

Fresh innovation: Testing fresh processed products to increase food hub to school sales, 1 year

G. Windhorst, Allamakee New Beginnings dba Iowa Food Hub, West Union
This project builds upon several previous studies that have allowed schools to begin purchases of local foods. This new venture would make

it possible for school to purchase more local produce, and for preschools to start farm-to-school programs and/or make small, fledgling farm-to-school programs robust. Project goals are to: 1) create a pilot program for early childhood facilities to provide free, lightly processed snacks to their classrooms on a weekly basis during the fall semester; 2) sell snack bags to a local school for use in the Fresh Fruit and Vegetable Snack Program; and 3) offer lightly processed products for sale to schools for salad bars and a la carte options. **Ending in 2017.**

Investigating feasibility of food hub node expansion in Dubuque, 1 year

G. Windhorst, Allamakee New Beginnings dba Iowa Food Hub, West Union
Food hub nodes are small cold storage facilities managed remotely by a larger food hub. This project proposes using the Iowa Food Hub infrastructure and sales platforms to enhance rural-urban partnerships, testing the concept of a food hub node in order to increase food hub development, and increase markets for locally produced food. **Ended June 30, 2017.**

Iowa Kitchen Connect: Empowering, connecting, and training Iowa's food entrepreneurs, 2 years

J. Grimm, Iowa Valley Resource Conservation and Development, Amana
Iowa Valley RC&D will oversee this project of expanding Iowa City Kitchen Connect into a statewide initiative called Iowa Kitchen Connect. Additionally, the group will establish a food business curriculum and training for start-up food businesses, and will empower and inform Iowa food entrepreneurs. **Cancelled.**

Latino groceries in the rural Midwest: Connecting tiendas to Iowa local food producers to amplify retail markets, 2 years

J. Wolseth, ISU Extension and Outreach
The project will increase the Latino grocery stores' capacity to serve as producer and/or marketer of local produce, pilot a program to build relationships between local food producers and tienda owners to increase availability and purchasing of local foods, and increase local food producer capacity to supply tienda produce needs. **Cancelled.**

Online training modules and professional development: A national certification program for local food leaders, 2 years

G. Taylor, ISU community and regional planning and ISU Extension and Outreach; C. Long and L. Huess, ISU Extension and Outreach Local Food Team
The project team will develop an Iowa Local Food Leader certification program that will assist new and existing local food practitioners in the development of core competencies needed for food systems development in Iowa. The certification program will include both online modules and an in-person training component developed in partnership with the findings from the North American Food Systems Network, in hopes that it will become a transferable program to surrounding states. **Cancelled.**

Reducing challenges for Iowa's beginning farmers through partnerships with Iowa financial experts, 2 years

S. Worley, S. Carlson, Practical Farmers of Iowa, Ames



This project will enable researchers to complete programming to meet the goals including: workshops on farm financials, help beginning farmers complete business plans and facilitate reviews of these plans, organize one-on-one consultations between beginning farmers and experts, hold webinars covering financial and business education, and publish educational materials. **Ending in 2017.**

Region 9 Virtual Market, 2 years

J. Huegerich, UNI Local Food Program, Center for Energy and Environmental Education, Cedar Falls
This project will launch an on-line ordering system in Region 9 (Black Hawk, Bremer, Buchanan, Butler, Grundy, and Tama counties) to increase commerce around locally grown foods primarily for institutional buyers and producers who wish to supply them on a more regular basis.

The virtual market allows buyers to place orders, make payments, and arrange for delivery/pickup by both parties. All producers and buyers in Region 9 can participate. **Cancelled.**

Supply chain development in northern Iowa, 2 years

M. Mahaffey, Opportunity Village, Clear Lake
Opportunity Village is a nonprofit agency in Clear Lake providing services to Iowans with disabilities, including the creation of community-integrated employment opportunities. The project will research supply chain development to improve utilization of locally grown food. Key aspects will be investigating existing local assets and participants and learning from other regional food hubs; developing a business plan for cooperation among growers, agencies and organizations; experimenting with light processing methods; and assessing feasibility and design of a working commercial space for food aggregation, processing, storage and delivery. **Cancelled.**

Supply chain management for Iowa regional food systems, 2 years

C. Krejci, ISU industrial and manufacturing systems engineering, A. Shaw, ISU food science and human nutrition
Investigators will work with two food hubs in Iowa and one logistics provider to apply supply chain management and food safety principles and methodologies to their operations. Partners include the Iowa Food Hub in Decorah, the Iowa Food Cooperative in Des Moines and FarmTable Procurement based in Harlan, Iowa. They will analyze inbound and outbound logistics and aggregation/staging activities to maintain food safety and quality and increase efficiency. **Completed. Final report due.**

Workflow optimization for Iowa regional food hubs, 2 years

C. Krejci, M. Dorneich, R. Stone, ISU industrial and manufacturing systems engineering
This project will develop and implement a strategic operations management and workflow plan. It will improve the effectiveness of a regional food hub's operations, the efficiency of regional food hubs distribution centers, and the satisfaction of employees and customers of regional food hubs. **Ending in 2017.**

POLICY INITIATIVE

Promoting improved water quality from Iowa farms: Opportunities for leveraging public resources to engage more Iowa farmers and landowners in water quality protection, 1 year

N. Hamilton, J. Zwagerman, M. Russell, Drake University Agricultural Law Center, Des Moines

The project's goal is to create the "Guide on how to improve water quality on Iowa farms" for farmers and landowners to use public programs to improve water quality and promote soil health. The guide will focus on farmers' and landowners' needs and experiences. The researchers will identify current on-farm conservation practices with a water quality impact offered by key agencies and private partner funders. They will document how farmers and landowners are encouraged to use these practices through financial incentives in programs such as EQIP and CSP. **Transferred to Iowa Nutrient Research Center.**

Reducing local regulatory barriers to local foods Phase 2: Local foods and county zoning project, 1 year

G. Taylor, ISU community and regional planning

The investigator will develop a guidebook for county officials in Iowa covering county zoning and land use regulations as they relate to agritourism, on-site processing and sales, event marketing and other activities that may be associated with local market farms. The guidebook will review legal issues associated with the agricultural exemption and its implications for county zoning codes and practices. **Completed. Final report due.**

Who will own Iowa's farmland? A comparative study of farmland owners, tenure, and succession in Iowa, 1 year

W. Zhang and A. Plastina, ISU economics

As part of the Iowa Farmland Ownership and Tenure Survey, the project will allow the researchers to develop sections of the survey to understand operating and non-operating landowners' current land ownership structure, tenant selection, leasing relationships and more. The information collected will provide useful baseline and needed resources to help entering and exiting farmers

make informed decisions about farmland ownership and control. The reports could also help shape agricultural policy discussions for beginning farmers and ranchers, farmland succession, and conservation. **Transferred to Iowa Nutrient Research Center.**

CROSS-CUTTING INITIATIVE

Attracting pollinators and natural enemies to add value to Iowa agriculture, 3 years

M. O'Neal and D. Lewis, ISU entomology; M. Gleason, ISU plant pathology and microbiology; C. Haynes, ISU horticulture and agriculture education; A. Joseph, Iowa Department of Agriculture and Land Stewardship; and M. Duffy, ISU economics

The investigators are developing an outreach program to show Iowa stakeholders how they can increase the ecosystem services of wild pollinators and natural pest enemies. They will implement a paired-comparison experiment on five ISU farms throughout the state to test the hypothesis that adding a refuge of perennial plants attractive to beneficial insects will improve the delivery of ecosystem services to soybean and melon production. They will calculate a partial budget to isolate the effects of the beneficial insects-enhancement treatment on the value of the marketable harvest of muskmelon and soybean. **Completed. Final report due.**

Climate change adaptation in grassland agroecosystems, 3 years

D. Debinski, ISU ecology, evolution and organismal biology; C. Anderson, ISU agronomy; H. Feng, economics, Michigan State University, East Lansing; J. Miller, natural resources and environmental sciences, University of Illinois, Urbana-Champaign

The researchers seek to engage landowners and land managers to protect grassland and biodiversity through development of climate change adaptation strategies in the Grand River Grasslands (southern Iowa and northern Missouri). Researchers will identify priorities for the conservation of grassland ecosystems, identify the vulnerability to climate change of a suite of plant species, identify options that land managers can take now to prepare for future climate conditions, and

evaluate these options with landowners and land managers to determine which options are most socially and economically feasible to implement. **Cancelled; to be completed with alternative funds.**

Enhancing the value of cover crops through utilization by beef stocker cattle, 3 years

D. Loy, ISU animal science;

E. Lundy and R. Vittetoe,

ISU Extension and Outreach

The objective of this project is to develop, evaluate, and disseminate best management practices for the integration of cereal rye cover crop into crop and livestock systems. This will increase forage resource usage, improve environmental quality, and provide a sustainable economic incentive to add increased value to cover crops through cattle.

Transferred to Iowa Nutrient Research Center.

Evaluating performance and feeding sustainability of corn genetic traits, 3 years

M. Licht, ISU agronomy, H.

Ramirez, ISU animal science



This project aims to generate information to guide crop and cattle production recommendations and add resiliency for sustainable integrated crop and cattle production operations. Using two genetic hybrids of corn in replicated plots, researchers will measure insect and disease severity, root and stalk lodging, grain moisture, yield and grain composition. They also will evaluate feedstock suitability and preference with varying levels of transgenic inclusion. **Cancelled.**

Further investigation of winter canola (*Brassica napus*) in order to enhance the sustainability of crop rotations in Iowa, 3 years

M. Wiedenhoef, ISU agronomy

Previous projects studying the potential for winter canola yielded two key questions about the crop's future in Iowa. This project was to examine 1) how winter canola can be

planted in early September in order to enhance winter survival without planting extremely short-seasoned soybean and 2) how canola varieties that have greater yield and profit possibilities can be grown. **To be completed with alternative funds.**

How does soil health differ between perennial and annual cropping systems across contrasting nitrogen fertilization treatments? 2 years

A. Keiser, ISU ecology, evolution and organismal biology

This research project will examine plant-soil feedbacks on soil carbon by determining the allocation of plant-derived carbon to plant, soil and microbial pools across cropping systems, nitrogen fertilization inputs, and site fertility. The results will inform stakeholders through multiple outlets and programming, and improve agro-ecosystem models used by the scientific community to understand ecosystem function. **Transferred to Iowa Nutrient Research Center.**

Impacts of contrasting rotation systems and weed management regimes on weed dynamics and agroecosystem health, 3 years

M. Liebman, ISU agronomy;

A. Johanns, ISU Extension and

Outreach, Osage; J. Hill,

University of Minnesota-St. Paul

This project uses data from a 22-acre cropping systems experiment at the ISU Marsden Farm to investigate differences in crop yields, soil properties, pathogen dynamics, agrichemical and energy use, production costs and net returns and selected ecological impacts. The plots compare three diverse crop rotations. It will provide new knowledge about weed seed bank dynamics and how herbicide regimes affect fossil energy inputs, greenhouse gas emissions, ozone formation and factors in Life Cycle Assessment (LCA). **Transferred to Iowa Nutrient Research Center.**

Impacts of cropping system diversity and input reduction on greenhouse gas mitigation, soil and water quality, and economic performance of Iowa grain systems, 3 years

K. Delate, ISU horticulture and

agronomy; C. Cambardella,

USDA-ARS National Laboratory for

Agriculture and the Environment,

Ames; A. Johanns, ISU Extension

and Outreach, Osage

The goal of this project is to achieve a systems-level understanding of the

relationships among agronomic practices, carbon and nitrogen cycling, soil function, and the provision of ecosystem services in agricultural systems. This project uses two well-established experiment sites: the Long-Term Agroecological Research (LTAR) Experiment, established in 1998 in Greenfield, and the USDA-ARS Organic Water Quality (OWQ) site, Boone, in its fifth year. **Transferred to Iowa Nutrient Research Center.**

Improving economic sustainability of beef cow enterprises in the Midwest by mitigating tall fescue-related heat stress and determining the value of shade in grazing systems, 2 years

P. Gunn, J. Russell, ISU animal science; S. Ensley, ISU veterinary science; H. J. Sellers, ISU Extension and Outreach Beef Specialist
This project will determine the impact of tall fescue concentration, endophyte infection, alkaloid concentrations, and shade presence on economic and production efficiency in pasture-based beef cow-calf systems. The project will be conducted on 10 cow-calf operations in south-central Iowa with varying proportions of tall fescue as well as available shade. **Cancelled.**

Innovative Conservation Agriculture, 3 years

S. Berges, Allamakee Soil and Water Conservation District, Waukon
Farmers in Allamakee County will learn from this project about the benefits of cover crops, extended rotations using small grains, and no-till, especially on acres that have had manure application, in order to reduce nutrient and soil loss as well as improve soil health. Through educational efforts such as field days, one-on-one exchange, demonstration sites, signage, and news articles, farmers in the area will have various means to learn about conservation farming practices in order to adopt them on their farmland. **To be continued to completion.**

Linking soil and water quality with crop performance across a continuum of tillage and management strategies, Years 2 and 3, 2 years

K. Delate, ISU agronomy and horticulture; C. Cambardella and M. Bakker, USDA-ARS National Laboratory for Agriculture and the Environment, Ames; A. Johanns, ISU Extension and Outreach, Osage
This project uses established experiments, each with a unique crop

rotation and management history, to look at long-term impacts of changes in soil microbiology on soil health. The three sites are the Long-Term Agroecological Research (LTAR) Experiment established in 1998 near Greenfield, the USDA-ARS Organic Water Quality site on the ISU Agronomy Research Farm in Boone County in its third year, and the Organic Reduced-Tillage site in its seventh year, also on the ISU Agronomy Farm. Additional soil and water samples will be collected as part of this grant and Best Management Practices guides will be produced based on research results. **Ended June 30, 2017.**

Long-term assessment of miscanthus productivity and sustainability (LAMPS), 2 years

E. Heaton, N. Boersma, and C. Bonin, ISU agronomy; I. Anderson, University of Iowa



This new research program, the Long-term Assessment of Miscanthus Productivity and Sustainability (LAMPS), builds on work by the University of Iowa's Biomass Partnership Project. The UI 2020 goal of 40 percent renewable energy could be met by burning sustainably produced biomass with fossil fuels in the University's power plant. Investigators plan to establish miscanthus fields at sites in northwest and central Iowa, in addition to the initial 15-acre field near Iowa City in southeastern Iowa. **Cancelled; to be completed with alternative funds.**

Maximizing conservation and return of investment on farms in the Turkey River watershed, 1 year

R. Eversizer, Northeast Iowa RC&D, Postville; A. Kiel, Iowa Soybean Association
The Northeast Iowa RC&D and the Iowa Soybean Association are partnering to encourage farmers in the Turkey River watershed to use best management practices for soil and water conservation that will maximize their return on investment. This project will encourage producers to incorporate practices in

the plan to help the TRWMA reduce floods and increase water quality. **Transferred to Iowa Nutrient Research Center.**

Optimizing nutrient management for Iowa hop production, 3 years

D. Cochran and B. Takle, ISU horticulture
While hop production is feasible in Iowa, more information is needed to ensure it is done sustainably. The overall objective of this project is to promote sustainable hop production in Iowa by improving nitrogen use efficiency and decreasing the potential for nitrogen leaching. The specific research objectives are to evaluate the effect of nitrogen levels on health, performance, and yield of *Humulus lupululus* var. *lupuloides* 'Cascade' hop plants; and determine the effect of select forms of nitrogen (urea, calcium nitrate and a urea ammonium nitrate) fertilizer on growth and yield of 'Cascade' hop plants. **Cancelled; To be completed with alternative funds.**

Precision cover crop seeding with existing planting equipment, 3 years

R. Wolf, Iowa Soybean Association
This project centers on using a different method for seeding cover crops, evaluating how it is different from other seeding methods through on-farm research demonstrations, and sharing these results directly with farmers. The project will explore the use of corn and soybean planters to seed a cereal rye cover crop. The main crop of corn or soybeans will be planted offset from the cover crop row using GPS guidance to reduce interference with seed placement or negatively affect early growth, particularly for corn. The project will compare narrow cover crop row spacing, no cover, and surface broadcast seeding methods. Along with crop yield, additional data will be collected on rye biomass, plant population, growth stage, soil nitrate and ammonium, ground cover, and corn stalk nitrate tests. **Transferred to Iowa Nutrient Research Center.**

Promotion of the continued development of beginning beekeepers, 1 year

D. Bajema, agriculture, Dordt College, Sioux Center
The research project will help to provide technical support for beginning beekeepers. Recently, six beekeeping courses were conducted in Iowa, Minnesota, and South Dakota, with 130 attendees. More than 70 of the

attendees have started beekeeping. These new beekeepers are looking for additional support for the challenges they are encountering. The grant will enable beekeeping experts to host a summer field day, employ technical support staff, and acquire equipment. **Ending in 2017.**



Revision of Extension publication "PM 1713: Pasture Management Guide for Livestock Producers", 1 year

P. Gunn, A. Janke, E. Lundy, K. Moore, D. Morrical, H. J. Sellers, S. Shouse, M. Wiedenhoef, J. Bisinger, D. Loy, Iowa State University Extension and Outreach
In 1998, a group of research and extension faculty in the Departments of Agronomy, Animal Science, and Agricultural Engineering published an Extension publication "Pasture Management Guide for Livestock Producers." While the majority of the information is still relevant, subjects need to be added or updated. A team with expertise in agronomy, animal production systems, wildlife and pasture ecology, and agricultural engineering will address the issues and revise the document. **Cancelled.**

Sustainably growing Iowa's beef herds: Evaluating systems that provide economic opportunities while protecting soil and water resources, 3 years

H. J. Sellers, ISU Extension and Outreach Beef Specialist; L. Schulz, ISU economics; P. Gunn, ISU animal science
Investigators will work with 24 beef producers using one of three grazing systems: traditional grazing, extensive grazing and limited grazing. Using benchmark data, they will analyze the environmental and economic sustainability of each model as well as the risk-bearing ability of each system. They will create case studies of practices for successful operations in each system to share with Iowa cow-calf producers. **Transferred to Iowa Nutrient Research Center.**



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"We say that flowers return every spring, but that is a lie. It is true that the world is renewed. It is also true that that renewal comes at a price, for even if the flower grows from an ancient vine, the flowers of spring are themselves new to the world, untried and untested.

The flower that wilted last year is gone. Petals once fallen are fallen forever. Flowers do not return in the spring, rather they are replaced. It is in this difference between returned and replaced that the price of renewal is paid.

And as it is for spring flowers, so it is for us."
~Daniel Abraham



4 trees preserved for the future



3,739 gallons wastewater flow saved



383 pounds solid waste not generated



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3 million BTUs energy not consumed

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