

Reconfirmation Reality
Reflection



Renovation
Revival Rewards





LEOPOLD CENTER
FOR SUSTAINABLE AGRICULTURE

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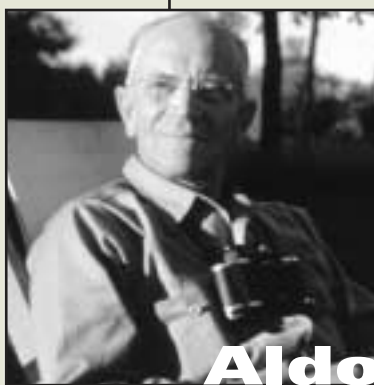




Iowa

The **Leopold Center** was

established by the Iowa Legislature as part of the Iowa Groundwater Protection Act of 1987. Its mandated missions are to identify 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.



Aldo Leopold

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

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.

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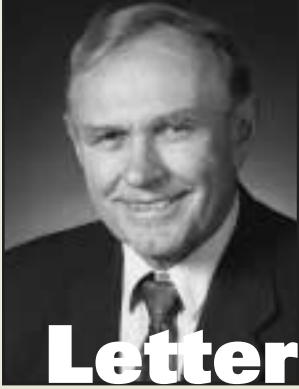
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report

legacy



Letter from the Director

vision

Being appointed as a new director of any organization devoted to any type of enterprise inevitably presents the appointee with something of a quandary. On one hand, it is always expected that the new leader will bring a change of vision, renewed enthusiasm, and inspirational ideas to the organization. On the other hand, there is a natural tendency in any organization to want to stay with what worked in the past, to adhere to old values, to not upset the status quo.

Being appointed a new director of an organization concerned with *agriculture* at the turn of the century adds additional levels of complexity. Agriculture throughout the world is faced with enormous challenges. Energy requirements to fuel industrial agriculture are increasing at the same time that traditional energy sources are being strained. Population growth, especially among the world's poorest people, is exploding at the same time that arable land available for producing food is declining. Environmental degradation is placing limits on the very natural resources (both terrestrial and aquatic) that are needed to improve

agriculture productivity. At the same time, those in agriculture enterprises who still stand to gain by keeping things pretty much the way they are will understandably be reluctant to see things change despite the burgeoning challenges.

Furthermore, we enter this new century of challenges without a common vision to guide our actions. We seem to be divided into two camps. There are those, on one hand, who believe that we can best assure our future by limiting human activity, "saving the environment," and "leaving nature alone." On the other hand are those who believe that we must develop new technologies as quickly as possible to reshape nature to accommodate the needs of the human species. An added difficulty is the fact that in the industrial world most citizens are alienated from agriculture. The only contact most of us have with agriculture is in the aisle of a supermarket or the booth of a fast food restaurant.

So those of us who have agreed to provide leadership to agricultural enterprises are faced with an intriguing set of questions.

- ❏ How do we develop a common vision for agriculture that will enlist the support of the majority of citizens?
- ❏ How do we achieve our multiple goals of economic, ecological, and community sustainability in the face of our new challenges?
- ❏ How do we begin to create the space for conversations that can provide the opportunity to discuss the issues?

At the Leopold Center we have been wrestling with these questions for several months, and we are now ready to engage the larger community of Iowa citizens in an effort to address them.

The Center operates under a legislative mandate that requires it to promote research and outreach activities that will make Iowa agriculture more sustainable. The work of the Center over the past 12 years has pointed out many pathways to a more sustainable agriculture. We believe it is now time to focus our energies and,

teamwork

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based on what we have learned, develop partnerships with numerous Iowa organizations and enterprises. Working in the context of Iowa communities, we hope to put more sustainable systems into place—systems that give farmers a better economic return, and that make Iowa a better place to live.

This doesn't mean that we know how those systems should be constructed. Nor does it mean that we have a blueprint to guide our work. But we believe that we can take what we have learned over the past 12 years, serve as a catalyst to bring Iowa farmers, entrepreneurs, and other citizens together in the context of their own communities, and develop common approaches to a more sustainable future. That will be our agenda for the next decade.

All of us at the Center look forward to facing these and other challenges with all Iowa citizens in the months and years ahead. As always, we welcome your input. I hope you find this edition of our annual report useful.

Fred Kirschenmann, Director

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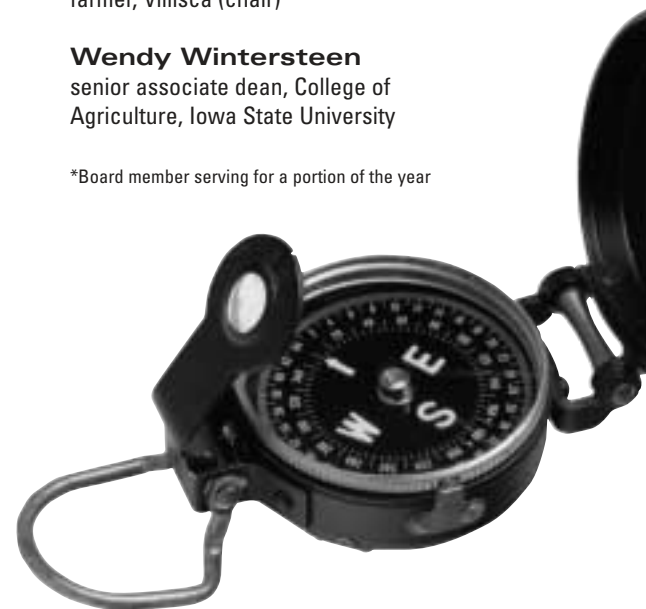
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The Three Rs at the Leopold Center

Here on the good ship Leopold, we have had ample opportunity to sample “life’s uncertain voyage” (as Shakespeare dubbed it) during the past 12 months. We’ve had smooth sailing, rocky seas, swells of ambiguity, and even now, large waves are still breaking on the shore.

When the fiscal year began in July 2000, new director Fred Kirschenmann embarked on his transition from grand master of a North Dakota organic farm to administrator of a university-based research and education center in Iowa. Moving from a tractor seat traversing a field of sunflowers to a stationary Aeron chair in a Curtiss Hall office presented some rare opportunities for Kirschenmann. The Center staff, meanwhile, was understandably eager to have a permanent director on the premises again. From the day of the first staff meeting, it was clear that the new director was determined to set the Center on a different path than the one it had followed for the past decade. It was a time of *reconfiguration*.

When you hire a philosopher and visionary to lead your organization, you can expect that that there will be a lot of heavy-duty thinking and soul-searching going on—and not just by the staff and the advisory board. From the day he arrived on campus, Kirschenmann was determined to take advantage of every possible opportunity to talk with the local sustainable agriculture community, the

university administration, commodity groups, and agricultural interest groups not always aligned with the sustainable agriculture fraternity. He accepted speaking engagements at events all over Iowa, which provided him with a crash course in Cyclone State geography. In addition to these informal soundings, Kirschenmann spearheaded a series of “community conversations” in six Iowa towns. The topics were the future of agriculture in Iowa for the “not-so-big” farmers and what role the Leopold Center should play in that future. It was a time of *reflection*.

While the Center and its adherents were contemplating what new directions would best serve Iowa farmers, adverse economic events overtook the process (not an uncommon occurrence in farming these days). A large shortfall in the state of Iowa’s financial fortunes was forecast. Legislators took up the task of drastically pruning the state’s budget, and the Center’s resources sustained a considerable financial reduction. The Center staff was forced to grapple with a severely constrained budget at the same time that old research initiatives were being reworked and the new research initiatives were still a gleam in Fred’s eye. It was a time for *reality*! Having dispatched those sometimes trying “three Rs,” the Leopold Center is now looking forward to plotting renovation, revival, and rewards for Iowa’s farmers in the years to come! — M.A.



Fifteen percent of the Leopold Center’s annual operating budget fell victim to Iowa’s economic downturn during the winter 2001 legislative session. A \$300 million decline in Iowa’s projected tax revenues left lawmakers looking for places to cut funds for the next fiscal year. And for the first time since the Center’s founding in 1987, it was targeted for substantial budget reductions.

Vilsack veto helps Center

The Center’s finances did not suffer as much as they might have, thanks to action by Governor Tom Vilsack. The agricultural appropriations bill that initially passed both houses of the Iowa legislature would have decreased the Leopold Center’s FY2002 funding from the Groundwater Protection Fund (GWPF) by \$350,000. The bill was forwarded to Governor Vilsack for his



The Leopold Center received excellent ratings in a recent ISU Extension survey. When asked about “the importance and satisfaction with centers to field staff,” 70 percent of the respondents thought the Leopold Center was very important and 41 percent said they were very satisfied with the Center’s performance.

Center’s by Iowa legislators, programs eliminated



signature, and on May 25 he elected to use his line item veto power to restore \$100,000 to the Center’s budget.

The governor’s rationale for restoring \$100,000 was that this GWPF money had been shifted to the Iowa Department of Agriculture and Land Stewardship to conduct pesticide applicator training. He felt that this use was not in keeping the original goals of the GWPF.

Many of the state’s environmental activists and family farm interest groups lobbied the legislature and later the governor to take action on behalf of the Center. “We are extremely grateful to all the friends of the Center who made the effort to contact their legislators or the governor in support of the Center’s activities,” said director Fred Kirschenmann.

In addition, the Center’s \$560,000 educational funding (which is part of the total Iowa State University state

appropriation) was cut by \$35,000. Together, these two reductions will diminish the Center’s \$1.5 million operating budget for FY2002 by \$285,000 (15 percent), a significant decrease in research funding capacity that will impact all aspects of the Center’s activities.

How the Center apportioned the cuts

After much consideration about how to handle the budget reduction, the Center advisory board and staff concluded that it was appropriate to honor the most immediate research commitments to (mostly multi-year) projects funded by the competitive grants program. However, these investigators were informed that the Center could not make any funding guarantees after the coming fiscal year. In addition, the Center did not issue its usual call for new (FY2003) preproposals in the summer.

Steps the Center will take to deal with the budget shortfall for the next fiscal year include the termination of funding for two long-running issue teams (animal management and agroecology) and two research initiatives (swine system options and long-term organic crop research). In addition, the grant program for funding conferences, workshops, and special events will be discontinued in its present form. On the personnel side, a vacant clerical position will not be filled.

These cost-cutting actions will allow the Center to move forward with funding in hand for three new research initiatives proposed by Kirschenmann. However, Center administrators are concerned that continued loss of funding at this steep rate will force the Center to make even more drastic changes in its programs and activities.

associate

Duffy returns as Center administrator

Michael Duffy, professor of agricultural economics at Iowa State University, rejoined the Leopold Center staff in September 2000. Duffy accepted a three-year appointment as the half-time associate director at the request of new director Fred Kirschenmann. Duffy will have a permanent office at the Center and will be involved with day-to-day administration, particularly related to the Center's financial affairs. He will be in charge of one of the Center's three



new research initiatives on economics and public policy, an area that many people feel

the Center should examine more closely. In addition, he will represent the Center at various events on- and off-campus. Duffy was previously affiliated with the Center for several years and has

participated on a number of the Center's competitive grant projects. He will retain his faculty appointment in the economics department and work with ISU Extension farm management specialists. He is also professor-in-charge of the ISU Beginning Farmer Center and conducts the annual Iowa land value survey.



Where in the world is

In his first months as Leopold Center director, Fred Kirschenmann logged plenty of travel miles. He was soliciting ideas and input for the direction of the Center and crafting a vision for Iowa agriculture that reflects the needs and interests of people around the state. The majority of his travels were funded by the organization he was meeting with or by funds from the Center's visioning grant from the Cavaliere Foundation. Here are just some of his public appearances in the past year:

October 2000

Bioneers, California
Ames Kiwanis
Matt Liebman agronomy class at ISU

November 2000

Tom Brumm class at ISU
Sustainable Agriculture Centers meeting, Madison, WI
American Society of Agronomy, Minneapolis
Developing Earth Principles, New York
Iowa Institute of Cooperatives meeting

December 2000

Iowa Farm Business Association, Amana
Nutrient Reduction Conference, Ames

January 2001

Allee Farm, Newell
Farm Business conference, O'Brien County
PFI annual meeting
ISU Extension meeting, Cedar Rapids





Fred Kirschenmann?

February 2001	March 2001	April 2001	May 2001	June 2001
<p>Northern Plains Sustainable Agriculture meeting, South Dakota</p> <p>NE Iowa Crop Clinic, Waterloo</p> <p>Dordt College, Sioux Center</p> <p>Grinnell College panel discussion</p> <p>Missouri Small Fruit conference, Springfield</p> <p>Community Conversation, Cedar Rapids/Hiawatha</p> <p>Watershed Planning Meeting, Treynor</p>	<p>Michigan State University, Lansing, MI</p> <p>Community Conversation, Mount Pleasant</p> <p>University of Nebraska, Lincoln</p> <p>Wallace Foundation Annual Meeting, Lewis</p> <p>Kellogg Foundation conference</p> <p>Upper Midwest Organic Conference</p> <p>Community Conversation, Decorah</p>	<p>Neely-Kinyon Research Farm, Greenfield</p> <p>North Central Small Farms Workshop, Springfield, IL</p> <p>U.S. Senate Agriculture Committee hearing, Washington, D.C.</p> <p>Heart of Iowa Coop Annual Meeting, Nevada</p>	<p>ISU Roads Scholar Tour</p> <p>Iowa Natural Heritage Foundation, Ankeny</p> <p>Kellogg/Fires of Hope, Pittsburgh, PA</p> <p>University of New Hampshire, Durham</p>	<p>Honors seminar, Central College, Pella</p> <p>Soil Management and Land Valuation Conference, Ames</p> <p>National Catholic Rural Life Conference, Des Moines</p> <p>Farming, Land, and People conference, Columbus, OH</p>
				<p>ISU Alumni Days speech, Ames</p> <p>Ducks Unlimited, Saskatoon, Canada</p> <p>Iowa AgState meeting, Nevada</p> <p>Linus Solberg Pork meeting, Emmetsburg</p> <p>Iowa CAFÉ meeting, Ankeny</p> <p>Wallace Country Life Center, Adair County</p> <p>Agricultural Education Summer Conference, Ames</p> <p>ISU Research Farm Anniversary Celebration, Nashua</p> <p>University of Florida College of Agriculture, Tampa</p>

Sustainable ag thinkers attend July "visioning" confab

Six prominent thinkers in the sustainable agriculture community were part of a unique and challenging forum sponsored by the Leopold Center on July 21, 2000. New director Fred Kirschenmann assembled the group to kick off the Center's yearlong visioning process with their unique perspectives on the future for agriculture. His charge to them: "We need to ask the difficult questions, decide who we want to be, and how we can move agriculture toward sustainability." The panelists were joined in their discussions by 30 interested observers from academia, farming, and agribusiness.



Front row (left to right): Cornelia Flora, Joan Dye Gussow
Back row (left to right): Mike Duffy, Karl Stauber, Fred Kirschenmann, Bill Heffernan, John Gardner, Dick Levins

Lead participants at the forum included:

Karl Stauber

president of the Northwest Area Foundation, Minneapolis (facilitator)

"The real challenge for the Leopold Center in this political economy is to create a bridge between traditional agriculture and entirely new audiences that include the suburban majority and the mass market consumer."

John Gardner

agronomist and associate dean of Agriculture and Natural Resources Extension, University of Missouri-Columbia

"A system-wide breakdown has to occur for us to be convinced that agriculture remains bound by ecological principles striving for stability and longevity."

Joan Dye Gussow

organic authority and former chair of the Nutrition Education Program at Teachers College, Columbia University

"We will never change the food system until we can change the demand end."

Cornelia Flora

director of the North Central Regional Center for Rural Development, Iowa State University

"Rural communities, even in Iowa, really are not dependent on agriculture, nor are they likely to depend on agriculture in the future."

Bill Heffernan

professor emeritus of rural sociology, University of Missouri-Columbia

"We need to make the case that independent farmers are stewards of our environment and they take care of our natural resources. If we cannot justify their existence this way, then perhaps agriculture needs to be treated like any other industry."

Dick Levins

professor of agricultural economics, University of Minnesota

"The future of agriculture comes down to economic power. How do you operate in an environment of power? Where do you find your power, or enough influential friends, to play effectively in this game?"



Community conversations 2001: the Center speaks with Iowa citizens

The Leopold Center conducted a series of dialogues with a diverse group of Iowans during February and March 2001. The topics for these outreach sessions were the future of Iowa agriculture and the Center's potential role in shaping the next decade on Iowa farms. The listening sessions were conducted with significant financial support from a grant provided by the Wisconsin-based Cavaliere Foundation.

Center director Fred Kirschenmann opened the conversations with brief remarks about the current state of Iowa agriculture. He proposed that the Center pursue three broad-based new initiatives in policy, ecology, and marketing.

Kirschenmann's presentation was followed by discussions with the invited guests who represented various groups interested in the survival of Iowa agriculture. Some of the participants were from the sustainable agriculture community, while others represented conventional agriculture organizations, local government, and commodity groups.

The Center's community conversations were held at:

1. **Sioux Center**
(northwest Iowa)
February 13
2. **Hiawatha/Cedar Rapids**
(east central Iowa)
February 27
3. **Mount Pleasant**
(southeast Iowa)
March 5
4. **Decorah**
(northeast Iowa)
March 19

Mini-conversations were conducted at:

5. **Lewis**
(southwest Iowa)
March 12
6. **Greenfield**
(south central Iowa)
March 20

Among the general themes that emerged from the six community conversations:

- ☪ Center efforts should focus on midsize farmers, processors, and retailers.
- ☪ Policy analysis is valuable, but must be careful about advocacy. State-level action is most appropriate for change. How does global policy/marketing affect midsize farmers?
- ☪ Farmers and consumers both need education: farmers on value-added opportunities and consumers on the farm connections in the food system.
- ☪ Any economic model for agriculture must include social accountability.
- ☪ Something must be done QUICKLY in order for the midsize farmer to survive.

SOUTH

Agroecology Issue Team extends Bear Creek work



this year with plantings on the Ion Larson and Tom Carpenter farms that lie directly south of the Jon Risdal farm. A site on the Larry Tesdal farm has been surveyed for installation of 10 boulder weirs or riffle structures designed to stabilize the channel by reducing down-cutting and bank collapse.

Among the year's findings at Bear Creek: Fine root decay rates are important in providing carbon to the soil ecosystem. After 360 days, approximately 40 percent, 60 percent, and 75 percent of silver maple, corn, and winter wheat roots had decomposed. For six-year-old grass communities, net primary productivity of switchgrass is significantly greater than that of cool-season grasses, contributing to higher surface friction that slows water flow and drops sediment.



The very successful Agroecology Issue Team continued work on three major projects plus several related initiatives. Under the leadership of Richard Schultz, Tom Isenhardt, and Joe Colletti of the ISU

forestry department, riparian management has proved to be a highly effective tool for halting erosion and water degradation in on-farm demonstrations. Funding from the Center has helped the team launch new initiatives, monitor for baseline data, purchase needed equipment, develop technology transfer, and collect data that can be used to help attract additional grant monies.

Bear Creek

Plantings for the Bear Creek project, the team's crown jewel, began in 1990 and now extend to ten farms in the watershed area. The team received the Iowa 2000 Division of Soil Conservation Award for their Bear Creek achievements. The Bear Creek project has evolved from areas of single-species plantings (for biomass uses) to a testing ground for multi-species plantings. The team has found that use of several species improves infiltration, groundwater cleaning, wildlife habitat, and aesthetic appeal of the landscape, while it lowers the chances of problems that arise with monoculture crops. The Bear Creek efforts were expanded

A protocol was developed to identify subsurface tile drain locations using digital elevation models with Geographic Information Systems. Locating tiles in this way also could help identify potential sites for tile-intercepting wetlands.

The team is investigating the use of geophysics, specifically electrical resistivity, to describe the geology in proposed buffer locations prior to installation. This work, coupled with soil coring and multilevel piezometers to monitor water quality at the same site, will help determine the optimal hydrogeologic settings for riparian buffers and/or the potential of those sites to reduce nonpoint source pollutants from the groundwater.



Missouri research

Work continues in the Otter Creek, Crooked Creek, and Long Branch watersheds. Investigators note that potential denitrification varies significantly among land uses, watersheds, and seasons.

A major survey was conducted in the Mark Twain Watershed to identify attitudes, opinions, and values of financial agents (bankers, land appraisers, land assessors, realtors etc.) who may either positively or negatively influence the landowner decisions about installing and maintaining riparian buffers. A March 2001 focus group was used to help test the survey document. The focus group responded that they thought soil and water conservation actions were important and desirable in the watershed, but that someone else should pay for them.

Iowa Cattlemen's Association joint project

The agroecology team is collaborating with the Leopold Center's Animal Management Issue Team to study the impact of upland and riparian grazing on the movement of sediment, phosphorus, and nitrogen in streams. Work is being conducted on four Iowa sites with funding from the Iowa Cattlemen's Association. The animal management team has a controlled experiment on upland grazing at the ISU Rhodes Research Farm. The agroecology team is working on private riparian pastures in northeast, central, and south central Iowa. Rainfall simulations and band erosion monitoring are the major methods of observing the movement of sediment and chemicals through the waterways.



Richard Schultz

ISU

Other teamwork

Members of the team coordinated studies on the Lake Rathbun Watershed to integrate multiple economic assessment tools. These tools included the erosion and sediment delivery protocol and the Stream Visual Assessment Protocol of the Natural Resources Conservation Service. They estimate erosion and sediment delivery to streams in the watershed and assess the potential of the riparian zones of those streams to capture significant portions of that material.

Agroecology team members are working with the Neal Smith National Wildlife Refuge to determine the long-term carbon sequestration potential for restored prairies and savannas on previously cropped soils. Approximately 600 samples from various ages of restorations have been collected from three specific soil series and are undergoing tests.

A newly hired team member is responsible for technology transfer and has completely overhauled and expanded the team web site (<http://www.buffer.forestry.iastate.edu>).



Tom Isenhart

A major case study using four farms under different scenarios has been created for use in the numerous workshops conducted by the team members. More than 3,000 slides have been cataloged in a database and made available in different formats for varying uses.

The team produced four refereed papers, numerous abstracts and posters, made 40 presentations around the state, region, and country, gave more than 30 tours of the Bear Creek sites, and conducted half-day and full-day workshops.

Animal Management Issue Team *continues* investigates rotational

Under the leadership of James Russell, ISU animal science professor, the Leopold Center's Animal Management Issue Team continued to investigate more sustainable ways to produce livestock in Iowa. For several years, the team has looked at ways to make grazing a more attractive option for livestock producers, especially in southern Iowa where some of the land is not well suited to crop production.

Previous team research has shown that rotational stocking may increase the carrying capacity and productivity of Iowa's summer pastures by 25 to 33 percent. Because stored feed costs represent the biggest expense in beef production, real improvements in profitability may be achieved by lengthening the grazing season and reducing stored feed costs. Corn crop residues and stockpiled perennial forages may serve as forage resources for winter grazing and have reduced the amount of stored feed required to maintain cows by 900 to 1,800 lb. per acre grazed. Grazing of stockpiled forages reduces the amounts of stored feeds used in the winter and also increases the quality of forage available for grazing or harvest in the summer.

The team compared forage and calf production and the amounts of stored feeds required to maintain beef cows in two systems. One was a conventional (minimal land) system with summer rotational stocking and winter feeding of cows in a dry lot. The other was a year round grazing system with summer rotational stocking of fall and spring



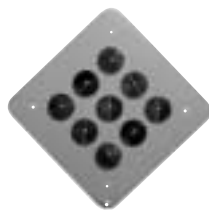
grazing, stocking

calving cows and stocker cattle and winter grazing of crop residues and stockpiled grass-legume forages by fall and spring calving cows. The project was conducted at the McNay Research and Demonstration Farm near Chariton. Results of this comparison showed small differences in the concentrations of digestible dry matter and crude protein in some of the pastures, suggesting that either grazing with stocker cattle or harvest as hay are effective methods for removing excess forage to maintain forage quality.

Feed costs for developing heifers to enter a beef cowherd can be considerable, leading to delays and reductions in economic returns. Yet farmers recognize that adequate nutrition is required for heifers to reach target weights for breeding and calving. The team looked at two options for feeding heifers, one where the stocking rate was decreased in an effort to improve nutritional quality of the forages

consumed, and one where the animals' diet was supplemented with concentrates. Body weight gain, body condition, forage selection and intake of the heifers, and forage mass, composition, and weathering losses will be determined over the winter.

Results of the year's research were shared with producers at field days at the ISU research farms in Lewis, Chariton, Guthrie Center, and Rhodes. The team presented information to the Iowa Cattlemen's Association and the Iowa Forage Conference. Project data appeared in several ISU animal science and research farm reports. In addition, the members of the Animal Management Issue Team have participated in construction of a Forage Budgeting Computer Program. Farmers may use this program to develop summer and winter grazing systems that help integrate the available forage resources with the farm's cattle management system.



Hooped house initiative *expands studies of swine housing*

The six-member ISU-based “hoop group” conducts research on and demonstrates the uses of hooped house production facilities for swine. Comparisons are made with confinement system performance on:

- » Pig growth, feed efficiency, and nutrient management,
- » Facility environment,
- » Manure pack management and manure composting,
- » Bedding use,
- » Pig behavior evaluation,
- » Animal health, disease control, and food safety, and
- » Production costs and returns.

During 2000, two additional groups of pigs were fed in the Hoop Research Complex (HRC) at ISU’s Rhodes Research and Demonstration Farm. Performance data on these pigs were added to the data set comparing seasonal effects of feeding pigs in hoops and confinement. Temperature and relative humidity are recorded at the HRC to relate to performance changes under cool or hot

conditions. Serial scanning of pigs was added to document muscle and fat development in differing environments. One hoop structure was paved with concrete at the suggestion of farmers. Researchers also compared barrows and gilts in hoops and confinement.

Five composting cycles were analyzed. Losses of nitrogen (N) from the bedded pack ranged from 35 to 45 percent of total N inputs. Average losses of 52, 31, and 35 percent of the remaining N, phosphorus, and potassium occurred during outdoor composting in windrows.

Research was conducted to see if allowing additional feeder space per pig could decrease the amount of fighting around the feeders. Pigs in hooped structures are less likely to clash than pigs in a non-bedded confinement system, but the fights that did occur were concentrated near the feeders. The number of feeder access areas for the pigs was increased to see if this resulted in lowered swine hostilities.

The 1999 economic analysis of the two systems showed seasonal variations. For the summer group, the profit per pig in the hoop systems showed a \$.50 advantage over the confinement system. However, for the winter season, the confinement system showed a \$3.46 profit advantage over the group raised in hoops. As with previously observed groups of pigs, the confinement pigs had better feed efficiency, while the hoop pigs had lower fixed costs. The hoop pigs gained more weight per day, but consumed more feed per pound of gain.

Additional studies were being conducted at other locations:

- » Comparison of survival and growth of early weaned piglets in hoops and nurseries, ISU Western Research Farm, Castana;
- » Manipulation of diets for finishing pigs to improve leanness, ISU Western Research Farm, Castana; and
- » Comparison of reproductive performance for gestating sows in different housing, Lauren Christian Farm, Atlantic.

Leopold Center continues partnership

with PFI

unique

A **third year** of financial support from the Leopold Center allowed Practical Farmers of Iowa (PFI) to continue and expand its unique on-farm research demonstrations. Among the efforts funded by the Center's \$50,000 grant were 40 research trials conducted by 30 cooperating farmers and 24 farm field days attended by 1,065 visitors, a slight increase from the previous year.



PFI was able to use the Center's funding to leverage additional grant support from the

- **Sustainable Agriculture Research and Education (SARE)**, for a study of differing soil fertility paradigms among farmers, consultants, and academics;
- **Iowa Farm Bureau Federation (IFBF)**, to integrate IFBF-identified producers and agribusinesses into the on-farm research and demonstration program;
- **Wallace Genetic Foundation**, for study of alternative corn genetics;
- **Michael Fields Agricultural Institute**, to consider economic advantages of small grain in cropping systems;
- **Natural Resources Conservation Service** through the Sustainable Agriculture Coalition, for a study of hoop house bedding management via composting; and
- **Organic Farming Research Foundation of Santa Cruz, CA** for on-farm research on management of gastrointestinal parasites in organic animal production systems.

"...the Leopold Center at Ames, nerve center of Iowa efforts to keep small farms thriving; ...has led efforts to diversify Iowa farms and to find new crops and new methods of livestock husbandry for smaller farms."

-Des Moines Register editorial, May 2, 2001





Organic initiative marks “organic certification” milestone at Neely-Kinyon Farm

Organic cropland in Iowa has grown by leaps and bounds in the past five years—from 13,000 acres in 1995 to 150,000 in 1999. The premiums paid for organic crops continue to prove attractive to farmers coping with economic declines and overproduction of conventional crops. Yet little work had been done to determine the best long-term crops and strategies for Iowa growers interested in organic production.

In 1998, Kathleen Delate, Iowa State University’s organic crops specialist, began establishing the Neely-Kinyon Farm’s Long-Term Agroecological Research (LTAR) site in Greenfield, Iowa. Funding from the Leopold Center allowed the Neely-Kinyon farm to set aside a 17-acre block of farmland devoted to four crop treatments consisting of a local conventional system and three organic systems consisting of combinations of grains, small grains, and legumes.

The organic fields became “certified organic” in 2000, after the required three-year period from the last application of synthetic substances. A hay crop was seeded around the perimeter of the experiment, providing the required buffer between the conventional and organic plots. The fertilization goal was to apply equal rates of nutrients in each treatment.

Results in 2000

A very wet spring contributed to difficulty in timely cultivation for weed control in organic plots in 2000. Despite these problems with weed pressure, soybean yields were excellent in the third year and corn yields in the organic plots (144 bu/acre) were greater than those in the conventional system (140 bu/acre). In 2000, a typical feed corn hybrid was grown on both plots rather than the less successful white milling corn variety used the previous year.

Soil quality improved over time in the organic fields sampled from 1998 to 2000. Increases were noted in total carbon, particulate organic matter carbon, aggregate stability, and potentially mineralizable nitrogen. Stalk nitrate content at the end of the season was significantly greater in the conventional system, with some plots exceeding recommended levels (over 2,000 ppm). (Nitrate N, a potential pollutant in Iowa waterways and groundwater, continues to be greater in the conventional system.)



Kathleen Delate

Education and outreach

Delate gave 67 presentations on the ISU organic program and the LTAR project. She also participated in five field days on organic agriculture where the LTAR project was discussed. Area farmers and cooperators remained enthusiastic and offers continue to come for additional organic research sites in the state.

Conference grants program closes shop in spring 2001, aims for new

education

Number of Leopold Center-sponsored conferences and conference expenditures from 1993 through June 30, 2001*.

Conference Topic	# of Events	Expenditures (\$)
Animal Management	32	41,244
Crop, Nutrient, & Management	23	16,339
Food Systems & Organics	29	42,348
Youth, Conservation & Other	22	31,684
Agroforestry & Water Quality	20	25,238
Sustainable Agriculture	17	24,227

The Leopold Center helped sponsor 24 regional conferences, workshops, tours, and camps in 2000-2001. These events reached more than 3,200 farmers, community leaders, educators, researchers, and youth in 13 Iowa communities. The Center also helped send Iowa farmers and community leaders to events in Illinois and Minnesota. Topics addressed at the Iowa educational programs included

- ↪ water quality,
- ↪ local food systems,
- ↪ grazing management,
- ↪ alternative crops,
- ↪ native grass management,
- ↪ nutrient management,
- ↪ youth education, and
- ↪ organic agriculture.

After awarding conference grants in spring 2001, the Leopold Center terminated its conference/workshop program. This decision was based partly

on the legislative cuts to the Center's budget. There was a perceived need, as well, for a new direction in the Center's sponsorship of educational events that are more consistent with the objectives of the three new research initiatives. This will be accomplished through targeted requests for event proposals and new collaborations and partnerships. Consistent with the Leopold Center's mission, the original conference/workshop support program was an important and efficient vehicle to carry the research findings of the Center to the public. It allowed the Center direct access to farmers, community leaders, and youth. The program nurtured partnership opportunities with numerous organizations and groups from across the state. The Leopold Center is grateful to the leaders and organizers of all these events who worked hard to make a difference through sustainable agriculture education.

New emphases

The new event-based outreach program of the Center continues in the same tradition, but with a focus on the Center's three new initiatives – **ecology - marketing - policy** – which leads to one or more of these outcomes:

EDUCATION AND OUTREACH



WHO ARE THE PLAYERS?

Government	Agencies receiving
National Resources Conservation Service (5)	Resource Conservation District
Iowa Department of Agriculture & Land Stewardship (2)	Limestone Bluffs (5)
Carroll County SWCD (1)	Geode (2)
Iowa Association of Water Agencies (1)	Sioux Rivers (2)
Iowa Department of Natural Resources (1)	Golden Hills (1)
Johnson County SWCD (1)	Iowa Lakes (1)
O'Brien County Economic Development Corp. (1)	Iowa Valley (1)
Story County SWCD (1)	Chariton Valley (1)

* This list reflects the primary sponsoring organizations. Most events have multiple sponsors. (Reflects



emphasis

- > **Ecologically** friendly systems less dependent on purchased farm inputs,
- > **Markets** for food and fiber that support and are linked to resilient local communities,
- > New food and agriculture **policies** that are community and farmer friendly.



PFI Youth Camp



The Center will hold and support conferences and other educational events that directly support the three new focus areas and will seek partners to co-sponsor and help coordinate these events.

Master Conservationist program

The Center continued support of a statewide Master Conservationist program in 2000-2001. Program participants provide 32 hours of volunteer service in conservation-related activities in exchange for 32 hours of conservation instruction. Nine counties have Master Conservationist programs in 2001, with four of these being held in counties that are new to the program. ISU Extension coordinates the program.

Summer interns

The Center continued its summer intern program that provides students with sustainable agriculture experiences. In 2001 Sarah Low and Annette Mathieu shared the summer internship. Sarah Low, an ISU public service in agriculture (PSA) major, helped education coordinator Rich Pirog develop a Powerpoint presentation on local food system projects and enterprises, and helped coordinate a meeting of sustainable

agriculture experts and Center staff in July 2001. Annette Mathieu, also an ISU PSA major, compiled evaluation data from Center-sponsored educational programs and researched food system pathways for potatoes consumed in Iowa.

Number of Leopold Center-sponsored events, number of people attending, and total annual expenditures from 1993 - 2001*.

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001
Events	4	10	18	16	18	19	20	25	13
Attendance	465	1,105	1,527	2,631	2,341	1,105	2,692	2,822	4,353
Dollars Spent	5,861	10,949	14,462	26,675	28,045	14,622	29,441	33,966	17,059

* Through June 30, 2001

program funds and number programs sponsored. *

Education	Farm	Non-Profit/Other
Iowa State University Extension (69)	Practical Farmers of Iowa (16)	Center for Health Effects of Environmental Contamination (2)
Center for Agricultural and Rural Development (3)	Organic Crop Improvement Association (1)	Iowa Environmental Council (2)
Southwestern Iowa Community College (3)		Coop Development Services (1)
Iowa State University Forestry (2)		Iowa Grape Growers Association (1)
Neely-Kinyon Farm (2)		Iowa Network for Community Agriculture (1)
Northeastern Iowa Community College (2)		Iowa Newspaper Foundation (1)
University of Northern Iowa (2)		Iowa Recycling Association(1)
Iowa State University Ag Ed (1)		Raccoon River Watershed Project (1)
Iowa State University Economics (1)		Trees Forever (1)
Iowa State University Entomology (1)		University of Northern Iowa Museums (1)
		Women, Food and Agriculture Network (1)

period from 1993-2001.)

Center sparks **food systems** interest in Iowa

agriculture

Iowa CAFÉ Workshops

The Leopold Center partnered with Practical Farmers of Iowa, ISU Extension, and the Iowa Natural Resources Conservation Service to plan and conduct a series of five food system workshops that were held throughout the state in May and June of 2001. Nearly 300 farmers, educators, agency representatives, economic and community development specialists, private entrepreneurs, and representatives from nonprofit groups and the faith community attended the sessions. Several neighboring states

have indicated a strong

interest in using the Iowa CAFÉ (Community Agriculture Food Enterprises) as a model for developing their own food system

workshops. As part

of the CAFÉ workshop, education coordinator Rich Pirog and intern Sarah Low developed a Powerpoint presentation on the "Face of the New Agriculture in Iowa," which highlighted many of the state's ongoing food system projects and enterprises.



How many miles does your food travel?

"Food, Fuel, and Freeways: An Iowa perspective on how far food travels, fuel usage, and greenhouse gas emissions" was released by the Center in June 2001. The report looked at the distance traveled by fresh fruits and vegetables and meats served as part of three Leopold Center-funded projects that used locally-sourced food grown by Iowa farmers. The local foods traveled an average of 45 miles from farm to point of sale, compared to 1,546 miles of transport for the same items from conventional sources. The report also compared the miles traveled by 28 fresh produce items grown in Iowa in local, regional, and conventional systems. Findings showed that the conventional system used 4 to 17 times more fuel and emitted 5 to 17 times more CO₂ than the local and regional systems, depending on the system and the truck type used. Information from the report will be used by several Iowa and regional groups working with community-based food systems, by food retailers and distributors in their planning and marketing, and by educators in college food system courses.



Summerset

Center report informs discussion of new Wine and Grape Commission

A bill establishing an Iowa Wine and Grape Commission and a related development fund was passed by the Iowa General Assembly and signed by Governor Tom Vilsack in 2001. The commission will monitor conditions affecting development of the grape and wine industry in the state and create new programs to support the industry. Prior to the vote, copies of *Grape Expectations*, a 2000 Leopold Center paper, were requested as background reading on the grape industry for Iowa legislative staffers. (The Center distributed more than 1,200 copies of the grape paper to Iowa farmers, agricultural educators, and researchers.)



Community Supported Agriculture



Vineyards

Johnson
County



Farm to School Conference links teachers, farmers, and school food service providers

Nearly 100 farmers, food service managers, and educators participated in a November 2000 special program to explore partnerships between food producers and processors and school districts. The Leopold Center, ISU Extension, Practical Farmers of Iowa, and the ISU Hotel, Restaurant, and Institution Management Department sponsored the conference. Participants discussed cost effectiveness, food availability, reliability, and safety, as well as purchasing regulations. Several schools expressed interest in following the lead of the Nevada school district. This central Iowa district has tested “farm to school” programs in which local growers provide some school cafeteria food items, and food system education is integrated into classroom instruction.



Farmer's Market, Clinton, Iowa

Siouxland project on rural marketing continues

“Our Rural Supermarket,” a Sioux City-based local foods pilot project entered its second and final year of Center sponsorship in 2001. The project, led by Sioux Rivers RC&D, continues to collect data on potential local food markets in the Siouxland area (northwest Iowa, southeast South Dakota, and northeast Nebraska).

Food Policy Council presents Governor with recommendations, receives Federal funding

The Iowa Food Policy Council, appointed by Iowa Governor Tom Vilsack and chaired by Drake law professor and Center board member Neil Hamilton, submitted its first annual recommendations to the Governor on April 30, 2001. Their report included a call for two task forces composed of various state agency representatives to suggest improvements in state food security and institutional buying activities. In May 2001, Governor Vilsack extended the life of the council for another year, and took action on some of the council's recommendations. The council also received a U.S. Department of Agriculture grant for \$65,000, which will allow the Council to hire staff to coordinate activities and perform research. (Leopold Center staffer Rich Pirog is a special advisor to this council.)



Michael Shuman

Author Michael Shuman touts local enterprises in ISU visit

Small-scale, locally-owned companies can be successful today, whether they are farms or community-based business ventures. Unlike the retail behemoths, these smaller businesses are more likely to be attuned to community needs and responsive to concerns about quality of life and the environment. They just need community buy-in and funding to get started. That's the message Michael Shuman, Washington, D.C.-based author and Village Foundation director, shared with ISU audiences in a September 2000 visit.

In his 1998 book *Going Local: Creating Self-Reliant Communities in a Global Age*, Shuman offered plenty of examples of thriving, modest-sized enterprises ranging from utilities to cooperatives to employee-owned firms. Currently he is working with the Chesapeake Bay Foundation to create Chesapeake-Friendly Chicken, a community-owned chicken processing business.

In Iowa he saw a variety of opportunities for community-friendly businesses to be established with the help of venture capital. Funds might come from government, private industry, consumer groups, or nonprofit foundations. He advised his listeners that "the only way communities can ensure their economic well-being is to stop chasing multinational firms with no community loyalties, and to start investing in community corporations."

Shuman returned to Ames in July 2001 as one of seven invited professionals from various arenas who offered ideas on strategies and plans for the Leopold Center to begin work on its three new research initiatives in marketing, policy, and ecology. At that meeting, Shuman joked that he was the founding member of the Leopold Center's East Coast Auxiliary.

Michael Price, Minnesota tribal college professor, tells how Native Americans approach science

The integrated, holistic approach to science and nature that often seems outside the bounds of modern technology is an easy matter for Michael Price. He meshes his own Native American ethos with the lessons in his science classes at Leech Lake Tribal College near Cass Lake, Minnesota. His students learn about nature from age-old ceremonies as well as from up-to-date scientific experiments.

In a March 2001 speech at ISU Price said, "We are not just invisible, objective observers but actual and accountable participants in the complex web of life. The ideas of sacredness and spirituality directly affect our relationship to and interaction with nature and one another."

Price, a member of the Wikweimikong First Nations, is the institutional representative for his college on a \$3.7 million grant from the Cooperative State Research, Education, and Extension Service that involves eight educational institutions. The grant sponsors research and education on the social, economic, and ethical aspects of biotechnology. Several ISU units, including the Leopold Center, are involved in the grant planning activities.

As part of the project, Price told his listeners that he sees many questions that can be asked about genetic engineering based on his background and heritage. Among them: How will what we do today impact seven generations from now? Why are we doing this? What are we giving back to the planet?



“Sustainability

is doing the right thing

at the right time for the right reasons.” - John Pesek

John Pesek



Sustainable agriculture at Iowa State gains a graduate program and a colloquium

Unique sustainable agriculture graduate program underway

Iowa State University has admitted students to the nation's first combined masters and doctoral degree program in sustainable agriculture. The Iowa Board of Regents approved the new sustainable agriculture program in July 2000 and the first group of candidates entered the program in fall semester 2001. The sustainable agriculture graduate curriculum is supported by several departments in the College of Agriculture and administered by the Henry A. Wallace Endowed Chair for Sustainable Agriculture. The Leopold Center is contributing \$15,000 per year for three years for a graduate student stipend to be called the Leopold Fellowship.

The new grad students will be able to select from classes in ten departments: agricultural and biosystems engineering, agricultural education and studies, agronomy, animal science, anthropology, entomology, forestry, horticulture, plant pathology, and sociology. In addition to the academic offerings by the university, the students will have access to the resources of the Leopold Center, ISU

Extension, the organic crops research program, and Practical Farmers of Iowa. The first semester's enrollment includes 13 master's and 5 doctoral degree students.

Colloquium honors Pesek's contributions

With the heightened university interest in sustainable agriculture, agronomy graduate students at ISU decided to launch a colloquium that would showcase sustainable agriculture. They hope this forum would become an annual event under the sponsorship of the Henry A. Wallace Endowed Chair for Sustainable Agriculture and the Leopold Center for Sustainable Agriculture. When it came time to name the fledgling sustainable agriculture colloquium and select the first speaker, the choice was a "no-brainer." It had to be Dr. John Pesek!

John Pesek, Charles F. Curtiss Distinguished Professor of Agriculture, was the longtime (1964-1990) head of the ISU Agronomy Department, and served as president of both the American Society of Agronomy and the Soil Science Society of America. These are impeccable mainstream agriculture



John Pesek

credentials. Yet Pesek remains a prescient and courageous figure in sustainable agriculture for his role in chairing the National Research Council committee that produced the landmark 1989 book *Alternative Agriculture*. From the time of the passage of Iowa's Groundwater Protection Act, Pesek has been a strong and involved supporter of the Leopold Center and its activities.

He presented the first-ever address for the John Pesek Colloquium on Sustainable Agriculture on March 1, 2001 at ISU's Scheman Building. A copy of his speech is available on the Web at <http://www.ag.iastate.edu/centers/leopold/pubinfo/papersspeeches/pesek.html>. The next day he traveled to Decorah to chair a panel discussion on sustainable agriculture in Iowa.

Competitive Grants Program

The Leopold Center will fund 11 new competitive grant projects for FY2002, a smaller number than usual. This will allow research funding to be shifted to the Center's three new initiatives (policy, ecology, and marketing) that will be launched in FY2002. In addition, 31 projects were renewed for an additional year of funding. Sixteen projects closed June 30, 2001, and will provide their final reports to the Center later in the year.

AGRICULTURE AND COMMUNITY



Alternative and horticultural crop education and marketing pilot project, 3 years

R. Fleharty, Southern Iowa Ag Diversity Corporation, Corning

How can farmers set up a cooperative to produce, market, and sell specialty and value-added horticultural and agricultural products? Within this pilot effort, they worked on developing a business plan, greater storage capacity, grower networks, and demonstration plots.

NEW

Developing a local food system in association with business and industry, 3 years

W. Johnson, Limestone Bluffs RC&D, Maquoketa

A group of agricultural producers, in conjunction with local businesses and a sheltered workshop, will create a subscription sales demonstration project for local food. Plans include three sites for distribution of fresh and frozen local foods and preserved products. The goal is to raise awareness and demand for local products, and introduce season-extending and value-added opportunities for local producers.

Establishment of a local food system in eastern Iowa, 3 years

W. Jones, Johnson County Soil and Water Conservation District, Iowa City

Activities in this project include linking producers and restaurants, serving all-Iowa meals, developing a producer directory, and collecting sales and cost data to help build a local food system in Johnson and surrounding counties. Investigators hope to increase commerce between local producers and consumers, strengthen rural-urban ties, and help the public to better understand the environmental, economic, and social implications of sustainable local food production.

Examining the potential for organic apple production: the Homestead Orchard project, 3 years

S. Muller, The Homestead, Runnells

An organic apple orchard with 360 dwarf trees has proved to be a valuable part of an occupational program for 32 autistic adults at The Homestead. Center funding helped establish the orchard in 1998. Participants in Homestead's vocational program have been taking care of the trees since then, and have enjoyed the first organic apple harvest in September 2000.

Institutional and commercial food service buyers' perceptions of benefits and obstacles to purchase of locally grown and processed foods, 2 years

C. Strohbahn and M. Gregoire, ISU hotel, restaurant and institution management

Preliminary findings indicated the greatest perceived benefits of purchasing food locally were good public relations, fresher products, the ability to purchase smaller quantities, and aiding the local economy. The greatest obstacles were availability of a year-round and adequate supply, local and state regulations, and dealing with more vendors. Food safety was of some concern to food buyers, but was not rated as the greatest concern. During the next year, investigators will visit 10 sites within 120 miles of Ames for in-depth evaluation of these issues. They also will collect food samples for bacterial analysis.



An internship program to help institutional food buyers develop links to local farms in northeast Iowa, 3 years

K. Enshayan, Center for Energy and Environmental Education, University of Northern Iowa

This project seeks to facilitate a stable local food-buying process by placing trained interns in several hospitals and nursing homes, and with other large food buyers. Investigators are monitoring farmer income and satisfaction, and preparing a checklist that summarizes the barriers and opportunities for incorporating local food into institutions. Five institutions are interested in joining the project in addition to five that already are a part of the program.

NEW
Local food connections: from farms to restaurants, 2 years

R. Karp, Practical Farmers of Iowa

Drawing upon experience in their local food systems program, investigators are developing information for a four-page fact sheet and resource manual for producers who want to market their products to restaurants. Topics will include post-harvest handling, quality control, pricing, packaging, marketing, customer relations, legal/health issues, and producer cooperation.

Making the connection: linking farms to hotels, restaurants, and institutions (HRIs), 2 years

G. Huber and R. Karp, Practical Farmers of Iowa

In the concluding year of this project, a model for linking Iowa small- and medium-scale producers with HRIs was chosen. The model involved a growers' network that supplies these HRIs and a brokering service (operated as part of PFI's non-profit activities) to make the linkage. This work followed information gathering on opportunities and barriers for HRI buyers and clients, as well as the farmers.

Planning for grass-based dairies and dairy networks/promotions, 2 years

B. Beaman, Ag Connect, Lenox

Ag Connect is leading an initiative to promote, provide information for, and help establish a grass-based dairy network in southern Iowa. They have helped four producers start new grass-based dairy operations, and are working with two other area producers. The grant provides funds for investigators to visit farms and related dairy businesses, to enlist "mentor" operations, to collect input and expertise from dairy specialists and analysts, and to conduct interviews to identify strong candidates for the goal of successfully establishing 12 grass-based dairies in southern Iowa.

Sustainability and community food systems in four Iowa counties, 3 years

C. Hinrichs, ISU sociology

Statewide there is increasing interest in niche markets and local food, but little is known about the nature and dynamics of local food systems, or about how a broader community food system might be developed. Investigators are working in Benton, Audubon, Marshall, and Johnson counties to collect information (production, processing, distribution, service, consumption, security, education, and policy) about food and food retailers. They are conducting field interviews of food system ventures (farmers markets, small-scale processors, community supported agriculture groups, etc.) and traditional food system outlets (lockers, independent grocers, congregate meal programs).

NEW
Sustaining agricultural producers through direct marketing of processed foods, 3 years

C. Chase, Black Hawk County ISU Extension, Waterloo

This education and demonstration project investigates potential returns for farmers who are considering the switch from commodity to food crops. Investigators will first focus on demand and profitability for various processed food products, and then look at related food business startup issues, from production and safety to planning and market development.



AGROECOLOGY



NEW

Black walnut cultivar performance, 3 years

B. Hanson, Iowa Nut Growers Association, Centerville

Members will plant a number of black walnut cultivars at several sites throughout Iowa and track costs and performance. Their data will be used in an Iowa black walnut cultivar selection guide that is being developed for growers and serious hobbyists.

Improving tree establishment with forage crops, 3 years

C. Mize, ISU forestry

Techniques for establishment of fast growing and high-value hardwood seedlings, a potential revenue source, are a concern to a variety of producers. This project provides data on tree growth and survival, crop productivity, and system economics for seedlings grown under several different treatments.

Iowa location for pawpaw regional trials, 3 years

P. O'Malley, Johnson County ISU Extension, Iowa City

This project established a site in Louisa County to evaluate the potential of the indigenous pawpaw fruit as a commercial crop for Iowa. After two growing seasons, the survival rate is 81 percent. This may be slightly depressed by some early planting and mowing accidents with

the trees, but the effects of these incidents also may have been offset by a slightly inflated survival rate from the mild winter of the first year. Twenty additional trees grown from seed of a wild Louisa County population were planted in spring 2000 at Nashua. These trees will help identify cold hardiness in the species. The project is part of a regional trial conducted by the Pawpaw Foundation to evaluate 28 varieties for fruit and growth characteristics.

CROP AND/OR FORAGE SYSTEMS



Demonstration and technology transfer to producers implementing sustainable rotational grazing systems, 2 years

M.D. Boswell, Southern Iowa Forage and Livestock Committee, Corning; and B.C. Peterson, Natural Resources Conservation Service, Creston

Using the Adams County Conservation Reserve Program (CRP) farm and producer acres in a multi-county area, investigators plan a series of demonstrations to address issues related to rotational grazing systems. "Hands-on" demonstrations (with attendee participation) include stream crossing/water access, use of Kura clover, establishment and maintenance of legumes into grass-based forage using a no-till drill, incorporation of warm-season grasses into an existing grazing system, installing water distribution systems, and materials and methods for installing electric fence, including New Zealand-style electric fence.

Development of dormancy breaking mechanisms in eastern gamagrass, 3 years

L.R. Gibson and A.D. Knapp, ISU agronomy

Interest in gamagrass has risen in recent years because of its potential value as a forage that livestock prefer, as a possible silage replacement for corn on marginal land, as a grass hedge for control of soil erosion, for wildlife habitat, for biomass production, and for reclamation of certain lowland areas and disturbed sites. Unfortunately, eastern gamagrass also boasts a robust seed dormancy mechanism, making it very difficult to establish. Researchers are working with several seed conditioning procedures to find a way to break seed dormancy in a practical manner, increase germination rate, and speed seedling development. The practical result of the work will be to supply a high-germination dry seed for producers and conservationists.

NEW

Development of switchgrass as a viable agricultural commodity for farmers in southern Iowa, 2 years

D. Guffey, Chariton Valley RC&D, Centerville

This project continues funding to develop and distribute information and educational materials for the multi-county, multi-agency Chariton Valley Biomass power project. Topics include establishment and management of switchgrass for biomass, carbon sequestration, water quality, and the economics and additional environmental impacts of these processes.



Development of switchgrass as a viable agriculture commodity for farmers in southern Iowa, 3 years

D. Guffey, Chariton Valley RC&D, Centerville

The Center provided funds for education and outreach efforts on behalf of this extensive, decade-long alternative energy project aimed at assessing the viability of switchgrass as a renewable energy source. The first test firing of coal and switchgrass occurred in November 2000 at the Alliant Energy power plant in Ottumwa, and subsequent tests are planned. In addition to the use of switchgrass to help generate electricity, researchers are looking for other potential applications of the warm-season grass in consumer and building products.

Evaluating the adaptability of forage species and varieties in northwest and south central Iowa, 3 years

D. Haden, ISU Northwest Research and Demonstration Farm, Sutherland

Stands of legumes and grass species are being evaluated at the Doone research farm site to determine regional adaptation, longevity, and forage traits. In the legume studies, 'Rhizo' kura clover, 'Windsor' cicer milkvetch, and 'Bigbee' berseem clover are being compared to 'Marathon' red clover, 'Jade II' alfalfa, and 'Norecen' birdsfoot trefoil. The eight grass species and varieties include 'Pete' Eastern gamagrass, 'Barenbrug' perennial ryegrass, 'Sikem' annual ryegrass, and 'Cheyenne' bermudagrass to be evaluated against 'Bounty' smooth bromegrass, 'Duke' orchard grass, 'Climax' timothy, and an endophyte-free tall fescue. Stands were established in 2000, and first forage harvest is scheduled in June of 2001.

Feasibility of organic soybean production following Conservation Reserve Program (CRP) land, 3 years

K. Delate, ISU horticulture and agronomy

Three years of evaluating 32 research plot trials at ISU's McNay Farm are coming to an end. Organic soybeans were grown following CRP land using the following tillage methods to open the ground: fall plow, spring plow, Kverneland plow, and Howard Rotavator. The tillage systems were evaluated based on biological and economic outcomes.

Improving productivity of warm-season pastures by interseeding legumes, 3 years

K. Moore, ISU agronomy

Growing legumes in mixtures with warm-season grasses could improve the quality of forage to grazing animals, and potentially reduce or eliminate nitrogen fertilizer requirements of a pasture. Twelve annual, biennial, and perennial legumes (hairy and crown vetch; crimson, red, white, kura and berseem clover; white and yellow sweetclover; alfalfa; cicer milkvetch, and birdsfoot trefoil) were interseeded into existing switchgrass and big bluestem pastures at the ISU Western Research Farm near Castana as part of earlier Leopold-funded work. Using data from strip grazing of beef cattle, cattle weights, forage and soil quality, and legume density and persistence, the investigators are developing site-specific recommendations to optimize warm-season grass pastures for cattle production in western Iowa.



NEW Incorporating grassland agriculture into row crop production systems, 3 years

M. Mensching, USDA-Natural Resources Conservation Service, Knoxville

The project goal is to increase farmer use of grass-based conservation alternatives in Madison, Warren, Marion, and Mahaska counties. Planned activities include workshops, surveys, analysis, and on-farm demonstrations about critical area seeding, contour buffer strips, grassed headlands, grassed waterways, rotational grazing, filter strips, and forage and seed production, marketing, and comprehensive farm financial analysis.

Local ecotype prairie seed-an alternative agricultural product for increasing the viability of smaller farming operations, 4 years

J. Selby and K. Fletcher, The Nature Conservancy, Des Moines

Investigators plan to assess the potential for local ecotype prairie seed as an alternative agricultural product for Iowa through market analysis and on-farm production demonstrations. A diverse seed mix of 45 species typical of the Loess Hills tallgrass prairie was gathered in the fall of 1998 for use in the 1999 plantings. The project has established demonstration sites at Broken Kettle Grasslands on a portion of the Briar Cliff College campus adjacent to the Sioux City Prairie, and on private lands of three area cooperators. *A Practical Guide to Prairie Reconstruction* was published in cooperation with Carl Kurtz. Market analysis will be completed this year.

Organic farming demonstration projects (eastern Iowa), 3 years

W. Johnson, Limestone Bluffs RC&D, Maquoketa; K. Delate, ISU horticulture and agronomy

Weed and soil management techniques on a variety of herb and vegetable crops were goals for the demonstration plots on the Andrew Jackson Demonstration Farm. St. John's wort, echinacea, peppers, onions, tomatoes, parsley, thyme, lettuce, and cabbage were among the crops grown. In the 2001 crop year, the project demonstrated the use of high tunnel season extenders and floating row covers. Plots at New Melleray Abbey demonstrate weed control for organic row crops, use of compost as an amendment, and the value of nitrogen-producing cover crops.

NEW

Sustainable grape production for the reestablishment of Iowa's grape industry, 3 years

G. Nonnecke, ISU horticulture

In response to increased interest in viticulture in Iowa, experimental field plots will be established in central and southwest Iowa, and on-farm research conducted, in an effort to identify sustainable management tools for growers. Researchers will be looking primarily at plant management issues such as cultivar performance, training systems for vines, and integrated pest management. They also plan to write a producer guide to grape pest management.

NEW

The value of CRP filter strips for grassland bird communities, 2 years

L. Best, ISU animal ecology

The investigator plans to evaluate bird use and bird productivity in Conservation Reserve Program (CRP) filter strips to determine if the strips represent a boon or an ecological trap. The study will document species composition, abundance, and nesting success in conjunction with strip width, plant species, and proximity of woody vegetation for both game and non-game birds.

LIVESTOCK MANAGEMENT



Chariton Valley Beef (CVB) Industry Initiative, 3 years

J. Sellers, Lucas County ISU Extension, Chariton

Beef producers in 20 counties are looking for better ways to market their products. Participating farmers receive general and specialized information from a database of producers, supporters and suppliers, and auction houses. CVB members add value to their calf crops by selling to grid markets, documenting health and genetic backgrounds of their calves, and making key management changes.

Complementary grazing systems for beef cattle production, 3 years

K.J. Moore, ISU agronomy

This grazing study at the McNay Research Farm near Chariton measures the impact of legumes and warm-season grasses (smooth bromegrass, birdsfoot trefoil, alfalfa, big bluestem, switchgrass, kura clover) on season-long productivity of complementary grazing systems (which will be stocked with crossbred steers). Eight complementary and four continuous grazing systems are being evaluated. One of the most striking results to date is the impact of yearly weather on system performance. There are no clear trends on animal performance to date, but work suggests that grazing system stability will be improved with higher species diversity. It is becoming increasingly clear that Kura clover needs to be included in the mix, regardless of grazing sequence.

Demonstration of swine carcass composting as part of an environmentally friendly production system, 2 years

J. Harmon, ISU agricultural and biosystems engineering

Composters for swine carcasses were built at two ISU research farms near Madrid and Atlantic. Both composters have shown that with proper management, composting works well for disposal of swine mortalities. Pigs ranging from newborn to large sows have been composted using sawdust and corn stalks as co-composting material. Besides offering tours to various visitors, a web site (<http://www.ae.iastate.edu/PIGSGONE>) was designed to highlight the compost demonstrations.



Evaluating pork production systems for niche markets, 3 years

*D. Stender, Cherokee County
ISU Extension, Cherokee*

Furthering efforts begun with an Iowa Pork Industry Center grant, the investigator is working with area producers to establish on-farm baseline data for side-by-side hoop and confinement operations. The investigator is tracking detailed production records including nutrition, labor, bedding, and carcass characteristics. Genetic lines will be identified when possible, and data kept by season and type of operation. Antibiotic use will be tracked, and on-farm odor and water quality assessment and a building audit will be available for each participant. Three producers signed up for the first year and another three will be added this year. Problems in setting up new farm data tracking software slowed initial work.

Growing dairy heifers in southwest Iowa, 3 years

R. Sanson, Clarinda

What is the potential for raising dairy heifers in southwest Iowa, particularly given the dynamics of today's dairy markets? ISU Extension specialists, local producers and lenders, and the Page County Rural Economic Development Organization cooperated in collecting and analyzing economic and production data that can be used to refine management practices and realistically assess the market for dairy heifers.

Winter grazing of corn residues: effects on soil properties and subsequent crop yields from a corn-soybean crop rotation, 3 years

*D. Busby, Southwest Area
Extension Center, Lewis*

This project is looking at the effects of grazing corn residues in different winter months on soil physical and chemical properties, and on subsequent crop production (corn-soybean rotation using either conventional or no-tillage methods). Data also are being collected on monthly cow condition scores and amounts of hay fed. Sites were established with cooperators near Atlantic and Chariton, and grazing initiated in October and November of 1999, respectively. First-year results indicated that while grazing corn crop residues at Atlantic and Chariton affected soil surface roughness and surface penetration resistance, respectively, the changes did not adversely affect yields of soybean planted with disking or no-tillage in the subsequent year. Grazing of corn crop residues significantly reduced the amounts of hay required to maintain the cows.



NUTRIENT MANAGEMENT



Agronomic and environmental soil testing for phosphorus and threshold levels in soils, 3 years

A. Mallarino, ISU agronomy

The overall goal of the project is to provide practical information for more efficient use of phosphorus (P) resources in agronomic settings. Preliminary results suggest that incorporating fertilizer or manure into the soil by chisel plowing or disking after a broadcast application, or by subsurface banding or injection in no-till or chisel-plow systems, will markedly reduce the accumulation of P in the top 2 to 3 inches of soil without affecting grain yield. Agronomic and environment soil P tests could both be similarly correlated to dissolved P in field plot runoff. No test was correlated with P loss in the tile water, probably because P loss through this mechanism was very low in the first year. Relationships of rates and methods of P application, soil P, and P concentration in water are being used to help develop the Iowa P index.



Crop response to zinc as a micronutrient in Iowa, 2 years

R. Killorn, ISU agronomy

Zinc assessments were completed on sites in six Iowa counties—each with at least two different soil types. Researchers are looking at responses to zinc fertilizers within fields, and then identifying soil characteristics in responsive areas.

Environmental impacts of the use of poultry manure for agricultural production systems, 4 years

R. Kanwar, ISU agricultural and biosystems engineering

The project is monitoring two application rates of poultry manure and commercial fertilizer nitrogen on corn and soybeans for leaching of $\text{NO}_3\text{-N}$ (nitrate-nitrogen), $\text{PO}_4\text{-P}$ (phosphate-phosphorus), and pathogenic bacteria to subsurface drainage water and shallow groundwater. The work shows that excessive use of poultry manure may increase pollution potential of water resources from nutrients and bacteria. However, poultry manure applications at a rate of 168 kg-N/ha resulted in the lowest $\text{NO}_3\text{-NO}$, $\text{PO}_4\text{-P}$ in subsurface drain water, and had a higher corn and soybean yield than the other treatments. This is a significant finding for use of poultry manure as a nutrient source for agricultural crops. Variations in rainfall, land slope, and hydraulic properties of the plots have made it difficult to identify significant trends in runoff concentrations.

Evaluation of organic soil amendments for certified organic vegetable and herb production, 3 years

K. Delate, ISU horticulture and agronomy

Poultry litter, feathermeal, Bio-Cal®, and conventional fertilizer have been applied in various crop production systems and their impacts evaluated at several on-farm and research farm sites.

Livestock and the environment project in Sioux County, 3 years

K. Kohl and J. DeJong, Buena Vista and Plymouth County ISU Extension, Storm Lake and LeMars

Members of the Northwest Iowa Extension environmental team are determining how producers use manure as a crop nutrient, what barriers deter producer use of manure as a nutrient, and if a new pit-sampling method is useful for producers. Surveys showed that Sioux County producers reduce their commercial fertilizer applications when manure is applied; producers who tested their manure were much more likely to take credit for the manure nutrients and made greater reductions in commercial fertilizer; and most producers who tested their manure believed that the manure's fertilizer value was better than or equal to commercial fertilizer. Early results of the surface pit-sampling method showed it to be a better predictor of nitrogen and potassium than profile samples, and showed the profile samples to be a better predictor of phosphorus levels.

Optimizing swine hoop manure management for soil quality and crop system performance, 3 years

T. Richard and M. Liebman, ISU agricultural and biosystems engineering and agronomy; D. Exner, Practical Farmers of Iowa and ISU agronomy; C. Cambardella, USDA-ARS National Soil Tilth Laboratory

Researchers plan to continue on-farm and research station experiments to evaluate the impacts of alternative hoop manure management strategies (corn/soybean rotation, composted manure, bedded manure, spring and fall applications) on soil quality and cropping system performance. Data are being collected on farm management, compost and bedding composition, soil biochemical properties, soil microbial biomass, crop biomass and macronutrient content, and seed yield. Six on-farm cooperators and research stations at Rhodes and Boone are participating.

Optimizing solid manure application by improving distribution, 3 years

M. Hanna, ISU agricultural and biosystems engineering

Solid manure application, which has environmental benefits and could substitute for commercial fertilizers, would be more acceptable to farmers if they could rely on uniform application. Researchers are evaluating the uniformity of existing spreaders, making recommendations for operating strategies that will improve uniformity, and developing a prototype solid manure applicator with improved application performance. Initial work shows trends based on load phase, apron delivery speed, and swath overlap. Most application occurred directly behind the spreader, so overlapping swaths by using travel lanes of similar width to the spreader was required to improve lateral distribution. Using overlapping patterns at reduced application rates may require reduced apron delivery speed or increased tractor ground speed to avoid over-application.



Reducing anhydrous ammonia application by optimizing distribution, 3 years

M. Hanna, ISU agricultural and biosystems engineering

In ongoing work to minimize inconsistent application by anhydrous ammonia equipment, researchers are comparing field distribution by a conventional manifold, a vertical dam manifold, a Cold-flo® device, and newly available manifolds and pump systems. They also have planned and tested two research manifolds. A wide variation was found between commercial models. This year they conducted spring and fall manifold tests, including testing of a new manifold designed by the research team, and continuation of the yield study started last year. The yield study helps assess the performance of different manifolds by looking at effective yields under different N rates.

Soil amendment effects on crop-weed interactions, 3 years

M. Liebman, ISU agronomy; and T. Richard, ISU agricultural and biosystems engineering

This research is investigating how amending soil with compost made from hog manure and cornstalks affects the growth and competitive ability of three weed species commonly found in Iowa corn fields (giant foxtail, velvetleaf, and waterhemp). The manure and cornstalk bedding come from swine hoop structures. Investigators are using both field experiments and laboratory analyses to (1) characterize manure properties and application rates; (2) evaluate the impacts of composted manure on corn and weed growth, yield, and competitive interactions; and (3) integrate information into a broader study of manure, legume residues, and tillage effects of soils, crops, and weeds. Early results suggest that compost application can enhance corn growth and may shift the relative proportions of species within weed communities.

PEST MANAGEMENT



Biologically intensive manipulation of foxtail soil seed banks for enhanced mortality, 3 years

J. Dekker, ISU agronomy

In the last year for the project, investigators focused on analyzing the extensive data set that had been assembled on the emergence, mortality, and long-term carryover of giant foxtail in soil seed banks and how these factors vary over time.

Biotic interference of biological control of purple loosestrife, 3 years

J. Obrycki, ISU entomology

In an earlier grant, the Leopold Center and Iowa Department of Natural Resources funded a biological control program to develop a mass rearing and release program for *Galerucella* beetles. They are natural enemies of an invasive, exotic wetland plant (purple loosestrife) that is overpopulating water features in the state. However, the expected reduction in plant density has not been recorded. This project is investigating several ecological interactions, such as identifying arthropod predators and quantifying predation at different life stages, to identify strategies that will improve the effectiveness of the beetles as a biocontrol agent.

Development of *Sporidesmium sclerotivorum* as a biocontrol agent for *Sclerotinia* stem rot of soybean, 2 years

C.A. Martinson, ISU plant pathology

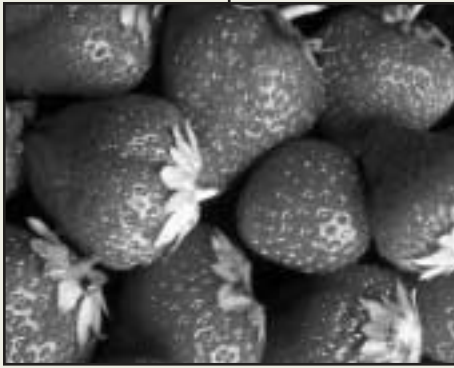
Current management schemes for white mold in soybeans involve the application of pesticides, use of wide rows, and/or planting lower-yielding tolerant varieties. Prior Leopold Center research had found that *Sporidesmium* spores applied to soybean fields after a white mold epidemic will reduce the amount of disease in a subsequent soybean planting by 50 to 100 percent. Further management information for farmers is needed, as is a better method of mass producing the spore itself. Work during the first year included: evaluation of control of white mold over four years of prior application of *S. sclerotivorum* spores; evaluation of the survival and spread of those same spores; work on improved methods for inoculum production; and establishment of additional field experiments.

Ecological impacts of herbicides associated with transgenic soybeans and spider mites, 2 years

L. Pedigo, ISU entomology

Research was conducted in laboratories and in the field to determine if outbreaks of spider mite and green cloverworm could be expected with the use of transgenic soybeans and related herbicide treatments.





NEW

The effects of thrips on strawberry production in Iowa, 2 years

J. Obrycki, ISU entomology

Beginning in 1994, strawberry growers adopted regular early-season insecticide applications to control thrips, minute insects whose feeding habits are suspected of being the agent behind bronzing damage. Investigators plan to document the level of thrip activity, if any, and to determine the actual losses and best management practices to help growers manage strawberry crops.

Effects of transgenic bacillus thuringiensis corn pollen on the monarch butterfly, 2 years

J. Obrycki, ISU Entomology

The monarch butterfly is a species likely to be affected by the increasingly widespread plantings of Bt corn. Previous research has shown that Bt insecticide sprays can have negative effects on nontarget moth and butterfly species. The objectives of the research are to 1) determine the sub-lethal effects of Bt corn pollen exposure on monarch larval development and adult characteristics, 2) quantify the use of milkweeds adjacent to Bt and non-Bt corn fields by monarchs, and 3) compare the survival of experimental cohorts and natural populations of monarchs adjacent to Bt and non-Bt corn fields. During the first year, higher than expected incidences of natural mortality occurred in the monarchs, precluding any preliminary conclusions on the objectives.

Evaluating sustainable, integrated management of muskmelon diseases, weeds, and insect pests in partnership with Iowa growers, 3 years

M. Gleason, ISU plant pathology

Muskmelons are one of the most widely grown and highest-value crops in Iowa, offering producers the opportunity to rapidly diversify and enhance cash flow. Using research plots and commercial grower farms, investigators are testing management techniques to reduce synthetic chemical use without sacrificing crop quality and yield. First-year results were very positive for the "Melcast" weather-based disease warning system, and also gave some strategic direction to effective sticky trap use. Soil dwelling bacterium that combat anthracnose had good results, and hairy vetch and winter rye cover crop plots were established.

Integrating biologically rational strategies for control of anthracnose fruit rot of strawberries, 3 years

M. Gleason, ISU plant pathology

Laboratory biocontrol screenings and modified field trials continued in the final year of this project. Growers of June-bearing and day-neutral strawberries will soon have better recommendations on economically feasible, biologically sound methods to control anthracnose fruit rot.



Investigation of the influence of tillage for management of woolly cupgrass, 4 years

M. Owen, ISU agronomy

Woolly cupgrass continues to be a problem weed in corn and soybeans. This research will look at woolly cupgrass response to various management practices such as tillage methods, tillage timing and chemical control; and make recommendations for effective management systems. Experiments include a tillage/herbicide field experiment to determine woolly cupgrass seed production, soil profile placement and seedbank number; and a tillage timing experiment to look at cupgrass mortality, germination, and emergence. No management recommendations are expected until the experiment is further along.

Managing weeds by integrating smother plants, cover crops and alternate soil management, 4 years

D. Buhler and K. Kohler, USDA-ARS National Soil Tilth Laboratory

This research looks at weed management alternatives: encouraging "untimely" weed emergence through tillage soil disturbance, management of the light environment, and management of cover crop and surface residue; and on developing spring-seeded smother plant systems that can provide consistent weed control without sacrificing crop yield. Results in 1999 and 2000 were encouraging for tillage timing and use of smother/cover plants as weed control options. Cover crops, especially rye, tend to reduce corn yield. Upcoming work will focus on cover crop densities.



Nontarget effects of Bt corn on pathogenic and toxigenic fungi, 2 years

G. Munkvold, ISU plant pathology

How do the popular Bt corn hybrids affect fungi that interact with corn pests? The project studied how different Bt corn genes impact stalk infection and stalk rot symptoms; corn aflatoxins, fumonisins, and other mycotoxins; and the occurrence of the beneficial fungi *Beauveria bassiana*.

WATER QUALITY



NEW Economically sustainable riparian buffer to promote bank stability and reduce gully erosion and phosphorus runoff in the Loess Hills, 3 years

J. Kelly, ISU forestry

Investigators propose to evaluate the effectiveness of a tree-based riparian buffer in the Deep Loess Hills for suitability in managing landscape issues such as erosion and phosphorus movement. Plant materials chosen are those which have potential economic value for owners: cottonwood, black walnut, bromegrass and alfalfa mix, and switchgrass.

Evaluating the effectiveness of restored wetlands for reducing nutrient losses from agricultural watersheds, 3 years

A. Van der Valk, ISU botany

The goals of this project are to examine the effectiveness of restored wetlands within the Iowa Great Lakes watershed to reduce nutrient losses; to determine if sub-watershed nutrient exports can be reduced further by altering the location, size, design, and/or management of restored wetlands; and to recommend workable guidelines for using wetlands as effective nutrient sinks. Initial work has included nutrient loss estimations, selection of restored wetlands for sampling, and collection of digital data layers for the modeling effort that would describe nutrient action in the sub-watersheds.

Impact of swine manure applications on phosphorus, $\text{NO}_3\text{-N}$ and bacterial concentrations in surface runoff and subsurface drainage water, 3 years

R. Kanwar, ISU agricultural and biosystems engineering

The goal of this research is to demonstrate the impact on surface and groundwater quality of liquid swine manure application when application is based on nitrogen (N) and phosphorus (P) needs of crops. Comparisons are being made between sources of nitrogen (liquid swine manure and liquid urea-ammonium nitrate, UAN, fertilizer), N application timings, and improved methods of application on six N experimental treatments. The study is tracking transport of $\text{NO}_3\text{-N}$, $\text{PO}_4\text{-P}$ and bacteria to surface runoff and subsurface drainage water. The work is being conducted at ISU's Northeast Research Farm near Nashua.

Soil carbon quality and interactions in Iowa wetlands, 2 years

T. Fenton, ISU agronomy

Wetlands possess many useful economic and environmental traits, from fishing to wildlife to water quality improvement. But significant changes in land use may have altered the natural potential of wetlands to participate in nutrient cycling and water quality maintenance. Researchers are examining soil chemical and physical variability, carbon sequestration, water movement, microbial processes, and denitrification in three north central Iowa wetlands in the Des Moines Lobe. The wetlands contain sites under natural conditions and also under restoration management periods of one, five, and 15 years. Researchers hope to use data to assess the ecology of similar Iowa wetlands.

NEW Understanding the potential of phosphorus transport to water resources via leaching, 2 years

J. Baker, ISU agricultural and biosystems engineering

Most of the current work to determine practices and policies that can reduce the total maximum daily load of phosphorus (P) in water supplies is through gross assessments of P leaching into surface water through subsurface drainage tile flows. Investigators in this project hope to provide new information and understanding about P movement in P-deficient subsoils, and to determine if such soils significantly lose their capacity to remove P over time.



Center's research and education projects concluded in 2000

Twenty-four projects funded by the Leopold Center submitted final reports on their work in 2000. Summaries of their efforts appeared in the 2001 Center Progress Report, which is available from the Center office, along with further details on the projects.

Among the completed programs featured:

Agriculture and communities

- Building Hope in the Heartland: a training program
- Community and economic regeneration through strengthening the local food economy
- Together in Tough Times

Crop systems

- Development and implementation of cost-effective fertilization and tillage management alternatives for improving soil quality in corn-soybean rotations
- Evaluation of forage plants collected from permanent pastures throughout Iowa
- Evaluation of three cropping systems grown under the influence of a shelterbelt
- Genetic diversity and performance of oat variety blends

- A simple method to increase alfalfa yields in the establishment year
- Small grain and annual forage legume intercrops for Iowa
- Soil quality, yield stability, and economic attributes of alternative crop rotations

Ecology

- Ecology and restoration of farmland woods in central Iowa
- The effects of transgenic soybeans and associated herbicide treatment upon soil-surface mesofauna
- Toxicity of pesticides adsorbed to suspended sediment to larval fish in the Cedar River

Education

- Biological control and sustainable horticulture principles for Iowa's vocational agriculture curriculum
- Statewide manure management education initiative

Livestock systems

- Botanicals as part of an integrated value-added pork production system
- Dairy manure quantification and characterization in grazing systems



Nutrient management

- Nitrogen conservation in swine manure composting-land application systems
- Socio-technical and environmental dimensions of swine manure management decisions

Pest management

- Biologically intensive pest management: Iowa apple growers take the next step toward sustainability
- Development of alternative carriers for use of *Beauveria Bassiana* in *Ostrinia nubilalis* suppression on corn
- Manipulation of predatory insects for enhanced biological control of insect pests
- Transferring biological control technology to Iowa strawberry growers
- Use of intra-field alfalfa trap cropping for management of the potato leafhopper



FY 2001 *financial* statement

Leopold Center for Sustainable Agriculture

REVENUES:

AMA	1,268,000
GPR	579,843
Total Revenues	1,847,843
Beginning Temporary Balancing Fund	1,865,461
Total Funds	3,713,304

EXPENDITURES:

Operational:

Salaries & Benefits	440,934
Info Systems	12,832
Office Equipment	4,803
Office Expenses	19,895
Printing	
Newsletter	6,513
Annual Report	16,643
Other	16,116
Postage	
Newsletter	3,551
Annual Report	678
Other	4,768
Travel	10,535
New Publications	
Board Meetings	2,097
Director's Search	6,553
Office Addition	7,790
<i>Encumbrances</i>	
Total Operational Expenditures	553,708

Research and Other Grants:

Competitive Grants	930,593
Issue Teams/Initiatives	272,610
PFI Partnership	100,000
Special Projects	5,802
Wallace Chair Support	0
Associate Director's Research	42,310
Total Grants	1,351,315



Center Sponsored Outreach:

Conference Grants	34,794
Education Programs	19,032
Special Conferences	3,052
Center Directed Conferences	
Total Outreach	56,878

Total Expenditures:	1,961,901
Returned from Grants	20,222
Balance	1,771,624

Ending Temporary Balancing Fund 1,101,124

Reserve Fund Balance

Salary Contingencies	238,000
Research Stoppage	332,500
General Contingencies	100,000

Reconfirmation Reality
Reflection



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