

LEOPOLD CENTER

FOR SUSTAINABLE AGRICULTURE



the journey

“It is good to
have an end
to journey
toward, it is
the journey
that matters
in the end.”

- Ursula K.
LeGuin

1998-1999
ANNUAL REPORT



LEOPOLD CENTER
FOR SUSTAINABLE AGRICULTURE



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

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.

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.

| Edited by Mary Adams | Graphic design by Juls Design |
| Photos by Leopold Center staff and PhotoDisc except where noted. |

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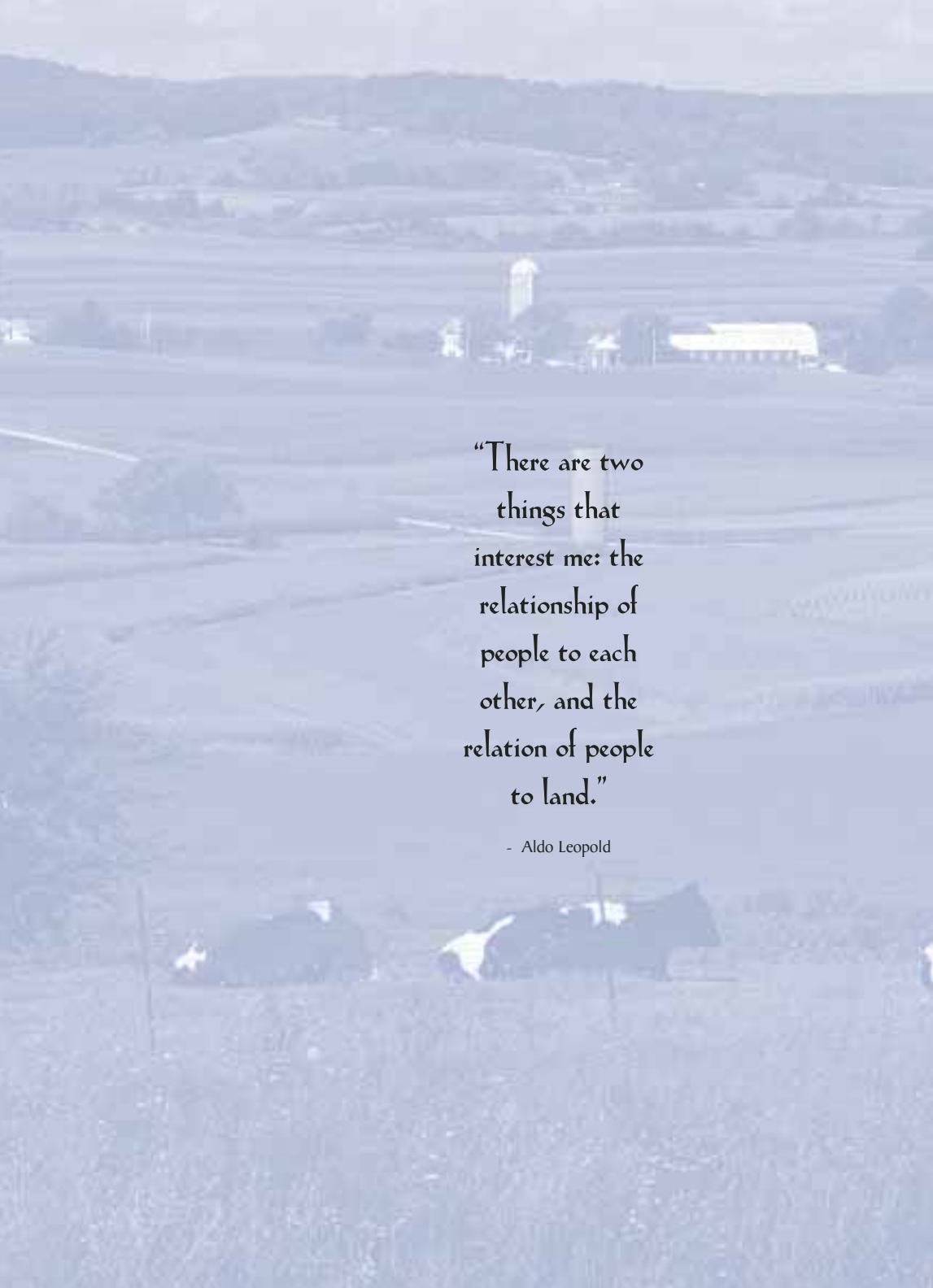


the journey



“The reward
of a thing
well done is
to have
done it.”

- Ralph Waldo
Emerson



“There are two
things that
interest me: the
relationship of
people to each
other, and the
relation of people
to land.”

- Aldo Leopold



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the journey



A person is skydiving over a cornfield. The skydiver is in the center of the frame, suspended by a large, multi-colored parachute. The cornfield is visible in the foreground and background, with tall stalks and leaves. The sky is a clear, light blue. The overall scene is captured in a low-angle shot, looking up at the skydiver.

“One’s mind,
once stretched
by a new idea,
never regains
its original
dimensions.”

- Oliver Wendell
Holmes

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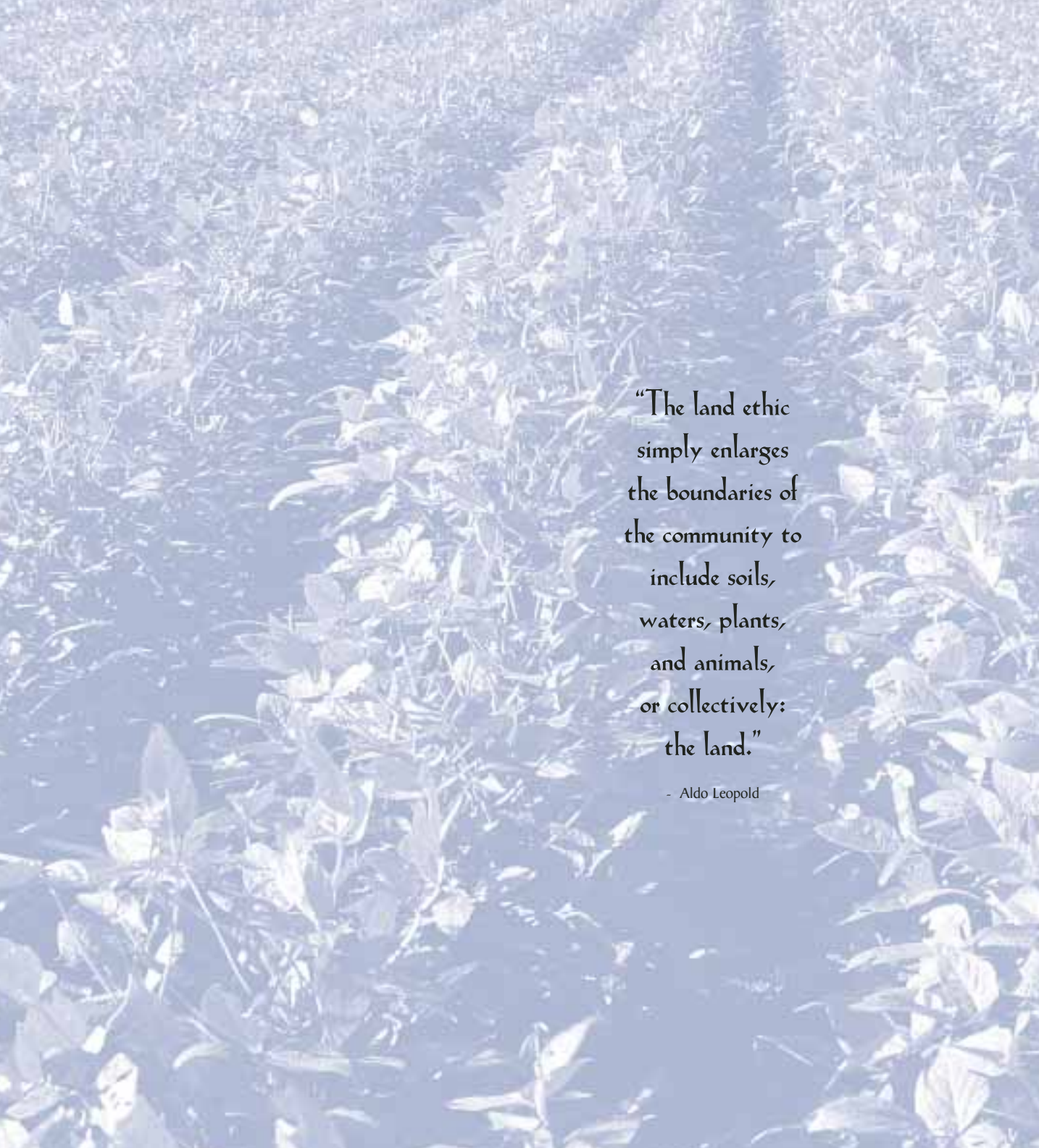
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the journey





“The land ethic
simply enlarges
the boundaries of
the community to
include soils,
waters, plants,
and animals,
or collectively:
the land.”

- Aldo Leopold

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the journey





LIFE
at the center



LETTER *from the director*

While this report covers in detail the activities and projects funded in 1998-1999, it has been greatly affected, as have the reports before it, by the past programs of the Leopold Center. In the first annual report I talked about a journey. That metaphor has been very appropriate. It indicates progress, but also an accumulation of experiences and knowledge from roads already traveled.

For me, the journey has been fascinating and rewarding. Along the way the Center has brought groups together to learn about each other and about better ways to manage and protect the state's natural resources, to reduce dependence on pesticides, to use fertilizers and manure more effectively, and to develop local markets for our products.

This annual report continues the journey. It tells of exciting advances in hooped house technologies, organic farming, grazing, stream bank protection, and weed control. It tells of the activities of the staff and cooperators in their journeys around the state, the nation, and the world.

The list of ongoing and completed competitive grants is daunting. One often hears inferences that sustainable agriculture practices mean a retreat to the past, yet looking at the work we support in partnership with others shows just how wrong that perception is.



Photo by Rod Swoboda

DENNIS KEENEY

The variety is breathtaking. From precision agriculture to trees, forages and wildlife, dairy, beef and swine, manure composting, handling and marketing, control of pests in apples, horticultural crops, soybeans, biological control of weeds and insects, crop and weed management, water quality, and even transgenics, the Leopold Center covers a wide array of research and policy issues that are an integral part of sustainable agriculture now and in the future.

The Center has not arrived at this point in the journey by random choice. We have worked closely with the advisory board and our constituents to bring about the programs you see here. And we have always held close the teachings and principles of Aldo Leopold to

test our way. With a guiding beacon like Leopold, guidance from the board, and the hard work and dedication of the staff and cooperators, it is clear how we got to where we are now.

The next phase of the journey will have a different captain. That person likely will steer a somewhat different course. But with the advisory board, the Leopold legacy, and the people of the Center and the state, the Center will always be what it is now: a major player in sustainable agriculture in the state, the nation, and the world.



the journey



“The
journey
is the
reward.”

- Tao



the TWO FACES of the center

If the Leopold Center had any links with ancient gods, the Roman deity Janus would have been the Center's patron for 1999. Janus is identified with doors and gates, and is represented artistically with two faces—one looking forward and one looking back. For much of the year, it seemed that the Center staff and advisory board found themselves balanced in the doorway between past and future.

The most compelling backward glance was the five-year academic review of the Center, which allowed all of us an opportunity to survey a half-decade of accomplishments. At the same time, we acknowledged ruefully that despite the sincere and dedicated efforts of the sustainable agriculture community, many problems remained unsolved, and some new dilemmas faced the farmers we meant to serve.

Then Dennis Keeney announced his decision to step down as the Center's director as the calendar rolls over to January 2000. The search was begun to find a worthy replacement for the man whose vision has guided the Center for the first 11 years of its existence. It was a time of mixed emotions—Keeney had brought the Center from a brief, bare bones description in a piece of omnibus legislation to a well-respected research center that has carried the banner of Aldo Leopold's land ethic far beyond the state of Iowa.

At the same time, the enigmatic Janus is peering into the future. Indeed, one of Keeney's most recent projects has been advising the state of Maryland on how they might set up their own center to promote sustainable agriculture. The search committee resolved that the new Center director would be someone who recognized and capitalized on the Center's existing strengths, but at the same time took a fresh look at how we might attack the problems facing Iowa farmers who want to make a decent living while taking good care of the land.

At the end of the year, the Leopold Center stands poised in that doorway—awaiting a new leader and a new millennium, yet still committed to Aldo Leopold's wisdom of the past.

CENTER engages REVIEW

Considerable energy was expended by the Leopold Center staff during the five-year program review process required by Iowa State University of its academic departments and related centers. In addition to preparation of a briefing book, the staff formulated a schedule geared to allow the outside reviewers maximum exposure to the Center in a minimum amount of time. The peer review team spent November 2-4, 1998, in Ames meeting with various stakeholders as well as ISU and Center of Agriculture administrators to discuss the Center and its operations. Members of the review team were:

DR. LORNA MICHAEL BUTLER
(chair of the review team),

Extension Anthropologist/Professor,
Sustainable Agriculture and Communities,
Department of Rural Sociology,
Washington State University

DR. ZANE R. HELSEL
Director of Extension and Dean of Outreach,
Cook College, Rutgers University

DR. PETER E. HILDEBRAND
Professor, Food and Resource
Economics Department,
University of Florida, Gainesville

DR. BILLY R. (BILL) BAUMGARDT
former Director of Agricultural Research
and Associate Dean of Agriculture at
Purdue University.

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the journey

"The only
thing you
take with you
when you're
gone is what
you leave
behind."

- John Allston



Following receipt of the report from the external review team, the Center advisory board and staff prepared a preliminary response and decided to engage in some philosophical discussion about the future direction of the Center. Many aspects of the Center's operations are mandated by the founding legislation, Iowa's 1987 Groundwater Protection Act. But the research program emphases have changed as new issues came to the forefront of Iowa's agricultural consciousness. The review team also raised a number of questions about Center activity that require additional coordination with other ISU entities. The central question remains whether the Center should stay the course, make minor adjustments in focus, or take some bolder steps to advance sustainable agriculture in the state. This will be a major focus for the advisory board, staff, and new director in the coming year.

farmers' THOUGHTS **about** *sustainable* AGRICULTURE

What do farmers really think about sustainable agriculture? How do they define it in relation to their operations? What do they see as Iowa's greatest environmental challenge? All these questions, highly pertinent to the Leopold Center's future programming, were asked of Iowa farmers as part of the five-year review process.

Center associate director Mike Duffy helped facilitate this survey to gauge farmers' attitudes about sustainable agriculture. A random sample telephone questionnaire was administered to Iowa farm operators during the summer of 1998 by the Iowa Agricultural Service. They collected 1,036 usable responses from a representative group of farmers.

The farmers' average age was 54.7 years and average number of years of education was 13. Just under two-thirds of the respondents, 66 percent, listed farming as their principal occupation, with an average farm size of 426 acres.

CONTINUED ON NEXT PAGE...



the journey

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*"There ain't
no rules
around here.
We're
trying to
accomplish
something."*

- Thomas Edison

THOUGHTS

the journey

“Why is it that conservation is so rarely practiced by those who must extract a living from the land?”

- Aldo Leopold

THESE WERE SOME OF THE SURVEY RESPONSES

When asked about their familiarity with sustainable agriculture:

- * Nearly half (48%) said they were somewhat familiar with sustainable agriculture
- * 12% said they were very familiar with sustainable agriculture
- * 40% were not familiar with the term sustainable agriculture

When asked what sustainable agriculture meant to them:

- * Land preservation was cited by 15%
- * Reduced inputs was cited by 13%
- * Almost 1/3 gave no answer
- * 16% didn't know

When asked about the change in sustainability of Iowa agriculture over the past decade:

- * 1/2 felt that Iowa agriculture was more sustainable
- * 1/3 felt that it was less sustainable
- * 11% thought the sustainability level had remained unchanged.

When asked to explain why Iowa agriculture was more sustainable:

- * No-till farming was cited by 26%

- * Reduced erosion was the answer of 17%
- * 10% attributed the increase to better farming practices in general

Those who thought Iowa agriculture was less sustainable gave these reasons:

- * Declining profits (18%)
- * Increased farm size (16%)
- * Greater use of chemicals (11%)

When asked whether Iowans needed to adopt more sustainable farming practices:

- * 62% said it was very important
- * 34% thought it was somewhat important
- * 4% said it was not important

When asked about the single, most important environmental issue facing Iowa today:

- * Water pollution was listed by 1/3 of those responding
- * Large hog units were cited by 21%
- * Agricultural chemicals were noted by 10%
- * Erosion was critical to 9%
- * 7% identified pollution in general



Keeney SHARES CENTER MODEL with Maryland educators

Center director Dennis Keeney shared 11 years of insights about life at one of the nation's first and foremost sustainable agriculture institutes at a Queenstown, Maryland conference. In a May 25, 1999, presentation on the "Leopold Center Experience," Keeney discussed how the traditional production-centered mission of agricultural research was reconfigured with a new focus by the Leopold Center and how support and funding for the Center were achieved. He explained the means used by the Center to carry out its legislative mission via a cooperative, statewide, university-based, multidisciplinary program, and pointed out lessons learned in Iowa that might be applicable to Maryland.

The "Agriculture and Natural Resources Research: Seeking Common Ground" conference was sponsored by the Wye Institute and the College of Agriculture and Natural Resources of the University of Maryland. Tom Fretz, who was an ISU College of Agriculture administrator when the Leopold Center was in its formative years, is now dean of the College of Agriculture at the University of Maryland, and has been part of the effort to establish an environmental research institute at Maryland.

WORLD BANK *staff takes a hard* LOOK AT AG SUSTAINABILITY



Mhey weren't much like your hometown bankers. They came to Iowa in July, 1998 from Italy, India, Germany, Lebanon, and Washington, D.C., to learn about how sustainable agriculture works in Iowa and how it might impact their efforts to aid developing countries.

The idea for a journey to Iowa grew out of a 1997 trip when Asok Seth, the World Bank's principal agriculturist for the South Asia region, came to Iowa State University and visited the Leopold Center. "That's when the thought occurred to me that our staff dealing with the sustainability in agriculture would be benefited by visiting Iowa," said Seth.

During a whirlwind six-day workshop/tour/outreach session, the 25 participants heard presentations by scientists, researchers, and administrators from ISU, other universities and government agencies. Director Dennis Keeney addressed the group on "Sustainable

Technologies and Management for Iowa: The Role of the Leopold Center for Sustainable Agriculture." Associate director Mike Duffy discussed "Comparative Economics of Intensive and Sustainable Agricultural Systems" while sharing findings from Center research projects.

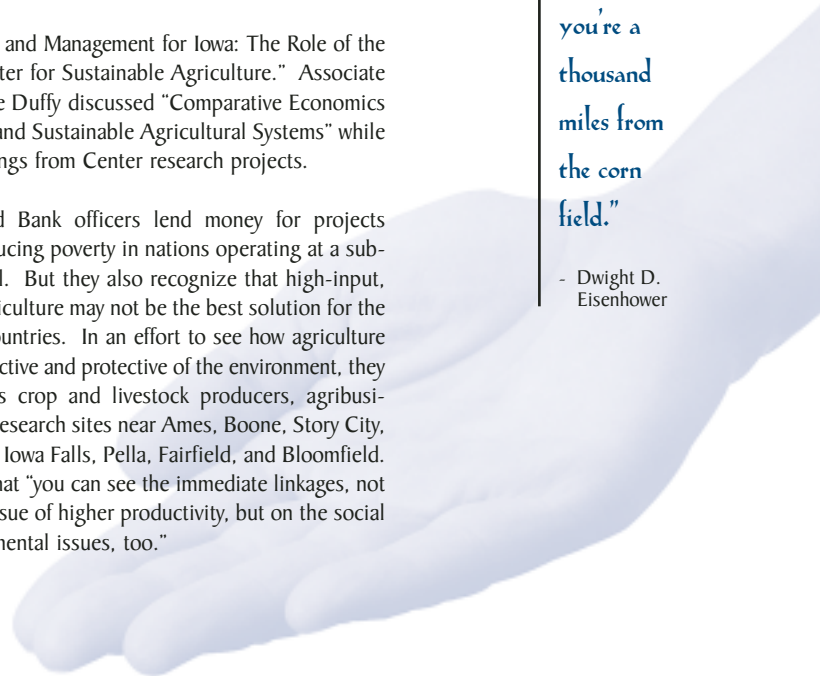
These World Bank officers lend money for projects aimed at reducing poverty in nations operating at a subsistence level. But they also recognize that high-input, intensive agriculture may not be the best solution for the food-poor countries. In an effort to see how agriculture can be productive and protective of the environment, they visited Iowa's crop and livestock producers, agribusinesses, and research sites near Ames, Boone, Story City, Des Moines, Iowa Falls, Pella, Fairfield, and Bloomfield. Seth noted that "you can see the immediate linkages, not just on the issue of higher productivity, but on the social and environmental issues, too."

the journey

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"Farming looks mighty easy when your plow is a pencil and you're a thousand miles from the corn field."

- Dwight D. Eisenhower



LORNA MICHAEL BUTLER

selected as first **HENRY A. WALLACE CHAIR**

Lorna Michael Butler is slated to become the first Henry A. Wallace Endowed Chair for Sustainable Agriculture at Iowa State University in February, 2000 following an extensive search. Butler's background includes more than 20 years on the faculty at Washington University as an agricultural anthropologist. She has done extensive research in sustainable agriculture systems (domestic and international), urbanization of agriculture, and communities. At WSU, she was a professor in the department of rural sociology and also had an Extension appointment.

The process of bringing the chair to Iowa State began in November, 1997, when ISU officials announced that a \$1 million grant from the W.K. Kellogg Foundation and a \$500,000 gift from the Wallace Genetic Foundation had been presented to the university to create the Henry A. Wallace Endowed Chair for Sustainable Agriculture. These bequests will be supplemented with funds from the Center and ISU's College of Agriculture. The endowment will provide perpetual funds for the faculty chair, research programs, and other sustainable agriculture efforts.

The Wallace Chair is a rotating position in the ISU College of Agriculture, with term length ranging from three to five years. Qualifications for the chairholder included a demonstrated record of achievement in sustainable agriculture, national or international stature, vision, strong communication skills, and an ability to work productively with constituencies of diverse viewpoints.

Center director Dennis Keeney, Leopold Center Board member David Williams, and former board member Dave Lubben were part of the advisory committee for the Wallace Chair. Keeney served as chair of the smaller search and screen group that vetted the applicants for the position.



center's 1998 *annual* **REPORT FINISHES SECOND** **IN NATIONAL** **COMPETITION**

The Leopold Center's 1997-1998 ANNUAL REPORT, written by Center editor Mary Adams and designed by Juls Design, Ankeny, garnered a national merit (second place) award in its category in the National Agriculture Marketing Association "Best of NAMA" program held in Atlanta, Georgia. More than 1,500 entries were judged in the NAMA contest which started with five regional competitions involving agricultural organizations, corporations, and ad agencies. The report was also honored with a merit award at the Northeast Iowa Women in Communications (WIC) awards event in April.

In June, the annual report received the top "gold" award in its category from the Agricultural Communicators in Education (ACE) contest during its international conference in Knoxville, Tennessee. Designer Julie Mangels also was given an "Outstanding Professional Skill" award, recognizing her work on the annual report as best of all entries in the publications category.

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the journey

"It is time
for a new
generation of
leadership, to
cope with
new problems
and new
opportunities."

- John F. Kennedy

For an organization that prides itself on staff continuity and longevity, it was an unusual year of additions and subtractions at the Center.

ELIZABETH WEBER, who came to the Center as its first technical editor in 1991 and later job-shared the communications specialist position, resigned at the end of June, 1998, to join her husband in his retirement and to do freelance writing.

LAURA MILLER came to the Center from ISU Extension Communications to fill the part-time communications specialist position vacated by Liz Weber. She edits the LEOPOLD LETTER newsletter and assists in public relations for the Center.

JAMES SWAN, one of the Center's two associate directors, retired from both of his ISU faculty appointments in February, 1999. Swan had been a professor of agronomy at ISU since 1989 and provided strong scientific support to the Center's competitive grants program.

DENNIS KEENEY, the Leopold Center's first and only director, announced his intention to retire by early 2000. Keeney came to ISU in 1988 as an internationally recognized soil and water quality scientist and will continue his active involvement in sustainable agriculture and environmental circles.

The search for Keeney's replacement as director began in April, 1999. Leopold Center advisory board member Wendy Wintersteen heads the search committee that will recommend candidates to succeed Keeney. Other Center board members on the 11-member committee are Kurt Johnson, Mary Jane Olney, Jim Penney, and Robert Sayre. Jeri Neal, competitive grants coordinator, is the Center staff representative on the search committee.

center SUPPORTS WEB SITE PROJECT TO BOOST AG LITERACY

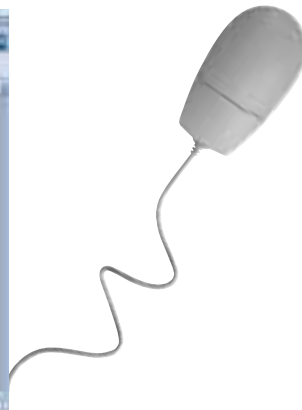
In 1998-99, the Center strengthened its ongoing relationship with the Iowa Agriculture Awareness Coalition (IAAC), a group of Iowa commodity and other agricultural organizations working to increase agricultural literacy among Iowa's youth. Center communications specialist Anne Larson served on an IAAC committee which developed the group's first presence on the World Wide Web, <http://www.agaware.iastate.edu>.

The site offers Iowa teachers a ready resource for integrating agriculture into science, math, social studies, music, art, and other curricula—encouraging students to more fully understand the importance of agriculture to Iowa's land and people. The site is hosted by the ISU College of Agriculture, in support of the contributions by the Leopold Center, Agriculture and Education Studies, Iowa 4-H and Youth Education, and ISU Value-Added Extension to this educational effort.

the journey

"The best thing about the future is that it comes only one day at a time."

- Abraham Lincoln



1998-1999

Leopold Center STAFF



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the journey

“The future
belongs to
those who
believe in the
beauty of
their dreams.”

- Eleanor
Roosevelt

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*part-time or shared appointments **partial Extension appointment



LEOPOLD CENTER STAFF FROM LEFT TO RIGHT:
(FRONT ROW) JOHN LANE AND KEN ANDERSON,
(BACK ROW) RICH PIROG, JIM SWAN, APRIL FRANKSAIN,
LAURA MILLER, JERI NEAL, DENNIS KEENEY, MIKE DUFFY,
MARY ADAMS, AND ANNE LARSON.

DR. MARTIN JISCHKE
ADDRESSING THE
BOARD.



advisory BOARD

- * LYLE ASELL.....Iowa Department of
Natural Resources*
- * LEON BURMEISTER.....University of Iowa
- * SHIRLEY DANSKIN-WHITE.....Iowa Department of
Agriculture and
Land Stewardship*
- * LENORE DURKEE.....Grinnell College*
- * THOMAS FOGARTY...University of Northern Iowa
- * CONNIE GREIG.....farmer, Estherville*
- * NEIL HAMILTON.....Drake University
- * MARY JANE OLNEY.....Iowa Department of
Agriculture and
Land Stewardship*
- * DON PAULIN.....Department of
Natural Resources*
- * SALLY PUTTMANN.....farmer, Kingsley*
- * ROBERT SAYRE.....University of Iowa (chair)
- * COLIN SCANES.....Iowa State University
- * ALLEN TRENKLE.....Iowa State University
- * PAUL WHITSON.....University of Northern Iowa
- * DAVID WILLIAMS.....farmer, Villisca
- * WENDY WINTERSTEEN.....Iowa State University

Ex officio members:

- * KURT JOHNSON.....Iowa Farm Bureau
- * PAUL MUGGE.....Practical Farmers of Iowa
- * MARVIN SHIRLEY.....Iowa Farmers Union
- * JIM PENNEY & CRAIG STRLIVE.....Agribusiness
Association of Iowa

*Board member serving for a portion of the year

legislature
EXPANDS
advisory board voting
PRIVILEGES

Effective July 1, 1999, the Leopold Center's advisory board has four more voting members. As a result of an amendment to Section 266.39 in the Code of Iowa 1999, signed by Governor Tom Vilsack on April 29, the four *ex officio* members are now voting members of the board. This will help ensure that the Center reaches the best possible consensus on its future directions in research and education.

Ex officio memberships were first added to the advisory board to bolster farmer and agribusiness voices in the guiding the Center. These positions were created in response to recommendations from a 1995 review of the Center's programs and procedures. Their 1999 receipt of full voting privileges further expands the Center's mandate from the people of Iowa.



1998-1999
 BOARD CHAIR
 ROBERT SAYRE



Fiscal year
BUDGET

FUNDING:	OPERATIONS	RESEARCH	EDUCATION & OUTREACH	TOTALS
AMA*	\$1,100,000	-	-	\$1,100,000
GPR		\$390,000	\$170,000	560,000
Balance	410,849	683,235	405,916	1,500,000
Total Funds	1,510,849	1,073,235	575,916	3,160,000

EXPENDITURES:	OPERATIONS	RESEARCH	EDUCATION & OUTREACH	TOTALS
Salaries & Benefits	306,474	67,860	125,666	500,000
Office Expenses	49,375	29,375	46,250	125,000
Competitive Grants	-	536,000	264,000	800,000
Issue Teams	-	250,000	-	250,000
Long-Term Agroecologic Research Initiative	-	50,000	-	50,000
Bear Creek & Raccoon River Watersheds	-	50,000	-	50,000
Hooped House Initiative	-	50,000	-	50,000
Practical Farmers of Iowa Partnership	-	-	50,000	50,000
Director's Research (Emerging Issues)	-	20,000	-	20,000
Associate Director's Research	-	20,000	-	20,000
New Publications	-	-	15,000	15,000
Conference Grants	-	-	35,000	35,000
Education Programs	-	-	25,000	25,000
Annual Conference	-	-	15,000	15,000
Reserve FY2000	660,000	-	-	666,000
Total Expenditures	1,015,849	1,073,235	575,235	2,665,000
Fund Balance	495,000	-	-	495,000

* Because the Center receives Agricultural Management Account funds quarterly, a balance is carried over to the next fiscal year (July 1-June 30). This funds the entire year's salary and benefits encumbrance by Iowa State University. It also allows for operational expenditures as well as partial funding for competitive grants until the first quarter payment is received.



issue
TEAMS
& initiatives



agroecology issue team
CELEBRATES
"showcase"
AWARD

The Agroecology Issue Team, one of the Leopold Center's longest-running multidisciplinary groups, continues to get better as it ages—just like the buffer strips that it studies! The Agroecology team stays on track thanks to the leadership of five ISU scientists, with forester Richard Schultz coordinating their efforts.

**Bear Creek now a
"showcase" watershed**

In June, 1999, the Bear Creek site was selected as one of the nation's 12 "showcase" watersheds to commemorate the 25th anniversary of the Clean Water Protection Act. The announcement stated that

"Bear Creek Watershed is hereby designated A National Restoration Demonstration Watershed for showcasing the application of stream corridor restoration technology and for improving the community, the environment, and water quality in support of the Clean Water Action Plan." The Bear Creek watershed was nominated for the honor by the U.S. Environmental Protection Agency (EPA) and the Cooperative State Research, Education, and Extension Service.

Research gains

Findings from the Bear Creek site demonstrate that processing of nitrate by the "living filter" improves as the buffer grows older. The buffers are capable of trapping nearly 90 percent of the sediment and attached chemicals from surface runoff that moves into the buffer from the adjacent crop fields. Below-ground reductions of nitrate can also be equally as high. Water moving in the ground



BEAR CREEK

water takes from one to two months to move through the buffer system, providing time for plants and microbes to work on pollutants.

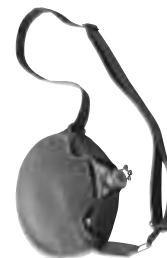
However, recent surveys of Bear Creek suggest that the majority of flow in the channel between storm events is derived from field tiles that drain most of the watershed. These tiles act as a short circuit for the buffer as water moves rapidly through the buffer in a pipe with no possible treatment. Modeling efforts suggest that significant reductions in nitrate loading of the stream can occur if tiles are intercepted by wetlands.

Work is now underway to locate

the large tiles and develop at least one wetland complex to demonstrate the approach.

The team also is working to quantify the contribution of bank erosion to stream sediment load. While buffers can effectively remove much of the sediment from surface runoff, their role in reducing bank erosion without using bioengineering techniques is not clear. Initial results suggest that buffered streams encourage significant revegetation of stream banks and that these banks are less likely to erode. Wildlife sightings continue to increase. During the past year, mink, badger, and river otter have been added to the list of mammals that have been seen in the buffer, along with many bird species. According to the landowners, the buffered sites are prime pheasant hunting territory.

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the journey

*"Plan your
work for
today and
every day,
then work
your plan."*

- Norman
Vincent
Peale



the journey

“Let there be
a tree – and
there will
be one.”

- Aldo Leopold

buffer

New buffer sites added

An additional mile of buffer was established this spring on land owned by Jon and Steve Risdal. One major parcel of buffer continues directly downstream from the original Ron Risdal site, providing an undisturbed reach of nearly two miles with ten-, six-, and one-year old buffers. Another parcel is located at the upper end of west Bear Creek where it begins at the mouth of a major drainage tile. The team has also been contacted by the landowner who owns the last farm along Bear Creek just before it enters the Skunk River. The landowner is interested in developing an on-farm buffer, which would be highly visible from Interstate 35.

Grants awarded

With the renewal of a current USDA National Research Initiative grant, the Agroecology Issue Team continues to study the movement of nitrate through buffers of various ages, and the biological and physical methods for nitrate reduction in the “living filter” of the buffer. One of the major questions that the team hopes to answer is how long it takes for a restored buffer to reach its maximum functional condition. Hence, buffers of various ages are being compared to long-term grass filters and forested buffers that have existed along Bear Creek and adjacent creeks in the area.

The team also received a major grant from the EPA to identify the potential of northeastern Missouri stream riparian areas to reduce nonpoint source pollution. While this work will be carried out in Missouri by team members at the University of Missouri, it provides an excellent opportunity to compare the responses of north central Iowa streams with another landscape in the region. Important differences may exist because of varying hydrogeological and soil conditions.

Sharing their information

The outreach program of the Agroecology Issue Team included more than 30 tours of the Bear Creek sites for visitors from all over the world, numerous workshops, and more than 40 regional and national presentations. The workshops included a series of four around the state requested by the National Resources Conservation Service (NRCS) and involving personnel from all their Iowa field offices. These workshops were coordinated through the issue team and Trees Forever. Continued cooperation with Trees Forever and other sponsoring agencies of the Iowa Buffer Initiative are establishing demonstrations of riparian buffers around the state. The associated field days at these sites are a prime opportunity to transfer buffer technology to landowners and natural resource professionals.

GRAZING CATTLE GROUND

with the **animal management issue team**

evaluation

Forage production is one way to preserve soil and water quality in areas prone to erosion. To make forage production truly profitable, producers must maximize livestock production per acre while minimizing production costs. For nine years, the Leopold Center's multi-disciplinary Animal Management Issue Team has been looking at ways to enhance livestock production through management of forage species, grazing systems, and type and systems of animal enterprises. ISU animal scientist James Russell leads the 27-member team.

Legumes, grazing, and stored forages

Legumes have been regarded as especially desirable plants for soil preservation efforts because they fix nitrogen in the soil, but there are challenges to establish and maintain good stands of legumes in some forage systems. Because feeding of stored feeds during winter is the largest cost in cattle production, alternative forages to extend the grazing season need to be evaluated. Greater diversity among animals that feast on the forages is valuable, too. One general approach to combining these interests is to incorporate herds of cattle calving at different times of the year. Evaluating this approach led to three major research paths for FY99:

Evaluation of summer grazing systems that utilize legume forage species and management intensive grazing to optimize long-term animal production per acre while reducing inputs or fertilizers and herbicides.

This project was to evaluate the effects of season-long or mid-season grazing of alfalfa on animal production and legume persistence in rotational grazing systems. Pastures with brome grass and alfalfa were developed at the ISU Beef Nutrition and Management Research Center and cattle were allowed to graze in 1998 and 1999.

Animal performance, legume persistence, and the yields, digestibility and intake of the various forages are being monitored.

Evaluation of winter systems that minimize costs associated with the use of stored feeds by extending the grazing system with crop residues, small grain cover crops, and/or stockpiled hay crop forages.

Producers see little short-term economic benefit from using cover crops, thus, they have been reluctant to incorporate these crops into the system. However, cover crops grown over late summer and fall may provide supplemental nutrients to cows grazing crop residues, leading to improved profitability. Work with rye-oat and berseem clover crops showed little promise, and this segment of the project was terminated. The team decided that the feed value of corn crop residues from Bt-corn hybrids was an important issue to consider when using corn crop residues as a resource for winter grazing and initiated work in this area. Items under investigation included digestibility of these Bt residues, stalk quality, and whether more or less hay would be needed to supplement cattle grazing Bt corn residues.

CONTINUED ON NEXT PAGE...



the journey

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“Do what
you can,
with what
you have,
where
you are.”

- Theodore
Roosevelt

Evaluation and demonstration of beef cow-calf production systems that integrate calving season with forage availability to optimize calf production while minimizing the feeding of stored forages.

At the McNay Research Farm in Chariton, the team has set up a year-round grazing system for experimentation and data collection. Here cows sequentially graze corn crop residues and stockpiled tall fescue-red clover or smooth brome-grass-red clover forage during winter. The animals rotationally graze smooth brome-grass-orchard-grass-birdsfoot trefoil pastures with seasonal grazing of yearling calves. While previous research with this system has been conducted with only a spring-calving beef cow herd, the incorporation of a late summer (August-September) calving herd into this system in 1998 provides greater flexibility in regard to animal nutrient requirements and resource utilization. This grazing program is being compared with a minimal land system in which cows are winter-fed hay produced from their summer pastures in a drylot and in summer are rotationally grazed on smooth brome-grass-orchardgrass-birdsfoot trefoil pastures. The systems are being evaluated for animal and forage production, utilization, and economic returns. Growth rate, feed efficiency, and carcass quality data of yearling cattle are being collected over three years of the project.



GRADUATE STUDENTS AND UNDERGRADUATE TECHNICIANS TAKING A BREAK FROM MEASURING LARGE BALE NUTRIENT LOSSES



Outreach

The team produced a videotape series demonstrating to interested producers the principles of stockpiled grazing. Four 15-minute videotapes were prepared on these aspects of "STOCKPILED FORAGES FOR WINTER GRAZING."

1.

INTRODUCTION TO STOCKPILING FORAGES FOR WINTER USE
(about the need for alternatives to stored feeds to maintain cows in the winter)

2.

ACCUMULATING FORAGES
(emphasizes correct selection of forages for stockpiling, the optimal length of time for stockpiling, and how manure distribution is affected by stockpiled grazing)

3.

ALLOCATING FORAGES
(how to control grazing to conserve forage nutrient quality to meet the higher nutrient needs of spring-calving cows in the winter)

4.

RISK MANAGEMENT
(the most successful producers are aware of the risks of a winter feeding system and will develop a system that most effectively integrates available feed resources)

"Two roads diverged in a wood, and I - I took the one less traveled by, and that has made all the difference."

- Robert Frost

weed management issue team **ASSEMBLES** *weed emergence* **DATABASE**

When working to curb pesticide use, it is important to note that more than 80 percent of the pesticides used in Iowa are herbicides, so pesticide use reduction focuses on weed management. Research on integrated weed management has shown potential to reduce herbicide use by up to 75 percent. Armed with these figures, members of the Leopold Center's Weed Management Issue Team seek to understand and predict reactions between weed biology and environmental conditions.

Annual weed species vary widely in their temperature and moisture requirements for germination, emergence, and early growth. Although there has been considerable research on weed emergence and modeling of weed emergence in recent years, little effort has been directed toward developing user-friendly emergence guidelines for farmers. The Weed Management Issue Team's current charge is to develop and validate weed emergence and early growth indices based on weather data and indicator plants. The next step is compiling and presenting that information to farmers facing weed pressure.

Weed emergence database

Work continued on the large database that details emergence patterns for major weed species of Iowa. In addition to the original research sites in central Iowa, 1998 experiments were conducted at three Iowa State University Research Farms — Northeast Iowa (Nashua), Southeast Iowa (Crawfordsville), Southwest Iowa (Lewis) — and Dordt College (Sioux Center). Nine common weed species were examined at each location and the farm managers each added one or two species of local interest to the study.

Data gleaned from these experiments help the researchers detail the emergence patterns of common weeds. Initial analysis has shown that the sequence of initial emergence for the species is consistent under a variety of environ-

mental conditions. However, preliminary analysis has failed to identify strong relationships between growing degree-day accumulation and emergence patterns. Field work at the sites will be completed during the 1999 growing season. Team members hope to be able to develop emergence prediction tools at that point.

Survey work halted

When the team was formed in 1996, an initial goal was to learn how farmers made their weed management decisions. After conducting an exploratory survey (with 1,000 respondents), it was clear that the team could benefit from more information about weed management choices and factors that influence these decisions. However, the expertise of a rural sociologist was needed to develop further survey instruments and the team was unable to find one with the available time or expertise to pursue this type of sampling with them.

Outreach and education

Findings on weed emergence were shared with other scientists by team leader Bob Hartzler at the 1998 North Central Weed Science Society Annual Conference. A paper written by three team members on emergence characteristics of four annual weed species was accepted for publication in the journal *WEED SCIENCE*. Results from the experiments at the outlying ISU farms were posted weekly on the ISU Weed Management Web page during the growing season (<http://www.weeds.iastate.edu/mgmt/qtr99-1/emergencehotline.htm>).

Data generated by the issue team is being used to develop a poster about emergence timing of different weed species for the upper Midwest (Iowa, Illinois, Wisconsin, and Minnesota). Production of the poster is being funded by the North Central Region Integrated Pest Management Program.

the journey

“Any fact facing us is not as important as our attitude toward it, for that determines our success or failure.”

- Norman Vincent Peale

HOOPED hog structures INITIATIVE

completes first year

first

Yhe recent trend in swine production has been to move away from outdoor, open, dirt-lot systems to total confinement systems. Seriously eroding profit margins in swine production, along with flexibility, high start-up costs, and environmental concerns, have caused many Iowa hog producers to look at hooped structures (hoops) as a less costly option for raising pigs.

The increasing popularity of hoops led the Leopold Center to compare various hog production systems. Swine confinement units and hoops were established at the Hoop Research Complex at the ISU Research and Demonstration Farm near Rhodes, and the Center's hoop group study team began gathering information on how these systems performed side by side in various areas of swine performance. Here are brief reports from their research. (Primary researcher is indicated at the end of each summary.)

Pig performance

The third trial group of finishing pigs was fed from December, 1998, through May, 1999. This "winter group" consisted of pigs from the same farm and of similar genetics (Duroc terminal sire) to the earlier summer group, and results of the trials will be considered jointly.

During the summer trial, the pigs in hoops grew faster and were more efficient converting feed to gain than pigs in confinement and pig mortality was lower in hoops. The results reversed during the winter when confinement pigs grew faster and were more efficient. Mortality also was lower in winter confinement trials. This suggests that there are seasonal effects on production from the naturally ventilated hoops. Pig mortality level also is a factor in the overall group performance. (MARK HONEYMAN)

Manure management

The experiment on composting swine manure at the Rhodes research farm initially indicated the possibility of significant nitrogen loss from the bedded manure pack and from more intensively managed compost piles. Losses of up to 30 percent appeared inside the hoop, and an additional 30 percent disappeared from the piles that were turned twice a week or more. Composting piles left unturned did not seem to lose as much additional nitrogen, but also did not reduce their volume or weight. The test is being replicated with manure from all three hoops at Rhodes, and a complete mass balance is being attempted for the hoop manure management system. Sonia Tiquia, a visiting scientist from Hong Kong with extensive experience in composting swine bedding manure, has been in charge of the current composting trials. Nutrient leaching will be studied next. (TOM RICHARD)

Economics

Financial results from the first full group of pigs produced in the demonstration facility during the summer of 1998 show that costs were slightly lower for the hoop-raised pigs (\$32.18) than for the confinement-raised animals (\$33.55). Fixed costs were lower for hoop pigs, while operating expenses (feed, labor, veterinary fees, etc.) were similar for the two systems. Premiums received were greater for the confinement hogs, as they were leaner.

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"Neither a wise nor brave man lies down on the tracks of history to wait for the train of the future to run over him."

- Dwight D. Eisenhower



RHODES RESEARCH FARM FIELD DAY

year

The three largest cost differences were for facility, bedding, and feed expenses. Seasonal differences existed, as was expected. The confinement pigs exhibited lower production costs for the first winter group.

Combined results (winter and summer hogs) showed the two systems achieved similar production costs: \$36.37 per cwt. for hoops and \$36.67 per cwt. for confinement. These figures represent performance for only two groups of pigs and further research will be done with additional groups. (JAMES KLIEBENSTEIN)


Pig behavior and physiology


Outdoor production systems provide more space and freedom of movement for pigs. On the minus side, pigs are exposed to environmental temperature extremes and may be challenged by soil-based diseases. Total confinement production eliminates concerns about weather and diseases, but with less floor space and no opportunity to root, pigs may become disturbed and not perform as well.

The behavior and response of pigs raised in hoop structures compared with pigs raised in the typical floor spacing in a confinement unit were compared. Two experiments, winter and summer 1998, were conducted and pigs were observed under both systems. In both experiments, pigs housed in the non-bedded confinement system (NBCS) displayed more abnormal behaviors than pigs in the hoop structures. In addition, pigs in the hoop structures exhibited more play behavior. In a stress test connected with handling, pigs raised in the NBCS system had higher cortisol concentrations, indicating that they were more stressed by handling than the hoop pigs. Respiration rates were similar for pigs in the two groups. Based on these findings, animal behaviorists consider the welfare of the hoop-raised pigs to be richer than that of non-bedded confinement-raised pigs. (DON LAY)

ORGANIC agriculture INITIATIVE

completes first year



 Organic agriculture has become big business (\$4.2 billion in sales annually) in the United States. Iowa farmers in search of an alternative to monocropping and conventional agriculture are jumping on the organic bandwagon. More than 100,000 acres of Iowa farmland were planted to organic crops in 1998 when the Leopold Center began funding the Long-Term Agroecological Initiative (LTAR) under the director of Kathleen Delate, ISU assistant professor of horticulture.

Demonstration plots begun

The beginning step in this ambitious research program is the establishment of large, replicated field plots that will provide years of future data on the soil health and environmental impacts of organic production. The first of these test plots (17 acres in various rotations of crops such as corn, soybeans, oats, and alfalfa) were planted at the ISU Neely-Kinyon Research Farm in Greenfield in spring 1998.

First-season observations at the site included:

- * Weed populations were similar in organic and conventional systems, despite two herbicide applications on the conventional plots.
- * Insect populations were similar in organic and conventional systems, despite one insecticide application on the conventional plots.
- * Comparable yields were obtained on organic and conventional systems.
- * Greater aggregate stability and soil fertility shown on land previously in alfalfa when compared with soybean ground (important information for farmers making the transition to organic production).

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“The outstanding scientific discovery of the twentieth century is not television, or radio, but rather the complexity of the land.”

- Aldo Leopold



the journey

"It will take decades to fully grasp what Leopold meant by a 'land ethic' and considerably longer to make it a reality."

- David Orr

Two field days (August 13 and 27, 1998) highlighted the plots and informed the public of first-year results. More than 230 people attended to discuss organic agriculture with ISU staff. Two follow-up organic farming workshops, co-sponsored by USDA-SARE (Sustainable Agriculture Research and Education) in September, attracted 40 participants with a waiting list of equal size. Staff associated with LTAR presented 41 talks on organic agriculture and produced an eight-part series on organics for the Iowa Communications Network.

Related grants work

Two competitive grants funded by the Leopold Center were closely linked with the LTAR initiative. "Feasibility of Organic Soybean Production Following Conservation Reserve (CRP) Land" provided grant money for two on-farm trials and one experiment station trial to undergo soil sampling, weed population sampling, yield monitoring, and economic analysis. The experiment station trial at ISU's McNay Research Farm near Chariton also compares tillage methods and planting (ridge vs. conventional) methods. Long-term SARE funding is being sought to supplement expenses for this trial.

"Evaluation of Organic Soil Amendments for Certified Organic Vegetable and Herb Production" takes a measured look at various soil amendments that reportedly mitigate vegetable disease and insect problems. One on-farm site for this experiment is a certified organic farm, One Step at a Time Farm, near Kanawha. Other experimental sites were established at the ISU Horticulture

Farm in Muscatine and the Heenah Mahyah Student Farm in Ames.

Treatments at the farms included a control plot (no fertilizer), a natural fertilizer (feathermeal-based) currently in use by certified organic farmers, locally produced compost (turkey litter) in combination with BioCal (an organic calcium amendment), and compost only. On all farms, the compost or organic fertilizer was applied at 100 lb. N/A to broccoli, pepper, and herb plants.

Researchers sampled soil quality and plant growth. Post-harvest analysis covered disease/weight loss, economics, and yields. Plant growth and yields were significantly increased with compost applications in Kanawha and Muscatine, according to initial findings. Data from the Ames farm is still being compiled.

Other organic work underway in 1998-99 as part of this initiative included:

- * organic corn trial at Crawfordsville
- * organic demonstration farm (herbs and vegetables), New Melleray Abbey
- * insect and disease sampling, Homestead Organic Apple Orchard
- * organic soybean trial, Heenah Mahyah Student Farm, ISU

PRACTICAL FARMERS *of Iowa* CONNECT with Leopold Center

Practical Farmers of Iowa (PFI), in collaboration with various ISU agricultural scientists, has carried out nearly 400 on-farm research trials since 1988. In the past, the Center had funded PFI work on a project-by-project basis. (The grants program funding is episodic, making long-term research efforts difficult to carry on.) In 1997, the advisory boards of the Leopold Center and PFI agreed to a continuing subsidy to ensure the longevity of on-farm research and demonstration efforts.



TOM RICHARD AND PAUL MUGGE AT PFI FIELD DAY

As a result of this long-term funding commitment from the Leopold Center, in 1998 PFI was able invest in new projects relating to swine, market gardening, and organic production. Funds provided by the Center also allowed PFI to double the number of Iowa Farm Bureau cooperators on future projects. This arrangement lets PFI present sustainable agriculture-related concepts and perspectives to a new audience. Seven PFI producers also began collecting data on labor requirements for the Center's "hoops group" initiative.

During the 1998 growing season, 21 PFI farmers conducted more than 30 research trials, as well as studies and demonstrations of sustainable agriculture practices. Weed and nutrient management, vegetable production, variety selection, and livestock production were some of the topics addressed by the research tests.

PFI sponsored 29 field days attended by more than 1,400 individuals. (Some of these research efforts also were supported by the USDA's Sustainable Agriculture Research and Education program.) Three vegetable producers were invited to take part in the on-farm research and field days, a departure from the usual agricultural producers featured in PFI outreach efforts. Attendance was especially strong at field days that demonstrated practices related to organic farming, from weed management to marketing tactics.

Funds from the Leopold Center and USDA/SARE will help PFI organic producers with a unique project on soil fertility. Demonstration plots on six private farms and two ISU farms will compare the two major philosophies of soil fertility: the "sufficiency" approach used by land grant universities and the Extension Service and the "ratio" paradigm, which is popular with organic farmers.

The Train-the-Trainers Initiative found PFI hosting three on-farm sustainable agriculture in-service training sessions for government agency personnel. More than 100 staff members from ISU Extension, the Natural Resources Conservation Service, the Iowa Department of Agriculture and Land Stewardship, the Iowa Department of Natural Resources, and the Farm Service Agency participated in the sessions. They were exposed to the kind of multidimensional problem solving that producers must engage in when making decisions about their farming operations.

Six PFI cooperators continued their work with Agricultural Research Service entomologist Leslie Lewis and ISU entomologist John Obyrcki on biological control of the corn borer and potato leafhopper. This cooperation allows the researchers to incorporate an assessment of the on-farm use of Integrated Pest Management (IPM) techniques.

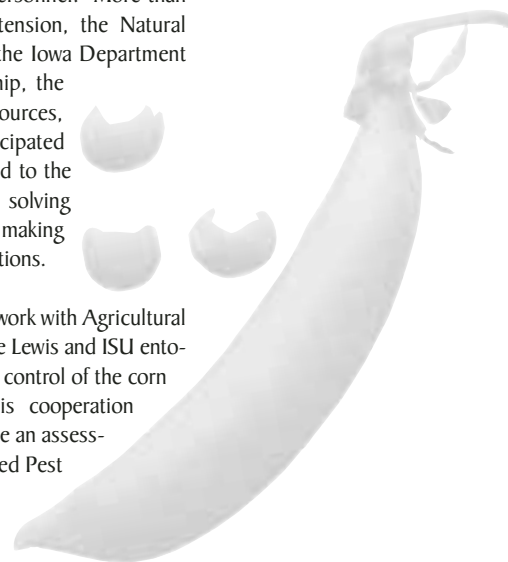
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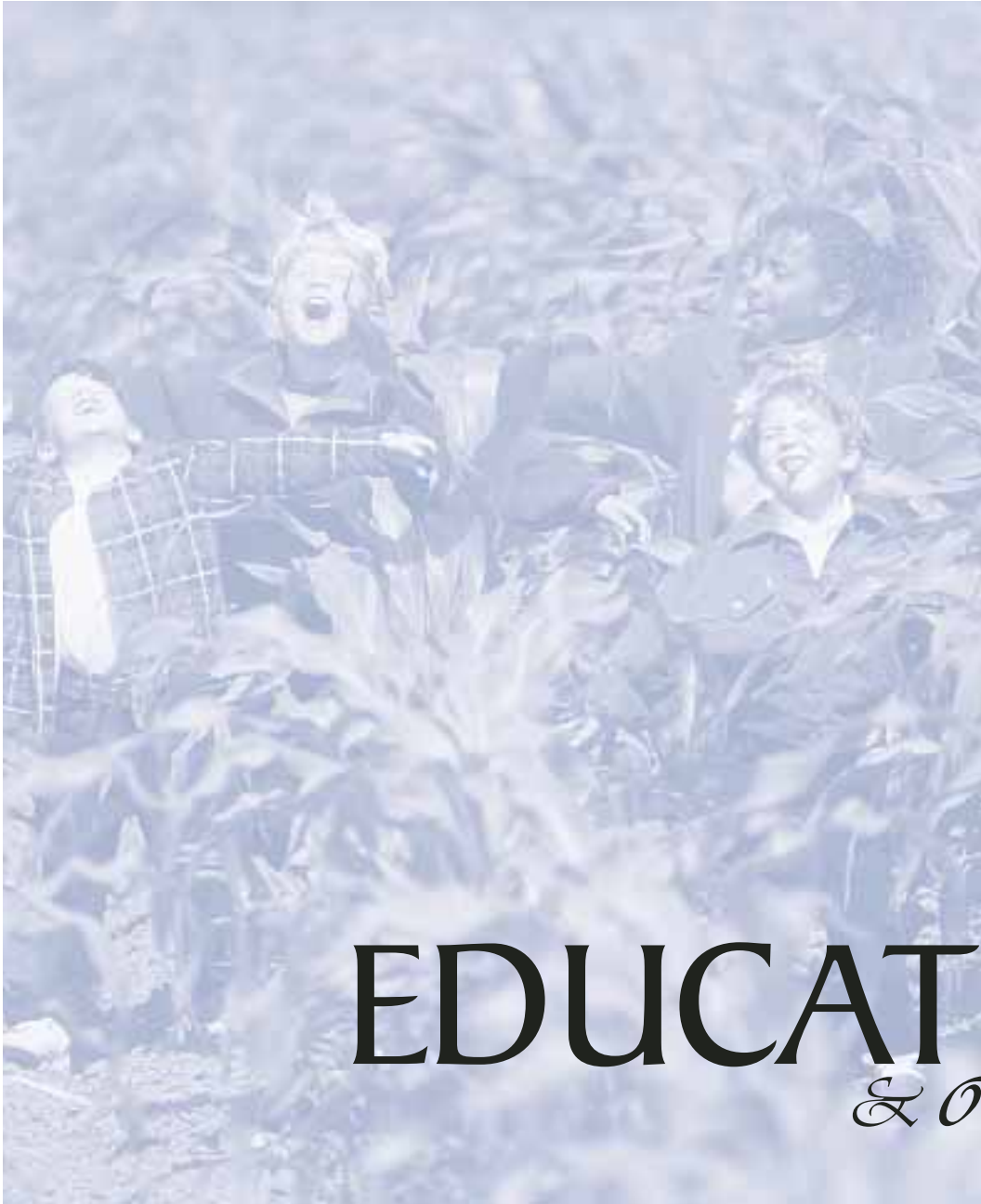
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"For of those
to whom
much is
given, much
is required."

- John F. Kennedy





EDUCATION
& *outreach*



SWINE **system** OPTIONS **conference:** THE SEQUEL

Making a cue from Hollywood, which inevitably follows up a blockbuster film with a sequel, the Leopold Center decided to build on its highly successful 1996 alternative swine system conference with a similar event in 1999.

The Center, along with several other organizations concerned with swine production, hosted a second statewide Swine System Options conference in Ames on February 17, 1999. The conference was held just as many independent hog producers found themselves looking for solutions to weather the precipitous market declines of late 1998 and early 1999. Attendance increased by 100 over the 1996 conference, with participants coming from Iowa, Minnesota, Illinois, Missouri, and South Dakota.

One swine producer said, "People vote with their feet. You can tell (from the crowd) how important swine alternatives are."

The Center's cosponsors for the conference were the Iowa Pork Industry Center, ISU Extension, the Iowa Pork Producers Association, Practical Farmers of Iowa, the Iowa Farm Bureau Federation, the ISU Beginning Farmer Center, the ISU College of Agriculture and Research and Demonstration Farms, and the ISU Extension Sustainable Agriculture Program.

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"Success
is where
preparation
and
opportunity
meet."

- Bobby Unser



JAY HARMON (LEFT) AND DENNIS KEENEY AT THE LEOPOLD CENTER'S BOOTH



DAVE STRUTHERS

the journey

“Associate yourself with men of good quality if you esteem your reputation, for it is better to be alone than in bad company”

- George Washington

Following a morning panel discussion featuring a farmer (Vic Madsen), livestock economist (John Lawrence), animal scientist (Mark Honeyman), and agricultural lawyer (Neil Hamilton), the 360 participants could choose from among 16 concurrent afternoon sessions, most with farmers as presenters. The sessions dealt with producer perspectives on design, management, renovation, production, and marketing within alternative swine production systems. Attendees also were pleased to find that much of the food served at breaks and the luncheon (including the pork) came from Iowa producers.

The first results from the Leopold Center’s hooped house research program comparing hoops and a confinement system at the ISU Rhodes Research Farm were presented to the gathering. “We’ve found these systems are environmentally friendly, producer-friendly, pig-friendly, community-friendly, and consumer-friendly,” said Mark Honeyman, who coordinated the research. Several sessions offered practical suggestions for farmers who want to convert their operations to hoops.

Ultimately, the second swine conference evoked even more excitement than the first one: “I drove 500 miles to get here today and it was worth it!” enthused one hog producer at the end of the day.



VIC MADSEN (LEFT) AND NEIL HAMILTON



MARK HONEYMAN (LEFT) AND JOHN LAWRENCE

presentations

"Expo '99: CREATING *a Thriving Iowa* AGRICULTURE" *offers mix* of HOPE AND PRACTICALITY

Amid the many somber news reports about the future of Iowa agriculture in the past year, it was the perfect time for a spiritual uplift like Expo '99: Creating a Thriving Iowa Agriculture. The Leopold Center joined with several

"The theme of this year's Expo says it all... futuristic practices that work today in agriculture, as told by the change-making agents themselves," according to Ann Schultz, Vision 2020 program coordinator.



other sponsors to offer information about alternative food marketing and production successes in the state, value-added projects, community supported agriculture, and farmers who are making their way with markets outside the usual system.

The June 17 event at ISU's Scheman Building kicked off with a morning visioning panel featuring Patty Judge, Iowa's Secretary of Agriculture; Marlyn Jorgenson, an Iowa farmer and entrepreneur; and Jill Euken of the Wallace Foundation for Rural Research and Development. An all-Iowa products luncheon was followed by 14 afternoon breakout sessions on topics ranging from the Niman Ranch Pork Company of Iowa, to ethanol opportunities, and organic marketing prospects. Five of the sessions featured Leopold Center-funded projects.

The 215 participants came away with many new ideas for practices, techniques, and networks that will enable them to survive and even prosper by taking a fresh approach at Iowa's agriculture and food system. Center director Dennis Keeney said, "I marveled at how far the agricultural community in Iowa has come in such a short time. Ten years ago this event would not have happened."

Another participant added, "It was great to bring together college administrators, faculty, students, and people from communities to solve current issues."

Primary collaborators on Expo '99 were the Kellogg Foundation's Vision 2020 project, Iowa State University Extension, the Leopold Center, and Sustainable Agriculture Research and Education (SARE).

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"I marveled at how far the agricultural community in Iowa has come in such a short time. Ten years ago this would not have happened."

- Dennis Keeney

sustainable agriculture SEMINAR series TARGETS SWINE production

Yhe hog markets were dismal for Iowa producers in 1998-99, but the Leopold Center and ISU animal scientist Jim Russell offered them some new ways to look at the situation via a multidisciplinary seminar series offered for college credit. "Alternative Production and Marketing Techniques to Improve the Sustainability of Swine Production in Iowa" featured eight sessions moderated by ISU faculty, many of who have done Leopold Center-funded grant work on swine production options.

The final session featured Paul Heimel, meat buyer for Wedge Foods, the nation's largest natural foods cooperative, based in Minneapolis. In a lively and provocative speech Heimel took the conventional agriculture system to task and explained in colorful terms what his "niche" customers at organic food stores really want from pork producers. This session was attended by many non-students interested in hearing Heimel's perspectives on marketing.

Alternative swine production systems were discussed by Mark Honeyman, an ISU animal scientist, and Tom Richard and Jay Harmon, of the ISU agricultural and biosystems engineering department. Mike Duffy, Center associate director, explained the issues of economic sustainability for Iowa swine producers, while sociologist Paul Lasley took a look at public perceptions and desires for the swine industry.

"We must
accept finite
disappointment,
but never lose
infinite hope."

- Martin Luther
King, Jr.



6th CONFERENCE *year*

Regional conferences

The sixth year of the Leopold Center's competitive grants program for outreach found several new organizations requesting funds for their programs. Many groups sought to use educational events to strengthen the links between communities and agriculture. The outreach support program, implemented on a calendar-year basis, was renamed the Conference/Workshop and Special Events program to allow sponsorship of events such as community forums.

Between July 1, 1998, and June 30, 1999, nearly 2,300 farmers, educators, and community leaders attended 23 Center-sponsored regional conferences, workshops, and tours in 19 Iowa locations. Programs focused on organic agriculture, integrated crop management, grazing systems, riparian management, local food systems and community-supported agriculture, and alternative swine production systems.

Special projects

The Community Guide to Agriculture project in Johnson County took off in new directions during its fourth year of Leopold Center funding. In an effort to reach more urban residents, programs on conservation and sustainable agriculture were developed for InfoVision, which is part of the Iowa City Cable Television Network. Using InfoVision, urban viewers could call up presentations on soil conservation, sustainable agriculture, and riparian buffers to view at their leisure.

Urban and rural stakeholders in the Clear Creek Watershed (Johnson County) met to develop a holistic, comprehensive plan to protect the quality of the creek's water. The Wallace House Foundation staff in Des Moines helped facilitate this discussion by using a study circle approach called Common Ground. All of the meetings featured an Iowa-grown meal.

WORKSHOPS and special EVENTS

sponsored

The Master Conservationist Program was presented to more than 20 people in Story County during June and July, 1998. This program exposes conservation-minded landowners to sustainable agriculture and food system principles. Participants must give back a set number of hours to the community on an environmental, conservation, or sustainable agriculture project. In 1999, the class was offered in Story County for a third year. The Story County Master Conservationist Program served as a model in expanding the program to eight additional Iowa counties in the next two years, thanks to a FY 2000 Leopold Center competitive grant awarded to ISU Extension wildlife specialist Jim Pease.



Several of the Center's research and demonstration competitive grants sponsored public tours and field days. The work highlighted animal manure/yard waste composting, grazing systems, organic agriculture, and manure and riparian management research projects.

Iowa Environmental Leadership Institute partnership

The Center joined with the Iowa Environmental Leadership Institute (ELI) to promote conservation activities via the Internet. Beginning January 1999, the Leopold Center,

John Deere Corporation, the Iowa Conservation Education Council, ELI, and the Iowa Natural Heritage Foundation sponsored a web site calendar listing environmental and conservation events.

ISU Extension's Value-added efforts

The Center was actively involved in ISU Extension's Value-added programs and training. Center education coordinator and Extension staffer Rich Pirog served on Extension's Value-added Internal Committee and was involved in planning for a June, 1999, ISU Extension In-Service training program which featured several components of sustainable agriculture, including local food systems.

Ag Journalism 101

Two sessions of Ag Journalism 101, a workshop for Iowa print and broadcast journalists, were held in western and eastern Iowa during the summer of 1999. The media people who write about contemporary agriculture received basic information about agricultural news sources, crops, livestock, ag marketing, and farm equipment, along with a comprehensive reference book of sources, story ideas, and basic facts about the state's predominant industry. The Center provided support for these workshops through the conference/workshop and special events program. Other sponsors included Agren, Inc. and the Iowa Farm Bureau Federation.

The Leopold Center maintained its summer intern program in 1998 with Jenifer Secrist summarizing participant evaluations of Center-sponsored conferences and helping to document outreach activities for the Center's five-year review. John Tyndall was hired in May, 1999, to be the Center's seventh summer intern. He is compiling conference evaluation summaries and working on several food system projects.

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"Far and away the best prize that life offers is the chance to work hard at work worth doing."

- Theodore Roosevelt

center SUPPORTS local FOOD SYSTEMS *work*

Why would you want to buy foods grown on the other side of the country when a farmer in your area is growing the same product—perhaps in a more sustainable manner? That is a question an increasing number of consumers are asking themselves these days.

The Leopold Center has been exploring new ways to link food producers with nearby consumers through education and outreach, competitive grants, and relationship building efforts. Planners of conferences and workshops sponsored by the Center are encouraged to seek out local food products to serve participants.

Local foods task force

Iowa Secretary of Agriculture Patty Judge assembled a 16-member statewide task force to investigate local food system possibilities that will add value for producers. The Center was well represented on the task force, whose membership included Rich Pirog, education coordinator; Neil Hamilton, long-time advisory board member; Kamyar Enshayan, principal investigator on a Cedar Falls food system project; and Gary Huber of Practical Farmers of Iowa and the Field to Family project. The task force chairperson reported to Mary Jane Olney of the Iowa Department of Agriculture and Land Stewardship, who also serves on the Center's advisory board.

Center staff have been involved in several in-service training sessions for staff members of ISU Extension, Natural Resources Conservation Service (NRCS), and local community development groups where locally grown food was served or local food systems information was presented. The Leopold Center continues to be a resource for groups trying to arrange locally produced meals for their events or needing information on local food systems.

New food system language (talking the talk)

Improving and promoting of local food systems holds much promise for both producers and consumers. It also introduces a whole new lexicon of agricultural terms such as institutional buying, relationship marketing, value-retained and value-added agriculture, food security, niche marketing, and community food systems.

INSTITUTIONAL BUYING OF LOCAL FOODS. A competitive grant project headed by Kamyar Enshayan of the University of Northern Iowa (UNI) has been working with food buyers and producers to serve more Iowa-grown and processed foods at the UNI and Allen Hospital cafeterias. Moving from nearly 100 percent non-local purchases, UNI acquired 11 percent of its produce locally while Allen spent 22 percent of its food budget on local items in 1998. Rudy's Tacos, a Waterloo restaurant, has made significant changes in its buying patterns, with purchases of more than 50 percent Iowa-grown and processed products.

RELATIONSHIP MARKETING. Audubon County Farms, another initiative funded by the Center through a local community development grant to M&M Divide RC&D, has been building ties by selling meats, poultry, honey, and other products through the Des Moines farmers' market and other local markets. In addition to offering quality products, they also try to build bridges between producers and buyers who frequent the markets. Audubon County Family Farms has developed its own trademark label for "hoop house pork."

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the journey

"The best way to predict the future is to invent it."

- Allen Kay



COUNTRY FOODS BILLBOARD



VALUE-RETAINED PRODUCTS. Country Foods, based in Adams County, stresses value-retained opportunities for producers to capture more of the food dollar. Besides operating a retail outlet and test kitchen in Corning, they shepherd a network of producers who supply local groceries, institutions, and specialist markets with produce, meats, and value-added commodity products. Country Foods has embarked on a venture to provide Iowa-grown products for use in the Iowa Farm Bureau Federation cafeteria at Farm Bureau's West Des Moines headquarters. Advisory board member Neil Hamilton and education coordinator Rich Pirog acted as resources to forge the link between Country Foods and the Farm Bureau food service provider, Sodexo-Marriott.

COMMUNITY FOOD SYSTEMS AND AGRICULTURAL PLANNING. Working with the Wallace House Foundation on a special project basis, the Center has been supporting a series of discussions using the Common Ground study circles process. Two groups in each of these categories met four times in the Ames and Des Moines areas:

- * The community food systems groups addressed issues of food and community, including increasing local production of food, hunger, nutrition, and food distribution. They concluded that they were ready to take action to help connect producers with consumers in local markets

- * The production agriculture groups dealt with alternatives in production agriculture that will provide better return to producers and better support for communities. They saw the need for continuing dialogue among stakeholders in order to build the consensus needed to support action.

Participants in both regions included farmers, community supported agriculture producers, consumers, citizens, leaders, as well as representatives of partner organizations. When the project ended in June, 1999, the steering committee recommended that the process be replicated in other parts of the state. The project is also funded by the Kellogg Foundation's Vision 2020 project.

Competitive grants work

New projects in the agriculture and community category that began related work July 1, 1999 are studying food systems, brokering of food products, selling to the hotel-restaurant-institution trade, and consumer interest in foods with environmentally correct labeling.

“Most of the important things in the world have been accomplished by people who have kept on trying when there seemed to be no help at all.”

- Dale Carnegie

GRANTS





COMPETITIVE *grants*

What route does a proposal travel to be funded by the Leopold Center?

One- or two-page preproposals outlining the dimensions of the project are solicited in the summer and are due to the Center in early September.

Following scrutiny by the staff and advisory board, and depending on assessments of available financing, roughly half of the preproposal authors will be asked to submit full proposals by mid-November.

By the end of February, the full proposals have been reviewed by outside experts, the Center staff, and the advisory board. The highest ranked proposals may be accepted for funding as they are written, or the Center may request modifications based on reviewer comments. Final versions of the proposals must be in place for funding at the start of the fiscal year, July 1.

The Center is funding 18 new projects in FY 2000 and renewed funding for 29 projects in their second or third year of operation. Another 16 projects were scheduled to conclude their activities by June 30, 1999, and provide final results to the Center later in the year. The competitive grant process involves every member of the Center staff and advisory board, with primary traffic cop responsibilities belonging to the grants program coordinator, Jeri Neal.

The new "agriculture and community" category of proposals attracted a lot of interest when the request for preproposals was issued in 1998. These projects created new partnerships, opportunities, and challenges for the Center staff and advisory board to consider in evaluating the proposals.

AGRICULTURE *and* COMMUNITY

Alternative and Horticultural Crop Education and Marketing Pilot Project

J. Leininger, Southern Iowa Ag Diversity Corporation, Corning 3 years

Area farmers planned to explore development of a cooperative infrastructure to produce, market and sell specialty and value-added horticultural and agricultural products. In the past year efforts focused on Country Foods, a licensed local food processing facility and local retail outlet. The project is being redefined as a result of changes in the population base of Adams County, changes in project leadership, retailing and marketing challenges, and a switch from a feed to a food crop focus. Primary emphases for this year are establishing stable markets for fresh foods and producing consistent, quality products for the new markets.

Assessing the Impact of Instructors and Students as Transfer Agents

E. Weber, ISU Agricultural Education and Studies 1 year, ending 1999

What sort of impact did the 1997 Future Farmers of America Nutrient Management Curriculum have on farm practices? The goal was to increase soil and tissue testing among producers who had contact with FFA students using the curriculum. In this project, surveys were used to determine whether instructors who attended an in-service training session on nutrient management had a higher level of student activity than those who merely received a copy of the curriculum.



the journey

"We shall never achieve harmony with the land, any more than we shall achieve absolute justice or liberty for people. In these higher aspirations the important thing is not to achieve, but to strive."

- Aldo Leopold

"If his back be strong and his shovel sharp, there may eventually be ten thousand [trees]."

- Aldo Leopold



Community and Economic Regeneration through Strengthening the Local Food Economy

K. Enshayan, Center for Energy and Environmental Education, Cedar Falls 3 years

The goal is to identify practical pathways to enable institutional food buyers to purchase products and services from Iowa farmers, processors, and distributors. The project has been successful in establishing local/regional purchasing at Allen Hospital, Rudy's Tacos, and the University of Northern Iowa dining services. Primary difficulties encountered are the small volume of fruit and vegetables grown in northeast Iowa, the lack of marketing channels that accommodate local agricultural products, and the lack of well-organized data on existing sources of Iowa-grown or Iowa processed food products.

Establishment of a Local Food System in Eastern Iowa

W. Jones, Johnson County Soil and Water Conservation District, Iowa City 3 years

NEW By building on an existing Extension 21-funded value-added agriculture project, Johnson County Soil and Water Conservation District and Johnson County Cooperative Extension will pursue activities to develop a local food system in the region. Anticipated outcomes of these activities are increased commerce between local producers and consumers, strengthened rural-urban ties and better public understanding of the environmental, economic, and social implications of sustainable local food production.

Examining the Potential for Organic Apple Production: The Homestead Orchard Project

S. Muller, The Homestead, Runnells 3 years

A model is being established for a commercial organic apple production system for facilities that house people with developmental disabilities and other special needs. During the past year, staff and residents invested more than 2,000 hours in soil sampling, plot, and materials planning, and orchard planting and maintenance activities. The focus for the coming year will be educational collaborations with Central College and Iowa State University, focusing on pest management, orchard management, and designing related methods and techniques for autistic residents.

Iowa Master Conservationist Program

J.L. Pease, ISU Animal Ecology 2 years

NEW The Master Conservationist program is modeled after the Master Gardener program, Master Woodland Manager program, and a successful Center-sponsored Story County pilot program. It consists of eight, four-hour hands-on educational sessions followed by 32 hours of volunteer activity by each course participant. The program meets a need for a community-wide and broadly based natural resource conservation literacy program for adults. Grant funds will be used to expand it to eight additional counties in the next two years. Counties currently identified for the program include Cerro Gordo, Iowa/Poweshiek, and Webster.

Making the Connection: Linking Farms to Hotels, Restaurants, and Institutions (HRIs)

G. Huber and R. Karp, Practical Farmers of Iowa 2 years

NEW The HRI market in Iowa appears to hold great potential for small- to medium-scale farmers. Plans include estimating the potential HRI market for Iowa-grown and raised foods; characterizing opportunities and barriers in this market for both HRI buyers, staff, and clients as well as farmer producers; estimating profitability potential for Iowa producers; analyzing possible models for linking Iowa producers and HRIs in these markets; and educating producers about HRI markets.

Rural Regeneration through Direct Marketing Audubon County Meats

D. Bauer, M&M Divide, Audubon 2 years, ending 1999

Audubon County Family Farms (ACFF) continued to stock booths at farmers' markets in downtown Des Moines and in Audubon. Increased emphasis was placed on year-round sales of ACFF products in restaurants and institutions and via gift certificates and fund-raising projects for organizations. An educational display with photos of the ACFF farmers and farms was updated for use at farmers' markets and other food-related festivals and conferences. ACFF staff shared their findings with other producers

Sustainability and Community Food Systems in Three Iowa Counties

C. Hinrichs, ISU Sociology 3 years

NEW Current popular discussion about globalization in agriculture often refers to a "global food system" and

"local food systems" without empirical evidence about the nature and dynamics of either. Using case studies in Benton, Audubon, and Marshall counties, historical, statistical, and survey data will be collected to identify the key food-related issues and ventures and their local and non-local aspects. The information will help describe the sustainability of the community food system in each county.

Youth and Conservation Methods

D. Groff, Woodbine Community

School, Woodbine 1 year, ending 1999

Using multi-media tactics to teach students about conservation methods allowed Woodbine fifth- and sixth-grade students to interview and videotape local farmers. The school children explained what they learned about ecology from these interactions in a series of posters. The videotape footage will be edited into a short video program about on-farm conservation practices.

AGROECOLOGY

Ecology and Restoration of Farmland Woods in Central Iowa

D. Farrar and C. Mabry, ISU Botany 3 years

In cooperation with Iowa Department of Natural Resources and The Nature Conservancy, sampling has been conducted to provide an inventory of woodland understory plant species in disturbed and undisturbed woodlands, including grazed and ungrazed woodlands. The information is being analyzed to determine the best candidate species for re-establishment in woodlands. Processes that limit the natural colonization of species also are being studied. Data from the early experimental work of this project are being applied in a restoration project undertaken at Camp Dodge in 1998.

Evaluation of Interactions within a Shelterbelt Agroecosystem

C.W. Mize, ISU Forestry 3 years, ending 1999

Crops within the shelterbelt were planted, tended, and measured to provide data for comparison with past years' growth. Data from wind speed sensors were analyzed to determine shelterbelt effects on wind speed. The snow fence on the western edge of the shelterbelt was reinstalled, but shrubs are being planted to remove the need

for a snow fence in the experimental setting. One row of trees was cut down to encourage sprouting from the stumps, which will help fill in the lower portion of the shelterbelt. About 40 percent of the trees in the other three rows were removed to increase growth of the remaining trees.

Evaluation of Three Cropping Systems Grown under the Influence of a Shelterbelt

C.W. Mize, ISU Forestry 3 years

This project is evaluating economic and biological benefits of applying hog manure to strip intercropping, with hog manure being applied to harvested oat strips, continuous corn, and a corn-soybean rotation grown under the shelterbelt's influence south of Ogden. Due to changes by the farmer in crop layout and a decision by the farmer to abandon the oats, strip intercropping as a system will not be evaluated, but data are still being gathered for corn and soybeans. Weather supported good tree growth for the shelterbelt.

Improving Tree Establishment with Forage Crops

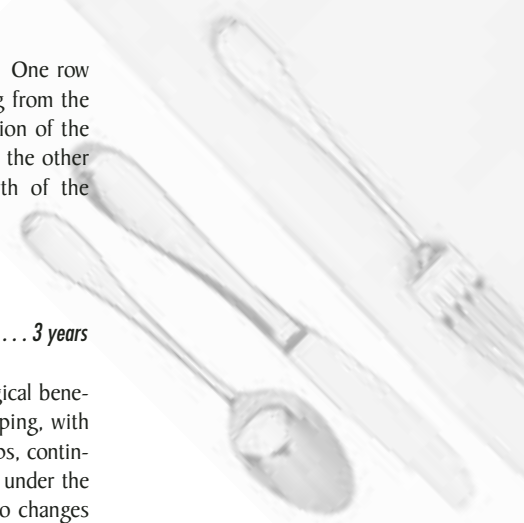
C. Mize, ISU Forestry 3 years

The project is documenting tree survival and growth, crop productivity, and system economics for fast-growing and high-value hardwood seedlings under weed control treatments that include small grain/forage crop combinations, herbicides, cultivation, and mowing. First-year tree survival was excellent at both bottomland and upland sites, and first-year growth did not vary much among the seven treatments. This was expected because seedlings have considerable stored reserves and competition was low for at least part of the growing season.

Iowa Location for Pawpaw Regional Trials

P. O'Malley, Johnson County Extension, Iowa City 3 years

NEW As a first step in evaluating the potential of the indigenous pawpaw fruit as a commercial crop for Iowa, the project would establish a Louisa County site as part of the Pawpaw Foundation regional trials. Twenty-eight selections will be evaluated for fruit and growth characteristics.



the journey

"You cannot escape the responsibility of tomorrow by evading it today."

- Abraham Lincoln

shelterbelt

“Our ability to perceive quality in nature begins, as in art, with the pretty. It expands through successive stages of the beautiful to values as yet uncaptured by language.”

- Aldo Leopold



CROP *and* FORAGE SYSTEMS

Determination of Early Summer Pasture Conditions to Optimize Forage and Calf Productivity and Profitability

*J. Russell, ISU Animal Science,
and Ann Cowen, ISU Extension. 3 years, ending 1999*

Using summer pastures to best advantage has been the focus of this project. Investigators have been assessing the effects of the environmental, soil, and forage properties at the beginning of grazing on the total forage yield, calf production, and cow reproduction on summer pastures. Fifteen producers, located on farms from Chariton to Corning, have been using the ISU-Integrated Resource Management-Standardized Performance Analysis (SPA) records to identify strengths and weaknesses in their cow-calf enterprises with special emphasis on how summer pasture conditions can optimize economic opportunities.

Development of Switchgrass as a Viable Agricultural Commodity for Farmers in Southern Iowa

J. Cooper, Chariton Valley RC&D, Centerville 3 years

Funding supports development and delivery of information and education materials for the multi-county, multi-agency Chariton Valley Biomass Power Project. During the first two years, the project has generated more than three dozen news reports and articles, 1,800 sets of project fact sheets and brochures, 600 issues of the project newsletter, six related publications, project displays, a slide set, a web site, 16 presentations, and 18 project field days. Topics include establishment and management of switchgrass for biomass, carbon sequestration, water quality, and the economics and additional environmental impacts of these processes.

Eastern Gamagrass Seed Dormancy

A. Knapp, ISU Agronomy. 3 years, ending 1999

Previous results have indicated that cupule removal and subsequent pericarp scarification (in the scutellar area) result in complete germination of dormant seed. The investigations also suggest, however, that mechanical scarification will be unsuccessful with this species. This is due to the variation in size and shape of the cupule and the structure of the caryopsis. Thus, researchers are pursuing other means to develop a practical method for inducing germination in Eastern Gamagrass Seed. They

have determined that the application of GA₃ in solutions buffered below the pKa of gibberellic acid will stimulate germination within 10 percent of the viability of the seed lots. This work along with thermo-gradient table studies (in progress) to determine the range of germination stimulating temperatures will form the basis for investigations on the value of solid matrix priming in inducing germination of dormant seed.

Economic and Environmental Evaluation of Crop Management Systems for Sustainable Agriculture

*W.D. Batchelor, ISU Agricultural and
Biosystems Engineering. 3 years, ending 1999*

This project analyzed the economic and environmental consequences of various levels of field management to determine when it is appropriate to adopt increasing levels of management on farms. In the final year of the project, investigators used two models to conduct a case study of field management on several types of fields. Using data from these and other models, they will develop criteria for determining appropriate levels of farm management in areas such as cropping, nitrogen application, and nutrient management.

Establishment and Persistence of Legumes on Sites Varying in Aspect, Landscape Position, and Soil Type

K. Moore, ISU Agronomy. 3 years, ending 1999

Work continued to determine how different variables affect the quality and variability of forages for grazing. New nondestructive vegetative sampling techniques were used in 1998 and two additional soil parameters (temperature and moisture content) were measured. Snowfall accumulation was checked to gauge how much was needed to insulate the ground for overwintering of legumes.

Evaluating the Adaptability of Alternative Perennial Legumes

*D. Haden, ISU Northwest Research
and Demonstration Farm, Sutherland 3 years*

Stands of kura clover, cicer milkvetch, and rhizomatous birdsfoot trefoil will be established on ISU research farms across Iowa to evaluate regional adaption, longevity, and forage traits. The project was scheduled to be established last year but investigators were unable to acquire the birdsfoot trefoil seed. Sufficient seed may be available in the fall of 1999.

Evaluation of Forage Plants Collected from Permanent Pastures throughout Iowa

E.C. Brummer, ISU Agronomy 2 years, ending 1999

White clover, orchardgrass, and birdsfoot trefoil species were collected from 20 permanent pastures around Iowa in 1996 and clonally propagated and transplanted to field plots near Ames. Additional replications were added for orchardgrass and white clover. This was the first year in which plants were intensively evaluated to determine relative merits of naturalized populations for cultivar development and forage yield.

Feasibility of Organic Soybean Production following Conservation Reserve Program (CRP) Land

K. Delate, ISU Horticulture and Agronomy 3 years

By evaluating yield, pest status, soil health indicators, and economics of organic soybeans on CRP ground, this project will document biological and economic outcomes of different treatments within the organic system and explore implications for management practices. An on-farm trial was established on the O'Brien farm near Clinton (land previously enrolled in the CRP program for 10 years). A research farm trial was established at ISU's McNay Research and Demonstration Farm near Chariton in the fall of 1998.

Genetic Diversity and Performance of Oat Blends

J.B. Holland and E.C. Brummer, ISU Agronomy 18 months

NEW Wider adoption of oats in Iowa cropping systems is hindered by unreliable yields, and this seems true whether farmers plant traditional pure-line stands or varietal blends. This research theorizes that greater genetic diversity between the varieties used in the blends is key to improved yield stability. Plans are to test for correlation between increased genetic diversity and blend superiority in oats.

Local Ecotype Prairie Seed: An Alternative Agricultural Product for Increasing the Viability of Smaller Farming Operations

J. Selby and K. Fletcher, The Nature Conservancy, Des Moines 3 years

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 demon-

stration. Westfield producer Craig Bobier will provide the site for spring plantings. A spring field burn was conducted last year, and a diverse seed mix of 45 species typical of the Loess Hills tallgrass prairie was gathered by machine and hand last fall for use in the 1999 planting. Links established with another local landowner and a producer in Monona County will allow for parallel projects.

Organic Farming Demonstration Projects (Eastern Iowa)

W. Johnson, Limestone Bluffs RC&D, Maquoketa; and K. Delate, ISU Horticulture and Agronomy 3 years

Three demonstrations are being established at New Melleray Abbey; one for weed control methods for organic row-crop production, one for use of compost as a soil amendment for fertility and to improve soil tilth, and a third for nitrogen-producing cover crops for organic corn production. Organically managed demonstrations also are being established at the Andrew Jackson Demonstration Farm with three acres of white corn, four acres of clear hilum soybeans, and one-quarter-acre plots of direct-seeded and transplanted echinacea, St. John's Wort, Anaheim peppers, and basil.

A Simple Method to Increase Alfalfa Yields in the Establishment Year

E.C. Brummer and K.J. Moore, ISU Agronomy 1 year

NEW Alfalfa only produces about 50 percent as much forage in the seeding year as it does in succeeding years, and farmers need to increase the first-year yield. The objectives are to test mixtures of dormant and nondormant alfalfa cultivars to determine the effect of mixtures on seeding year yield, yield in the second production year, and forage quality.

Small Grain and Annual Forage Legume Intercrops for Iowa

J.B. Holland, ISU Agronomy 2 years, ending 1999

Five small grain and five annual forage cultivars are being grown alone and in combination to determine the most promising mix of production and management practices. Some of the first year's treatment effects and interactions were inconsistent between the Ames and Nashua sites, and the second year of data was focused to help make better sense of the first year's results. Botanical separation and forage quality analyzes from the 1997 experiment were completed to provide better understanding of the ecology of the intercropping system.

the journey

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"I could use a hundred people who don't know there is such a word as impossible."

- Henry Ford



PHOTO BY AMAN RICE

the journey

“Do not go where the path may lead, go instead where there is no path and leave a trail.”

- Ralph Waldo Emerson

LIVESTOCK MANAGEMENT

American Bison as an Alternative Livestock Enterprise in Iowa

E. Tophoj, Monona County Extension 2 years

Due to a career change, the principal investigator was unable to pursue this work. The project, although approved, was not funded.

Botanicals as Part of an Integrated Value-Added Pork Production System

E. Franzenburg, Benton Development Group, Van Horne; P. Holden, ISU Extension Animal Science 1 year

NEW Research funded by the Leopold Center in 1998 identified three botanicals (peppermint, echinacea, and garlic) that warrant further investigation for potential benefits in swine production systems. Using nursery pigs, the botanicals' performance will be compared to commercial feed additive performance. Measurements include average daily gain, feed efficiency, mortality, general visual health, standard carcass evaluation, and sensory tests for tenderness, juiciness, and flavor of the pork.

Chariton Valley Beef (CVB) Industry Initiative

J. Sellers, Lucas County Extension, Chariton 3 years

Producers in 20 counties have formed a nonprofit corporation to work on new marketing efforts, and are building a database on the carcass, performance, and health attributes of cattle raised in the region. Data is returned in summary reports to the producer group and in individualized evaluations for the producers, and also is used to help members market fed cattle into value-added grids and to market feeder cattle at source-verified sales. CVB staff plan to evaluate market effects of source verification, as well as other technologies, for marketing of specific traits.

Complementary Grazing Systems for Beef Cattle Production

K.J. Moore, ISU Agronomy 3 years

NEW A grazing study will be conducted at the McNay Research Farm near Chariton to evaluate the impact of legumes and warm-season grasses (birdsfoot trefoil, alfalfa, kura clover, smooth bromegrass, big bluestem, switchgrass) on season-long productivity of complementary grazing systems (systems will be stocked with crossbred steers).

Coupling Swine Technologies: Pig Production Systems for Iowa

M. Honeyman, ISU Research and Demonstration Farms 3 years, ending 1999

Three aspects of alternative bedded hog production were the focus of 1998 research efforts: a Swedish feeder pig production system, outdoor farrowing with gestation in hooped structures, and wean-to-finish in hoops. Investigators summarized two-and-a-half years of results from a Swedish system and prepared a detailed outdoor farrowing budget using artificial insemination hoops for gestation. Key challenges faced were the high pre-wean mortality in the Swedish system and day-to-day management of early-weaned pigs in hoops. The early-weaned pigs grew faster and ate more feed than the pigs in a hot nursery.

Demonstration of Swine Carcass Composting as Part of an Environmentally Friendly Production System,

J. Harmon, ISU Agricultural and Biosystems Engineering 2 years

NEW Swine carcass composting demonstrations will be conducted at the ISU Rhodes Research Farm and the Lauren Christian Swine Farm near Atlantic. The projects will examine deep bedding, various co-composting materials (wood chips, straw, and soybean residue), finishing swine mortality (Rhodes), and sow farm and nursery pig mortality and afterbirth (Atlantic).

Growing Dairy Heifers in Southwest Iowa

R. Sanson, Page County Extension, Clarinda 3 years

ISU Extension, local producers and lenders, and the Page County Rural Economic Development Organization are cooperating in collecting and analyzing economic and production data that can be used to refine management practices and assess the growth potential for growing dairy calves in southwest Iowa. Initial information meetings on dairy production issues such as heifer health, herd bio-security, economics, birth-to-400-lb. management, nutrition, and marketing were held in June, 1998, to stimulate interest in the project. Three local producers are providing production data for the project.

Stability and Activity of Antibiotics in Animal Manures

W. Hyde and P.M. Imerman, ISU Veterinary Diagnostic Laboratory. . . . 3 years, ending 1999

Part of this project looked at the effects of composting on tetracycline-type antibiotics in manure, a matter of



CHARITON VALLEY BEEF INITIATIVE

concern to organic producers who are likely to use composted manure products. Swine manure was spiked with two tetracycline antibiotics, composted with cornstalks in bioreactors at various moisture levels, and antibiotic residues were analyzed. The second segment of the research is evaluating anaerobic digestion and antibiotic residuals.

Winter Grazing of Corn Residues: Effects on Soil Physical Properties and Subsequent Crop Yields from a Corn-Soybean Crop Rotation

D. Busby, Southwest Area Extension Center, Lewis 3 years

NEW In several forums, Iowa cattle and grain producers identified the relationship between grazing of corn crop residues and soil physical properties as one of their highest research priorities. This research will attempt to determine the effects of grazing of 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).

NUTRIENT MANAGEMENT

Crop Response to Selected Micronutrients in Iowa

R. Killorn, ISU Agronomy 3 years

NEW The purpose is to update ten-year-old research on crop response to micronutrients. At least ten sites will be evaluated, and the micronutrients to be tested will be decided upon in consultation with cooperators. Work will begin with zinc, a micronutrient known to have produced yield responses in earlier research and producer trials.

Dairy Manure Quantification and Characterization in Grazing Systems

W. Powers and M. Faust, ISU Animal Science 2 years

Two northeast Iowa grazing dairy operations are participating in this research. The investigators have established year-round sample collections of milk and manure from the two herds of ten cows each; and also collect monthly fecal and urine samples from the same 20 animals. These data, along with records of milk production and pasture clippings, are among the measures being used to generate manure composition and quantity prediction equations that will help intensive dairy grazers make environmentally sound stocking rate and manure storage management decisions.

Education-based Incentive Program to Enhance Long-term Adoption of Sustainable Nutrient and Pest Management—A Demonstration with Farmers in Northeast Iowa

G. Miller, ISU Agronomy 3 years, ending 1999

Project investigators continued to refine their model for cost-effective educational incentives that can be used to alter producers' attitudes and practices in crop nutrient and pest management (NPM). The NPM Incentive Education Program requires participating farmers to learn the basics of NPM by creating nutrient management plans and records for their own farms. Workshops, a biweekly NPM newsletter that addresses current nutrient and pest management issues, and incentive payments are key program elements. In the third year of the project, investigators upgraded workshop discussion formats and provided information about the many new genetically modified and herbicide-resistant products in the marketplace.

Evaluation of Organic Soil Amendments for Certified Organic Vegetable and Herb Production

K. Delate, ISU Horticulture and Agronomy 3 years

After analysis for macronutrients, moisture, and carbon/nitrogen ratio, several composts will be applied to production systems and the composts compared through an evaluation of their impact on product yields, pest status, soil health indicators, product quality, and economics. On-farm sites have been established near Kanawha (Jan Libbey farm) and Ames (Heenah Mahyah Student Farm), and a research farm site has been established in southeast Iowa at the Muscatine Island Research and Demonstration Farm. Types of amendments being tested include poultry litter, feathermeal, Bio-Cal, and conventional fertilizer.

Livestock and the Environment Project in Sioux County

K. Kohl and J. DeJong, Buena Vista and Plymouth County Extension, Storm Lake and LeMars . . . 3 years

NEW The Northwest Iowa Extension environmental team will investigate through survey and focus groups the barriers that deter producers from using manure as a crop nutrient, and will test a new pit-sampling method for producer acceptance. The goal is to define strategies that would measurably and positively impact manure management attitudes.



the journey

“The ultimate measure of a man is not where he stands in moments of comfort and convenience, but where he stands at times of challenge and controversy.”

- Martin Luther King, Jr.

convenience

“Leadership
is the
capacity to
translate
vision into
reality.”

- Warren G.
Bennis



Nitrogen Conservation in Swine Manure

Composting: Land Application Systems

*T.L. Richard, ISU Agricultural and Biosystems Engineering;
T. Loynachan, ISU Agronomy; C.A. Cambardella,
USDA-ARS-National Soil Tilth Laboratory 2 years*

By quantifying nitrogen transformations as swine manure is composted with corn stalks and by quantifying carbon and nitrogen mineralization when composts of different maturities are applied to soil, researchers can understand how to develop compost products that synchronize nitrogen release and crop uptake and improve overall soil quality. In the first six months of this study, special nitrogen analysis and potassium chloride extraction methods and special laboratory composting reactors were designed to deal with the high variability of the samples. Functional pilot scale reactors were constructed and initial analytical trials were conducted.

Optimizing Swine Hoop Manure Management for Soil Quality and Crop System Performance

T.L. Richard and M. Liebman, ISU Agricultural and Biosystems Engineering and Agronomy; D.N. Exner, Practical Farmers of Iowa and ISU Agronomy; C.A. Cambardella, USDA-ARS National Soil Tilth Laboratory 3 years

NEW Researchers plan to use 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. Observations will include farm management data, compost and bedding composition, soil biochemical properties, soil microbial biomass, crop biomass and macronutrient content, and seed yield data.

Reducing Anhydrous Ammonia Application by Optimizing Distribution

M. Hanna, ISU Agricultural and Biosystems Engineering . . 3 years

NEW In ongoing work to minimize inconsistent application by anhydrous ammonia equipment, researchers will compare field distribution by a conventional manifold, a vertical dam manifold, and a Cold-flo[®] device; develop and compare an alternative design; and field test the results. These new equipment designs may help decrease the amount of N used by producers.

Socio-technical and Environmental Dimensions of Swine Manure Management Decisions

*C. Hinrichs, ISU Sociology, and T. Richard,
ISU Agricultural and Biosystems Engineering 2 years*

Qualitative field interviews were conducted during the spring of 1999 in the Raccoon River and Iowa River watershed regions to examine how farm operation characteristics and personal views on environment and technology influence swine producers' manure management decisions on their farms. The research includes questions in four main areas: the biological, physical, social, and economic characteristics of the farm operation; farmers' perceptions about manure and features of their manure handling systems; farmer environmental and watershed perceptions; and current challenges and concerns of farmers.

Soil Amendment Effects on Crop-Weed Interactions

*M. Liebman, ISU Agronomy, and T. Richard,
ISU Agricultural and Biosystems Engineering 3 years*

NEW This research will investigate 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 cornstalks will come from swine hoop structures, which are increasingly popular with Iowa pork producers.

Statewide Manure Management Education Initiative

G. Miller, ISU Agronomy 3 years

Under leadership from ISU Extension, the ISU College of Agriculture, the Leopold Center, Iowa Veterinary Medical Association, soil and water conservation districts and the Iowa Independent Crop Consultants' Association, this project uses intensive workshops with individualized participant plans to encourage appropriate decision-making about utilization of manure nutrients. During the first three winters, 267 workshops were conducted across the state, reaching more than 1,900 livestock producers from all sizes and types of livestock and crop operations.

leadership

PEST MANAGEMENT

(includes biological control, diseases, insects, and weeds)

BIOLOGICAL CONTROL OUTREACH

Biological Control and Sustainable Horticulture

Principles for Iowa's Vocational Agriculture Curriculum

G. Nonnecke, *ISU Horticulture* 2 years, ending 1999

Curriculum units on biological control and sustainable horticultural principles were presented to focus groups of Iowa agricultural education teachers and students. Following additional input from teachers and subject matter specialists, curriculum materials were produced in electronic and hard-copy formats. Final versions of curriculum materials and supplemental educational materials were distributed to the teachers at the summer 1999 in-service training for Iowa vocational agriculture teachers. A web site that contains the curriculum units and educational materials was developed and demonstrated to the teachers at the summer training.

Biologically Intensive Pest Management: Iowa Apple Growers Take the Next Step Toward Sustainability

M. Gleason, *ISU Plant Pathology* 3 years

Apple growers are participating in cooperative trials to identify biologically intensive pest control tactics best suited to Iowa conditions. Tactics under evaluation include: a weather-based warning system for sooty blotch and flyspeck that recommends fungicide sprays only when outbreaks are imminent; postharvest treatments of soap and dilute chlorine washes for sooty blotch and fly-speck; substitution of codling moth insect growth regulator for conventional control insecticides; and yield, fruit quality, and taste evaluation of 13 new scab-resistant cultivars.

Manipulation of Predatory Insects for Enhanced Biological Control of Insect Pests

J. Obrycki, *ISU Entomology* 3 years

One impediment to manipulating predators for biological control is that scientists do not understand the chemical cues and behavior used by the predators to locate their prey. Focusing on predatory lacewings and adult lady beetles, investigators have successfully identified a number of attractant compounds released by corn plants, as well as "arrestment" chemicals released by insect prey. Further plans are to include a second predatory lacewing species in the study, conduct detailed field trapping studies to optimize levels of attraction and arrestment,

develop a more efficient dispenser system, and examine the responses of predatory species to blends of aphid- and plant-emitted volatiles.

DISEASES

Integrating Biologically Rational Strategies for Control of Anthracnose Fruit Rot of Strawberries

M. Gleason, *ISU Plant Pathology* 3 years

Analysis of performance and economics of a number of biological and cultural tactics will lead to recommendations for biological strategies to control this emerging disease of June-bearing and day-neutral strawberries. Seven genera of fungi have been isolated from strawberry foliage and fruit for screening for their antagonism to the anthracnose pathogen. Field tests are underway for several biological products nearing EPA registration and a straw mulch trial also is underway. Detection methods for anthracnose and methods of pathogen spread also are being studied.

Nontarget Effects of Bt Corn on Pathogenic and Toxicogenic Fungi

G. Munkvold, *ISU Plant Pathology* 2 years

NEW The transgenic corn hybrids (Bt hybrids) being integrated into farming systems may have unforeseen effects, either positive or negative, on fungi that interact with pests. The research proposes to determine the effects of different Bt genes on corn stalk infection and stalk rot symptoms; corn kernel infection and ear rot symptoms; aflatoxins, fumonisins, and other mycotoxins; and the occurrence of the beneficial fungi, *Beauveria bassiana*.

INSECT

Biological Control of Purple Loosestripe by Two Host-Specific European Leaf Feeding Beetles in Iowa Wetlands

J. Obrycki, *ISU Entomology* 3 years, ending 1999

As purple loosestripe spreads in Iowa's wetland ecosystems, interest grows in finding alternative methods to control the plants. In 1998, the team continued to rear, release, and conduct field assessments of the use of the *Galerucella* beetle as a biological control agent for purple loosestripe. More beetles were raised at ISU and in northwest and north central Iowa, with Upper Iowa becoming a major *Galerucella* spp. supplier to eastern Iowa sites. Data on overwintering, purple loosestripe densities, and beetle densities were collected to compare with results from earlier years.



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management

"If we did all the things we are capable of doing, we would literally astonish ourselves."

- Thomas Edison

“The great thing in this world is not so much where we are, but in what direction we are moving.”

- Oliver Wendell Holmes, Jr.

Development of Alternative Carriers for Use of *Beauveria bassiana* in *Ostrinia nubilalis* Suppression on Corn

L. Lewis, USDA-ARS Corn Insects and Crop Genetics Research Unit, Ames 2 years

Investigations will be conducted on four private farms to evaluate clay, corn cob grits, two mesh sizes of a starch substrate, and corn kernel as carriers for the fungus *B. bassiana*, which has been proven effective for managing European corn borer activity in corn. A primary concern for using corn kernel-based carriers is that they might lead to elevated levels of aflatoxin. Although corn borer pressure was light across Iowa in 1998, and the wet spring prevented *B. bassiana* application at the most desirable growth stage of the corn, there was no significant yield difference and no detectable aflatoxin (20 ppb or less) for any of the carriers. The work will be repeated this year.

Ecological Impact of Herbicides Associated with Transgenic Soybeans on Spider Mites

L. Pedigo, ISU Entomology 2 years

NEW Fungal diseases of insects are the main force responsible for keeping many potential pests below economic thresholds in Iowa soybeans. If these fungi are susceptible to Roundup® formulations soybeans could suffer outbreaks of pests. This research will determine if outbreaks of spider mite populations could be expected with the use of transgenic herbicide-resistant soybeans and their corresponding herbicide management packages.

Use of Intra-field Alfalfa Trap Cropping for Management of the Potato Leafhopper

J. Obrycki, ISU Entomology 3 years

Originating from farmer observations and practices, this project is studying the use of an alfalfa trap crop for potato leaf hopper management. By quantifying interactions among the trap crop, cycles of leafhopper populations, and development of the entomopathogen *Zoophthora radicans*, the project is assessing effectiveness of intra-field alfalfa trap crop management at three locations. One question of particular interest is the influence of alternate leafhopper hosts, including the uncut strips, on reinfestation of the regrowth alfalfa following the first cutting.

WEEDS

Biologically Intensive Manipulation of Foxtail Soil Seed Banks for Enhanced Mortality

J. Dekker, ISU Agronomy 3 years

By determining the emergence, mortality, and long-term carryover of giant foxtail in soil seed banks, and how these fates vary over time by biotype, location, and burial depth, the project seeks to enhance weed seed death and provide practical weed seed bank management tools. A correlation has been found between fall germination rates and subsequent foxtail seedling emergence. To further define this correlation as a management tool, mortality, emergence, and other seed data will continue to be collected from the 30 different populations established at research sites near Ames and Crawfordsville. The data also will be used to continue investigation of another critical element of weed control, which is understanding seed death and carryover in the soil seed bank.

Managing Weeds by Integrating Smother Plants, Cover Crops, and Alternate Soil Management

D. Buhler and K. Kohler, USDA-ARS National Soil Tillage Laboratory 3 years

With a goal of expanding weed management scope and diversity in corn and soybeans, this research is focused on 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. The smother plant systems being investigated use species mixtures and low-rate herbicide applications, and continually assess for new smother crop material. Work also is underway to integrate the research results into a system of biologically-based weed management. Farmer cooperators near Grinnell, Fort Dodge, and Treynor will provide on-farm sites for the systems research efforts.



SOIL *and* WATER QUALITY

Development and Implementation of Cost-effective Fertilization and Tillage Management Alternatives for Improving Soil Quality in Corn-Soybean Rotations

A. Mallarino, ISU Agronomy 3 years

Project objectives include development of phosphorus (P), potassium (K), and starter fertilization recommendations for corn and soybean under different tillage systems; evaluation of improved diagnostic tools to assess P and K soil fertility in no-till and ridge-till; economic analysis of alternative fertilization and tillage practices; and demonstration of a methodology for on-farm research and demonstrations based on precision agriculture technologies. Work is being conducted on five Iowa State University Research farms as well as a number of private farms in locations near Yale, Parkersburg, Vinton, Alden, Marion, Manning, and Wellman. Early results suggest that deep-banding and variable-rate application of P has little impact on yields or economics but markedly reduces the risk of surface water contamination, and also that deep-banding of K could have economic benefits in all tillage systems.

The Effects of Transgenic Soybeans and Associated Herbicide Treatment upon Soil-surface Mesofauna

L. Pedigo and R. Bitzer, ISU Entomology 2 years

By identifying and quantifying springtail species composition in transgenic and other soybeans with their corresponding weed management systems, the study will reveal the effects of these systems on tiny insects that are important to overall soil health. Targeted transgenic/herbicide packages in the study include: glyphosate used with the Roundup-Ready®, and Roundup-Ready SCN varieties, and glufosinate with Liberty Link. Three non-transgenic varieties are being used for the conventional treatments: STS, Jack, and Kenwood 94, each with pre-emergence application of the herbicides metribuzin and dimethenamid. Early data collected on species variety and numbers are being used to construct the seasonal phenology necessary to understand springtail interactions with herbicide applications. Several kinds of abundance patterns have been observed and are being analyzed for statistically meaningful correlations.

Environmental Impacts of the Use of Poultry Manure for Agricultural Production Systems

R. Kanwar, ISU Agricultural and Biosystems Engineering. 3 years

The project is monitoring two application rates of poultry manure and commercial fertilizer nitrogen on corn and soybeans for leaching of NO₃-N (nitrate-nitrogen), PO₄-P (phosphate-phosphorus), and pathogenic bacteria to sub-surface drainage water and shallow groundwater. Initial treatments of 150 lb-N/ac from poultry manure resulted in the lower NO₃-N concentrations in tile water than treatments with 150 lb-N/ac from UAN and 300 lb-N/ac from poultry manure. PO₄-P and fecal coliform concentrations in tile water from the 300 lb-N/ac poultry manure were similar to 150 lb-N/ac treatments either from poultry manure or from UAN fertilizer.

Soil Quality, Yield Stability, and Economic Attributes of Alternative Crop Rotations

D. Karlen, USDA-ARS National Soil Tilth Laboratory, Ames 2 years, ending 1999

Laboratory analyzes of soil samples from Iowa and Wisconsin sites were completed in summer 1998. Various soil quality indicators were used to evaluate long-term tillage and crop residue management effects. Long-term yield stability was examined for the various crop rotations under study to determine if more diversified rotations improve soil quality and thus "buffer" yield variations caused by seasonal precipitation and temperature stresses.

Toxicity of Pesticides Adsorbed to Suspended Sediment to Larval Fish in the Cedar River

R.C. Summerfelt, ISU Animal Ecology, D.A. Laird, USDA-ARS National Soil Tilth Laboratory 3 years

Agriculture has been charged as responsible for loss of fish species in Midwestern streams and is considered an important source of pollution affecting streams and rivers. In this National Research Initiative-Leopold Center grant, investigators are describing physical and chemical characteristics, including pesticide residues, of sediment and water samples from the upper Cedar River; determining the toxicity of river sediments and water to larval walleye; measuring adsorption and desorption of the insecticide chlorpyrifos on clays; and determining whether toxic pesticides adsorbed to clays are toxic to larval fish. In preliminary work, Cedar River water and



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"The path to success is to take massive, determined action."

- Anthony Robbins

SUCCESS



sediment collected in May 1998 were no more toxic to larval walleye than the control water and sediment, although this may be influenced by flood events. Substantial variation in affinity for chlorpyrifos has been found for various sediment, clays, and humic colloids. A number of new experimental methodologies have been designed for use in the final phase of the research.

FINAL REPORTS PENDING

Iowa Lakes Controlled Grazing Project

D. DeWitt, ISU Extension. project ended 1997


A group of concerned cattle and sheep producers in Emmet, Palo Alto, Dickinson, and Clay Counties joined with local agencies to demonstrate that alternative grazing techniques with profit potential for producers would also benefit their local communities. Initially, seven beef producers worked with the ILCG to collect information on their present grazing practices while implementing improved practices. An additional cooperator, Iowa Lakes Community College farm, offered student involvement in the project. Besides sharing their results with others, project leaders hope to facilitate long-term leadership to continue the controlled grazing efforts beyond the end of the project. No final report received.

Transferring Biological Control Technology to Iowa Strawberry Growers

D. Lewis, ISU Entomology. project ended 1998

The project investigated field effectiveness and economics of a number of biocontrol technologies for strawberries, including a biocontrol fungus that attacks the tarnished plant bug, fungi that suppress gray mold growth, and corn gluten meal as an inhibitor of weed germination. The biocontrol fungus (*Beauveria bassiana*) tested for control of tarnished plant bug was shifted from research farm plots to growers' fields. By moving the trials, plot size can be increased and the distance between treatments can be increased to keep insects from migrating easily from one plot to another. Data collection and analysis for other treatments continued. No final report received.

COMPLETED *grants*

 Sixteen research projects funded by the Leopold Center's competitive grants program were completed in 1998. For more information, consult the *1999 Center Progress Report* or request a copy of the final report for the project from the Center office.

Agriculture and communities

- * Compensation of farm employees
- * Determining the benefits of environmental improvements in pork production and their sustainability: a community-based study of Iowa's pork industry
- * Field to Family Community Food Project
- * Non-farmer's Guide to Agriculture (Polk County)

Agroecology/ecosystems

- * Incorporating native plant communities on farms for forage and wildlife
- * Wildlife use of terraces in Iowa rowcrop fields

Integrated pest management

- * Biocontrol of Sclerotinia stem rot in soybeans with *Sporidesmium sclerotivorum*
- * Evaluation of the impact of tillage/ cropping systems on soil microflora and weed seedbank predation
- * Identification and characterization of the Rose Rosette disease causal agent
- * Integrated pest management for wireworms
- * Pheromone mating disruption: novel, non-toxic control of the European corn borer
- * Spring-seeded smother plants for weed control in corn and soybeans

Livestock management

- * Botanicals as part of an integrated value-added pork production system
- * Evaluation of the nitrogen and energy utilization of legume forages by growing cattle and sheep

Soil and water quality

- * Constructed wetlands to reduce agricultural chemical transport to water resources
- * Development of guidelines for application of swine manure to optimize nitrogen management for corn

the journey

"The business of life is to go forward."

- Samuel Johnson

one step



at a time...



Acknowledgement

The quotations used in this annual report were selected lovingly. The wisdom of the wise and experience of the ages enlightened our journey. We look forward to our next path as we continue to create, protect and preserve our environment so that it can be enjoyed for generations to come.

Many thanks to all

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the journey

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