

CENTER FUNDS EDUCATIONAL OPPORTUNITIES FOR IOWANS



The Competitive Educational Support Program (CESP) is funded by the Leopold Center to encourage sustainability-focused educational events outside the regular research grants program. Iowans with ideas for one-time educational events, programs, workshops, conferences, performances or displays can apply for up to \$1,000 to support their project. (See details at www. leopold.iastate.edu/grants/education.) The program is managed by communications specialist Carol Brown with input from a review committee.

Here are the events that the Center assisted in staging during FY2016:

July 16-18: UNI Tallgrass Prairie Center, \$1,000

Iowa Prairie Conference at University of Northern Iowa, Cedar Falls

The conference, themed "Working Prairies," highlighted efforts to incorporate native prairie into agricultural landscapes for soil and water conservation, water restoration, nutrient reduction, renewable energy and wildlife habitat.

July 17-19: Seed Savers Exchange, \$1,000 Annual conference and campout in Decorah

The conference celebrated SSE's 40th anniversary as an organization and there were over 300 participants. The CESP funds supported scholarships for eight young farmers to attend. They are interested in conservation and sustainable farming practices and are sharing what they learned at the conference with others in their communities.

August 30: Prairie Rivers of Iowa, Ames, \$250 Local Food Cycle

The 2015 Local Food Cycle was a 35-mile ride in the Nevada and Colo areas to highlight local food and area farmers. There were 70 bicyclists on the ride, and they made stops at Walkabout Gardens, Trinity Farms and others, wrapping up at Niland's Café in Colo, with root beer floats and a hayride.

October 18: Our Yesterday Inc., \$500 Fall Heritage Harvest, Mediapolis

This annual event attracted more than 300 people to celebrate the benefits of rural living and the history of agriculture through demonstrations, tours, and hands-on activities.

November 6-7: Women, Food and Agriculture (WFAN) Network, \$1,000

The WFAN conference included pre-conference field tours, a performance of the play "Map of My Kingdom" and a farm-to-table tasting event, in addition to keynote address and breakout workshops. There were 180 attendees at the event.

November 22-23: Iowa State University Horticulture Department, \$990

The 15th annual Iowa Organic Conference was held at the University of Iowa with more than 325 attendees from five states. The conference included a Local Foods Expo, which the CESP grant helped to fund.





November 12: Sustainable Iowa Land Trust (SILT), \$500

SILT's first birthday celebration, Hotel Pattee, Perry

The CESP grant provided funds for five farmers from the Lutheran Services of Iowa Global Greens program to attend the event. The fund-raiser included a reception, dinner, and program about the land preservation group.

December 18: ISU Community Design Lab, \$500

Ag Urbanism Toolkit Annual Event, Reiman Gardens. Ames

The CESP grant supported travel scholarships for five community partners to attend, and helped with printing of an informational brochure. The day-long event brought together individuals and organizations from across the state to learn about programs going on within lowa communities such as shared-use kitchens, incubator farms, farmers markets, school gardens and more.

February 2-3: ISU Agronomy Extension, \$1,000

Soil Health Conference, lowa State Center. Ames

The CESP grant helped to bring regionally and nationally-known speakers to the first annual conference including Jo Handelsman, associate director for science at the White House Office of Science and Technology Policy, and Wayne Honeycutt, Deputy Chief for Science and Technology and USDA-Natural Resources Conservation Service (NRCS) in Washington, D.C. There were 235 attending the event.

March 23: Iowa Water Center, \$1,000 Iowa Water Conference, Iowa State Center. Ames

The grant supported travel expenses for Luther College students to present the multi-media "Body of Water" performance, and for Ames High School students involved in The Bluestem Institute to display their photo collages on specific water quality issues prior to the performance.

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April 13-23: Winneshiek Energy District, \$400

The festival included 14 independently produced films and video shorts exploring the topics of farmland access, rural livelihoods, sustainability, local food and more. The event attracted more than 150 people from three states; the majority were between 18-34 years-old.

June 23-24: Nahant Marsh Education Center, \$500

The second annual Quad Cities Pollinator Conference was held at the River Center in Davenport. More than 275 people attended the two-day event which included speakers and habitat tours. Participants came from 11 states for the conference.

GPSA STUDENTS

PURSUE NATURAL RESOURCES RESEARCH

The Graduate Program in Sustainable Agriculture (GPSA) has received support from the Leopold Center, with matching support from the College of Agriculture and Life Sciences, since it was established at ISU in 2003. Matthew O'Neal of the ISU entomology department is the faculty administrator for the GPSA program, and Angela Stone serves as program coordinator.

In FY2016, Leopold Center financial assistance funded portions of several GPSA research assistantships. Some of the recipients of those awards describe their work:



ALA KHALEEL
M.S. in Natural Resources Ecology
and Management

It has long been recognized that when strategically integrated into agricultural landscapes, trees can enhance ecological functionality and contribute to income diversity. Our primary research goal is to evaluate the potential of agroforestry plantings to provide biomass and carbon sequestration opportunities in the upper Northern Great Plains (North and South Dakota, Kansas, and Nebraska). Agroforestry is the intentional integration of trees/or shrubs into crop and animal production systems.

Broadly, we seek to understand the role of trees in improving soil health, which in turn strongly mediates a broad array of ecosystem service outcomes. In achieving this goal, our specific objectives are to:

1) measure soil organic carbon content beneath existing agroforestry plantings (field windbreaks and riparian buffers)

and compare that with adjacent crop fields, and 2) use the findings to help test the USDA's farm-level carbon sequestration model, COMET- VR, which is being used to predict farm to regional estimates of potential carbon sequestration with agroforestry practices. During summer 2015, more than 600 soil samples were collected for analysis from the study sites, and used to quantify various aspects of soil organic carbon dynamics and qualify soil quality improvements.

During my first year, I was responsible for soil samples processing and analyses in the National Laboratory of Agriculture and the Environment in Ames. Completed analyses include total organic and inorganic soil carbon, total nitrogen, pH, soil texture, aggregates stability, particulate organic matter, saturated hydraulic conductivity, and bulk density. Work continues on technical analyses and eventually there will be more field data to be analyzed. We look forward to presenting preliminary findings at various conferences such as the Annual Meeting of the Society of American Foresters in Madison, Wisconsin in late 2016.



JOHN KRZTON-PRESSON M.S. in Horticulture

Vegetable growers in the Midwest are facing many new challenges: increasingly erratic rainfall, herbicide-resistant weeds, decreased soil and water quality, and greater attention to food safety. My research on the use of strip-tillage and rolled cover crops in muskmelon production seeks to answer questions that will help farmers manage in a new agricultural landscape. This

research addressed two specific questions: 1) Can the use of strip-tillage and a rolled cover crop be equally or more profitable than conventional tillage with plasticulture? 2) Can a rolled cover crop mulch serve as a physical barrier between muskmelon fruits and soil contaminated with human pathogens? This research has generated much interest among growers and has been the subject of experiments at several vegetable farms across the state. I presented on the subject at several ISU Extension field days and also presented my research at the American Society of Horticultural Science (ASHS) annual conference in August 2016.



ROBERT VALEK
Ph.D. in Natural Resource Ecology
and Management

As a Graduate Research Assistant, my work focuses on designing and facilitating the execution of software development activities for People in Ecosystems/ Watershed Integration (PEWI, http:// www.nrem.iastate.edu/pewi/). PEWI is a simple web-based educational game designed to provide a scientific platform for teaching, discussing, and evaluating the tradeoffs associated with agricultural land use and management. Over the past year I have attended over a dozen outreach and stakeholder-focused events to better understand agricultural stakeholders in Iowa and the Midwest. I also have implemented a large update backlog to PEWI, designed and began building the next phase, and started preliminary research for additional land use modules in the program.



WALLACE CHAIR FOR SUSTAINABLE AGRICULTURE RESEARCHES AG ALTERNATIVES

The Henry A. Wallace Chair for Sustainable Agriculture at Iowa State University is currently held by ISU agronomy professor Matt Liebman. The Leopold Center has provided ongoing support for the Wallace Chair for nearly two decades. Funds from the Leopold Center (\$20,000 annually) are used to help staff a variety of research projects led by Liebman. (See http://www.wallacechair. iastate.edu for more details.)

FY2016 Leopold Center funding provided support for graduate student Julie Mueller, who is pursuing an M.S. degree in Sustainable Agriculture. Her M.S. thesis project is focused on the effects of prairie conservation strips on soil properties. Some of the funds were used to cover a portion of her salary (stipend), benefits and tuition. Other Leopold Center funds paid for the services of an Agricultural Specialist who conducted field activities (planting, harvesting, soil and biomass

sampling, and lab analyses) for Liebman's 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.

Liebman is a team member on three projects studying three cropping systems in central lowa: the Marsden Farm rotation experiment, the Science-based Trials of Row-crops Integrated with Prairie Strips (STRIPS) experiment, and the Comparison of Biofuel Systems (COBS) experiment.

INVESTMENT IN IOWA LEARNING FARMS AND WATER ROCKS! PAYS OFF



Field days and farmer workshops have been at the heart of the lowa Learning Farms (ILF) program since its inception in 2004. During FY2016, ILF hosted 33 field days and workshops for farmers and landowners with more than 1,700 in attendance. Since 2004, ILF has held 240 farmer-centered events that reached more than 11,000 attendees. Leopold Center support has been instrumental in allowing ILF to establish and grow these programs.

Over the years, ILF has developed an evaluation process to gather feedback and improve the effectiveness of its outreach. Their "Field Day Success Loop" is based on the findings from the 2015 field day evaluation data. If farmers attended three or more field days, they were more likely to report influencing other farmers than if they only attended one field day. ILF staff found that the more cover crop acres that farmers reported planting, the more successful they were at influencing others to try conservation practices. These farmers and landowners are excellent advocates for conservation, extending ILF's influence to 61 percent more

farmers beyond those attending an ILF field day. The full 2015 report is available on the ILF website: www.iowalearningfarms.org/ilf/content/ilf-reports

lowa Learning Farms continues be a leading voice in lowa on cover crop research, outreach and education. With help from the Leopold Center, the lowa Cover Crop Working Group, under ILF leadership, has the longest running on-farm winter rye cover crop project in lowa. Reports on "Winter Cereal Rye Impacts on Yield and Soil - Year 7 Update" are now available on the ILF website.

The "Conservation Chat" podcast began in 2015 and continues to highlight farmers and agricultural leaders working to improve soil and water quality. There are now 21 episodes available. Jacqueline Comito, ILF program director, talks casually with guests about conservation and agriculture, integrating humor and stories to discuss serious topics such as farm succession and achieving the lowa Nutrient Reduction Strategy goals. The podcasts are found at www.conservationchat.org.

Water Rocks!

A record breaking year for Water Rocks! outreach was achieved thanks in part to Leopold Center funding. From July 2015 to June 2016, Water Rocks! engaged with over 20,000 learners at 153 community and youth events, including all 11 days at the Iowa State Fair, a 64 percent increase in visitors over 2014. Iowans of all ages learned about conservation practices for both urban and rural areas, water quality, watersheds, wetlands, soil, storm water and biodiversity. They are on pace to interact with even more learners this year, having already surpassed 9,000 attendees by the end of June 2016.

Water Rocks! hosted a winter Summit in December 2015 for 23 non-formal educators including ISU Extension staff, watershed coordinators, and naturalists. In June 2016, Water Rocks! held two teacher Summits for 67 lowa K-12 teachers and high school students. At the Summits, attendees participated in activities, lectures and discussions and took home a supply kit valued at over \$800. The summer teacher Summits also included a field trip to see several conservation practices at work on lowa farmland.

Eight Water Rocks! videos took home awards at the annual lowa Motion Picture Association awards ceremony held April 19, 2016. The videos can be seen on the Water Rocks! website, YouTube and TeacherTube.

ILF and WR! Receive Recognition

Earlier this year, the ILF and WR! Team received an lowa State University Professional and Scientific Council Team Award in recognition for its outreach and research efforts across the state. The team also was honored at the East Pottawattamie Soil and Water Conservation District's annual banquet with a plaque in recognition and appreciation for outstanding dedication to soil and water conservation education and land stewardship.

ILF and WR! partners include lowa State University Extension and Outreach, Leopold Center for Sustainable Agriculture, Iowa Department of Agriculture and Land Stewardship, Iowa Department of Natural Resources (Section 319 of the Clean Water Act), Natural Resources Conservation Service, Conservation Districts of Iowa, Iowa Farm Bureau Federation, Practical Farmers of Iowa, and the Iowa Water Center.





ECOLOGY INITIATIVE



DRIVING RESEARCH INTO PRACTICE

At the start of 2016, Malcolm Robertson assumed responsibility for the Ecology Initiative's management and activities. Moving forward, the Ecology Initiative will remain focused on turning "research into practice," through targeted research in three key areas:

- Soil: improving knowledge of soil health and systems and developing practices that positively impact the self-renewing capacity of soil,
- Landscape: adoption of multiple sustainable practices in targeted lowa agricultural systems and landscapes, and
- Water: improving water quality, hydrology, water use and water management.

Soil health and systems – understanding the process

Soil and its associated state of health continues to be an important topic in agricultural circles. The Leopold Center seeks to improve understanding of the mechanisms regulating soil health. This knowledge is essential to producers and their advisors as they identify optimal crop production practices and management strategies.

During the year, a number of completed projects shed light on the impact of various practices on soil health. In two of these projects, research was done regarding the makeup of the microbial community and ecological mechanisms involved with soil health aspects. These projects were done at long-term research sites initially set up with the help of Leopold Center funding.

"Understanding microbial contributions to soil aggregation and organic matter accumulation" - Kirsten Hofmockel and Elizabeth Bach, ISU Ecology, Evolution and Organismal Biology.

The PIs were able to leverage an existing collaborative project, Comparison of Biofuel Systems (COBS), which was established in 2008. The team for this project compared belowground factors (i.e., microbial biomass, composition, and enzyme activity) regulating soil organic matter formation, aggregation and long-term carbon storage among conventional and alternative cropping systems to provide a better understanding of managing soil carbon (C).

The research provided new insights into soil fungal community composition in classic and alternative cropping systems. Moreover, it highlighted the importance of soil microorganisms, particularly fungi, in providing key ecosystem services such as soil C retention in managed agricultural systems.

"Soil Health and Productivity in Riparian Grass Buffers: A Re-evaluation after 13 Years" - James W. Raich, ISU Evolution and Organismal Biology and Richard C. Schulz, ISU Natural Resource Ecology and Management.

In this project, researchers used the riparian buffer zone at Bear Creek, which was established 2001, to evaluate changes in soil health and aboveground biomass production that occurred over the past 13 years across a diverse array of grass buffers. Microbial activity had significantly increased, both in density and diversity when compared to the original analysis and these data suggest that greater plant diversity improves soil health dynamics by promoting organic matter formation and enhanced soil microbial activity.

Landscape research – transferring research into action Cover crops and third crops

The Leopold Center has a long history of supporting cover crop research and views cover crops as an important tool to promote soil health while reducing soil erosion and nutrient leaching.

"Predicting long-term cover crop impacts on soil quality using a cropping systems model" - Fernando Miguez, Sotiris Archontoulis and Andrea Basche, ISU Agronomy.

In the most recently completed Ecology Initiative cover crop project, investigators answered critical questions regarding the long-term impacts of a cover crop on soil and crop yields in corn and soybean crop rotations. Using both field data and a cropping systems model platform, investigators predicted that continuous use of a winter rye cover crop did not affect yields in a corn-soybean crop rotation, but did significantly reduce soil erosion. Additionally, the research showed a 34 percent decrease in nitrous oxide emission (an important greenhouse gas) from the system and reduced soil carbon loss by 3 percent. Moreover, the investigators reported improved soil water dynamics, including increased soil water storage over a series of wetter and drier seasons, when

Water

Water quality remains the cornerstone of the LCSA mission and research agenda. The majority of the Ecology Initiative projects have a direct or indirect focus on water quality.

"Performance of cropping systems designed to reduce nitrate leaching into shallow municipal well aquifers" – Robert De Haan and Ronald Vos, Dordt College; Matthew Schuiteman, AJS Farms; Nelva Huitink, Natural Resources Conservation Service; Rebecca Ohrtman, Iowa Department of Natural Resources; Harlan Kruid and Matthew Van Schouwen, City of Sioux Center

In this recently completed project, five cropping systems were evaluated in an lowa community reliant on shallow wells for the majority of its drinking water. The goal was to determine cropping systems that reduced the risk of nitrate N movement into shallow municipal aquifers, but still provided a reasonable financial return for landowners/ operators. Data were shared with those who could benefit from the information (farmers, municipalities, Natural Resources Conservation Service, Iowa Department of Natural Resources, and the research community). As a direct consequence of the research, one producer, farming in the capture zone of the community well field, decided to change his farming practices. He adopted a corn-corn-alfalfa rotation rather than continuous corn production since it was shown to be an improved system for

WORKING GROUPS AND RESEARCH TEAMS

The Leopold Center has a long history of initiating and or taking leadership roles in a variety of working groups and research teams. Many groups take up issues where research and answers are needed. Through targeted research and subsequent transfer of knowledge, these groups are able to develop applied solutions for real world concerns. Working groups and research teams in which the Center participates include:

Mid-American Agroforestry Working Group – promotes the practice and adoption of agroforestry in lowa and the U.S. Midwestern region.

Green Lands, Blue Waters (GLBW) – a multi-organizational working group comprised of land grant universities and environmental and agricultural nonprofit groups that are involved in the development of new agricultural systems in the Mississippi River Basin.

The Science-based Trials of Rowcrops Integrated with Prairie Strips (STRIPS) – a team of researchers, educators and extension specialists who investigate the impact of incorporating prairie strips into conventional row-cropped agricultural systems.

SPECIAL PROJECT (COMPLETED)

"Does long-term use of cover crops affect soil health and quality as measured by the Haney Soil Test?" - Stefan Gailans, Practical Farmers of Iowa and Sarah Carlson, PFI Midwest Cover Crops Research Coordinator

This project was conducted at seven farms participating in a long-term, cover crop study. All farmer-cooperators employed corn-soybean rotations and planted replicated plots of either a cereal rye cover crop or no cover crop. Minor changes to soil health (soil's biological properties and the balance of soil C and N and their relationship to microbial activity) on the cover crop plots were detected, but they were not different compared to non-cover crop plots. Generally, it takes more than five years to detect changes in soil properties.





MARKETING AND FOOD SYSTEMS INITIATIVE



MARKETING AND FOOD SYSTEMS INITIATIVE SPINS OFF LOCAL FOODS TEAM

The Marketing and Food Systems Initiative (MFSI) was directed by Craig Chase in FY2016, with support from the Local Foods Team (LFT). Team members included Corry Enderton, Lynn Heuss, Kayla Koether, Ahna Kruzic, Courtney Long, Savanna Szymanski, Alice Topaloff, and Teresa Wiemerslage. While the MFSI will continue to be part of the Leopold Center research portfolio, the Local Foods program became part of Iowa State University Extension and Outreach, effective October 1, 2015. Chase will continue to serve as a Leopold Center initiative leader during the transition period and will coordinate the research done through MFSI with the LFT efforts.

Local Foods Team members concentrated their work in four core areas:

- beginning farmers (curriculum development, incubator farms, mentor programs, and prison farms);
- community development (community capacity building, agricultural urbanism toolkit, food health and access, farm to school, and FoodCorps);
- economic development (food processing, food hub business development, farmer profitability); and
- evaluation (conducting evaluations and evaluation capacity-building).

WORKING GROUP ADDED

The team continued to support the Regional Food Systems Working Group (RFSWG) and the Food Access and Health Collaborative (FAHC), and launched the new Iowa Food Hub Managers Working Group (IFHMWG).

The food hub group met quarterly, and more than 30 individuals representing about 15 aggregators and distributors of local food attended the meetings regularly. Managers and guest presenters at the meetings discussed common challenges and shared information on managing for growth, sales and pricing strategies, evolving between food hubs, and other topics. Collaborations that sprang from the working group include a shared inventory tracking pilot project, which was funded by a North Central Region-Sustainable Agriculture Research and Education (SARE) Partnership Grant, as well as a SARE Professional Development Program mini-grant to send a delegation of seven lowa food hub managers to the National Food Hub Conference.

COMMUNITY SHARED-USE KITCHEN PROJECT COMES TO FRUITION

A feasibility study funded by the Leopold Center (project M2012-06) has informed the creation of a shared-use commercial kitchen at the Robert W. Mickle Neighborhood Resource Center in Des Moines, Iowa. The Neighborhood Investment Corporation (NIC) purchased the building from Polk County in 2002 to operate an incubator for small for-profit and nonprofit entities. Early in 2016, NIC's board of directors voted to implement remodeling of the building's long-abandoned kitchen, and offer it as a community shared-use facility. NIC has worked with the Wallace House Foundation staff, an architect, and contractor to design and build the kitchen, set to open in the fall of 2016.

AG URBANISM SPREADING IN IOWA

The Agricultural Urbanism Toolkit is a planning process that helps lowa communities explore their ag-related resources and needs to make fresh, local food products more widely available to residents at all income levels. The design process involves community capacity-building, research and analysis, public input, tactic prioritizations and design documentation and has been funded by the MFSI since its inception.

Three lowa communities (Des Moines, Cedar Rapids, and Cresco) started the process in 2013. Coalitions built with the support of LFT staff in Des Moines and Cedar Rapids have "graduated" from the three-year process and will continue to operate independently to advocate for local food systems. Dubuque, Cass County, and several northern lowa counties began agriculture urbanism projects in 2014, and Pleasant Hill held its first coalition meeting in June 2016. To learn more about the Agricultural Urbanism Toolkit, go to the resource page at: http://www.extension.iastate.edu/localfoods/infrastructure-and-planning-agriculture-urbanism-toolkit/.

NEW PUBLICATIONS AND TOOLKITS

Iowa CSA Farms: 2016 Statewide List of Iowa CSA Farms and Organizers (LF0012)

This directory lists 85 lowa farms that operate Community Supported Agriculture (CSA) enterprises, with contact information, website links, available produce, and distribution range shown for each farm.

Cafeteria Coaching Toolkit (LF0011)

Cafeteria coaching encourages students to try new foods and eat nutritious school meals. This toolkit will guide users to set up cafeteria coaching programs at local schools.

Tools to Evaluate Your Coalition (LF0010)

A series of four publications by the lowa State Extension and Outreach Local Foods team introduces the importance of coalitions and how evaluating those partnerships can be helpful.

Using Accounting Software for Food Hubs: Processing Traceable Orders

Based on an actual lowa food hub, this tutorial takes a step-by-step approach, guiding users to expand their use of QuickBooks to improve product traceability, accounting, basic inventory management and recordkeeping.

Local Food Organizational Toolkit

This toolkit offers the business and financial elements of starting and coordinating a local food organization in Iowa.

Agriculture Urbanism Toolkit

An overview of Agricultural Urbanism as a design strategy for developing urban local food systems, as well as a brief synopsis of the ISU Community Design Lab's design process and its role in local food system development.

Resource Guide for Beginning Farmers

This is a resource for people interested in hosting a farmer training program, covering production practices, post-harvest handling, and business planning/basic finances.

MEMBERSHIPS AND SPONSORSHIPS

The Leopold Center has been an active member of the Sustainable Agriculture Food Systems Funders (SAFSF) group since 2013. SAFSF is "an international network of grant makers that works to foster communication, shared learning and information exchange about issues connected to sustainable agriculture and food systems." Craig Chase was part of the recent Policy Impact conference planning committee, which met in Des Moines, Iowa, in December 2015. More than 60 members attended to talk about water quality issues. who controls research, the upcoming Farm Bill, and a host of other relevant policy topics. Chase also recently joined the membership committee and participated in the summer 2016 conference at Louisville, Kentucky. Thanks to relationships built through these activities, the Local Foods Team has received more than \$100,000 in grants from other members of SAFSF, and developed strategic partnerships related to local food coordinator training and other topics.

The LCSA became a sponsor for the *Journal of Agriculture, Food Systems and Community Development* (JAFSCD) in 2013. (FY2016 was the Center's third and final year in this capacity.) The journal focuses on public policy, research, and practice in food systems work, and emphasizes "accessible scholarship" that maximizes its usefulness in the transdisciplinary field of food systems.

Closely connected to JAFSCD is the North American Food System Network (NAFSN). NAFSN is intended to be a professional development network and provide a training platform and/or certification process for local food system practitioners. The Leopold Center and ISU Extension and Outreach continue to work with NAFSN on the development of a national certification program.

