



1999-2000 ANNUAL REPORT



LEOPOLD CENTER
FOR SUSTAINABLE AGRICULTURE

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LEOPOLD CENTER
FOR SUSTAINABLE AGRICULTURE



seasons of change

1999-2000 ANNUAL REPORT

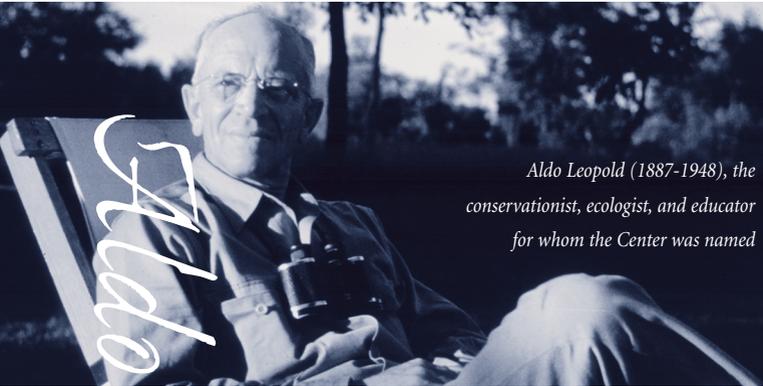




LEOPOLD CENTER FOR SUSTAINABLE AGRICULTURE



LEOPOLD CENTER
FOR SUSTAINABLE AGRICULTURE



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

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

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LEOPOLD

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.

In those seasons...the powers are gathering their strength for new efforts; as land which lies fallow recovers itself for tillage.
J.W. Alexander

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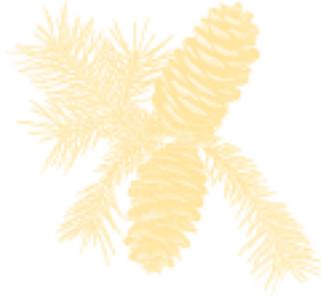
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LETTER FROM THE INTERIM DIRECTOR

winter



Having the opportunity of serving on the Advisory Board for about ten years and now as interim director for the past six months, I would like to share some of my thoughts on sustainable agriculture and the Leopold Center.

Fifteen years ago when more resources began to be directed towards sustainable agriculture on a national and to some extent international basis, expectations were high for improvements in many aspects of the impacts of agriculture on the environment and society. However, there was no universal agreement on the definition of sustainable agriculture and consequently the limited resources were not critically focused on key issues. In many respects this was not bad because various groups have tried many different approaches. As we look to the future there needs to be an in-depth evaluation of what has been done and identification of the important areas for new work.

With a decade of diversified work it should be easier for sustainable agriculture to set priorities for future research. The down side of no widespread improvement on the effects of agriculture on the environment is that it will be difficult to justify continued or increased support for sustainable agriculture in times of limited budgets.

The legislative mandate that established the Leopold Center stated that funds received from the state were to be used to support research and an outreach component to make the research results known. I think there have been successes from the efforts supported by the Center. The competitive research grants, the issue team component of the research and outreach programs, and the publications from the Center have received excellent evaluations from two external review teams. To claim the Center has started change in the dynamics of agriculture to be more in agreement with Leopold's land ethic would be a bolder statement than I want to make. The initial high expectations for sustainable agriculture have been tempered by the reality that many forces influence decisions Iowa farmers

*it takes patience to view the seasons' stately
passage within the great cycle of nature*

patience

and landowners must make with respect to use of the land. As researchers we must develop empathy with people who farm the land to appreciate the factors influencing their decisions.

As the Center reached out to work with more people and to diversify the areas of work, it became necessary to interact one-on-one with individuals and groups of people. This has not been traditional agriculture research. Staff has had to be out in the state and willing to help grant recipients achieve their goals, rather than staying on campus evaluating proposals and reading reports. Many university scientists whose projects are supported by the Center are finding satisfaction from conducting research on

farms and working in partnership with farmers even though the experiments are often not as well controlled as on university farms.

Traditional agriculture research has been adept at providing recipes (i.e., X lbs of fertilizer per acre for Y expected yield) for wide-ranging application. Sustainable agriculture is an evolving process. Dennis Keeney, former director of the Center, likened it to a journey that farmers learn as they understand the land they farm as a living community. Each farm and parcel of land is unique. To be successful, I think some portion of sustainable agriculture research must be shifted to engage the people farming the land with the living community on their farm in order to help them become better stewards of the land.

All of us at the Center look forward to working with Fred Kirschenmann and his perspectives of sustainable agriculture as he assumes leadership as Director of the Center.

Allen Trenkle

Allen Trenkle

WHAT DO YOU SAY about a year whose benchmarks were the gala retirement party for a departing director and a seemingly excruciating wait for the official announcement of the identity of his successor? Geoffrey Chaucer opined that patience is “a heigh virtue” and this sterling quality was much in demand among Leopold Center Advisory Board members and staffers during the past year, as they waited to see when and how the Center’s leadership vacancy would be filled.

This is not to imply that the Center’s operative made this year was one of long-suffering (one definition of patience). Rather, the Center remained steadfast (another form of patience) in its resolve to maintain and improve the research and education programs that have served Iowans so well during the decade just past.

Indeed, patience seems to be a quality that Aldo Leopold would applaud—he certainly needed stores of patience to spend years reclaiming the abused land that housed his famous Wisconsin shack. Rabelais said, “He that has patience may compass anything.”

The true conservationist knows that it takes patience to view the seasons’ stately passage within the great cycle of nature. It takes patience to watch the oak tree grow from a minute seed. It takes patience to wait for the land to heal itself after human mistreatment. And it takes infinite reserves of patience to change the minds and hearts of a society that has lost its elemental respect for the land.

Farmers know the virtue of patience too—they are forever waiting on the vagaries of the weather, the markets, and the government. No matter what else is afoot, the Center will work to reward their patience with well-grounded guidance on how to farm more sustainably, more economically, and more responsibly. It just takes time. And patience on everyone’s part. As the Bible passage (Hebrews 11:1) urges us, “Let us run with patience the race that is set before us.” — M.A.



KIRSCHENMANN

MELANIE LEOPOLD CENTER DIRECTOR



Frederick L. ("Fred") Kirschenmann, president of Kirschenmann Family Farms, Inc., of Windsor, North Dakota, has been chosen to guide the Leopold Center into its second decade of activities and achievements. Kirschenmann, a longtime leader in national and international sustainable agriculture circles and director of an organic family farming operation, has experience as an academic, an administrator, and a working farmer. He will be the first farmer to head the Leopold Center operations, an important step that will complement the Center's legislative mission of serving Iowa's agricultural community.

He began work at the Center on July 1, 2000. During his first five months of employment, he will be making a gradual transition from management of his 3,500-acre farming operation in central North Dakota to the Leopold Center offices in Ames.

Kirschenmann said of his new position, "It's an opportunity to think about where we want to go with agriculture in the future, and for many farmers, we don't have a lot of time left. Of course, I come into this with some trepidation because I don't have any easy answers either...The Center has a strong background in science and I want to build on that, but also recognize the challenges ahead of us."

On announcing the appointment, outgoing ISU President Martin Jischke remarked, "Dr. Kirschenmann has a talent for looking into the future, bringing people together to agree on goals and keeping them together to get things done. We're delighted that he will provide leadership for the Leopold Center."

Center advisory board members described him as "a true intellectual with an ability to draw upon scientific knowledge, apply it in diverse situations, and link research with agricultural practices." One member felt that Kirschenmann "could take the Center to the next level and add to (not just highlight)

"Dr. Kirschenmann brings new experience, vision and leadership to this position and I expect many people at Iowa State and elsewhere will come to appreciate his noteworthy qualities."

*-Wendy Wintersteen,
Chair, Director Search Committee*

the Center has had many changes—a year of retirements, farewells and new beginnings

Passages

important work done by Aldo Leopold and the University of Wisconsin in conservation.”

Kirschenmann brings a highly diverse set of life experiences to the Center. He has been a department chair, acting dean of students, director of a university consortium for higher education religion studies, and dean of the college at Curry College in Milton, Massachusetts. After his father's illness in 1977, Kirschenmann returned to North Dakota to operate the family farm, which has been certified organic since 1980.



Kirschenmann's educational background includes a B.A. degree from Yankton (South Dakota) College and graduate degrees from the University of Chicago. He received a B.D. degree from Hartford (Connecticut) Seminary Foundation. He also will be a professor of philosophy and religion at ISU.

The announcement by President Jischke on June 7, 2000 was the culmination of a 14-month-long search that involved the Center's Advisory Board, ISU faculty and staff, and numerous other stakeholders from agribusiness and the sustainable agriculture community. Wendy Wintersteen, chair of the director search committee and Leopold Center Advisory Board member commented, "Dr. Kirschenmann brings new experience, vision, and leadership to this position and I expect many people at Iowa State and elsewhere will come to appreciate his noteworthy qualities." Kirschenmann was the first choice of the search committee, the advisory board, and the Center staff from among the 30 applicants for the director's position.

AN ERA OF ADMINISTRATIVE STABILITY CAME TO AN END FOR THE LEOPOLD CENTER THIS YEAR.

- **Dennis Keeney**, the Center's first and only director, retired from Iowa State University on December 31, 1999.
- **Michael Duffy**, the Center's associate director of nine years, resigned from his position with the Center on December 31, 1999.
- **Allen Trenkle**, a longtime Advisory Board member and ISU distinguished professor of animal science, was appointed as interim director for the Center in January 2000.
- **E. Anne Larson**, who came to the Center as its first communications specialist in 1993 and later job-shared the position, resigned in May 2000 to pursue a career in horticulture.
- The **search for Keeney's replacement** as director began in April 1999. Leopold Center Advisory Board member Wendy Wintersteen headed the search committee that recommended three director candidates to ISU President Martin Jischke on March 29, 2000. Dr. Jischke interviewed the three finalists on April 25. Other Center board members on the 11-member committee were Kurt Johnson, Mary Jane Olney, Jim Penney, and Robert Sayre. Jeri Neal, competitive grants coordinator, was the Center staff representative on the search committee.

CENTER OFFERS HELP FOR RURAL IOWA WINTER



Life

AT THE CENTER



The Leopold Center Advisory Board expressed serious concern about the burgeoning farm financial crisis at its September 1999 meeting and directed the staff to consider some ways to alleviate the situation. In response to the board's suggestion, the Center helped cosponsor two ongoing efforts to aid farmers under stress. In both cases, the issue of creating and maintaining sustainable communities was part of the ongoing discussion.

“TOGETHER IN TOUGH TIMES”

The Center provided \$10,000 to extend an earlier farm community support initiative by ISU Extension called “Together in Tough Times.” The funding pays a part-time facilitator from the Ecumenical Ministries of Iowa who has been coordinating “community conversations” in several areas hard hit by the farm economic downturn.

Local cooperatives and school boards also are encouraging participation in these discussions by a wide group of community residents in Alta, Denison, Creston, and West Liberty. Some of the communities are dealing with complex issues of added ethnic diversity in their areas along with economic upheaval.

“BUILDING HOPE IN THE HEARTLAND”

The Center helped fund a training session for parish nurses, clergy, and others interested in assisting rural church congregations and farming communities. “Building Hope in the Heartland” was held in March 2000 under the guidance of the Sharing Help Awareness United Network (SHAUN). The workshop participants learned how the farm crisis affects individuals, families, and communities. They were encouraged to return to their local areas and help individuals and groups come together to support each other. The \$2,500 from the Center was used to provide scholarships for some of the parish nurses, to videotape the sessions for viewing by those unable to attend, and to reimburse speakers at the event.

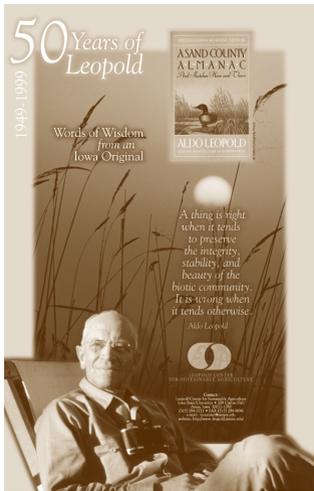
nearly 200 people gathered for a reception just weeks before Keeney's official retirement

retirement

FROM ALDO'S PEN TO YOUR LIBRARY

Early on, the Leopold Center staff learned that the quickest way to gain a convert to Aldo Leopold's unique conservation ethic is to put a copy of his natural history classic, *A Sand County Almanac*, in the person's hands. Aldo's words will do the rest.

So it was an easy call when the Center staff was searching for a fitting way to celebrate the 50th anniversary of the publication of *A Sand County Almanac* on October 27, 1999. The Center provided complimentary copies of Leopold's beautifully written legacy to more than 1,500 Iowa citizens and institutions. Copies of the paperback version of the book and a four-color commemorative poster* were mailed to 573 public libraries, 436 high school libraries, 107 libraries in community colleges, universities, and prisons, as well as offices of 91 conservation boards, 117 soil and water conservation districts, and 100 county extension offices. Judging by the comments received from the recipients, Aldo's message still resonates, even across the span of a half-century.



**The poster shown here received a silver award from the Agricultural Communicators in Education.*



Photo by Rod Swoboda

CENTER STAFF AND BOARD, SUSTAINABLE AG COMMUNITY MEMBERS, AND FRIENDS FETED KEENEY ON HIS RETIREMENT

As Dennis Keeney wrapped up the final chapter in his career as Center director, his professional colleagues, friends, family, and coworkers came together to indulge in a bit of nostalgia and wish him well. Nearly 200 people gathered in the Brunner Gallery of ISU's Scheman Building for a late afternoon reception on December 4, 1999, a few weeks before Keeney's official retirement from the Center.

The event began with a program highlighted by remarks from Paul Johnson, then director of the Iowa Department of Natural Resources, one of the legislative godfathers of the Leopold Center, and a longtime Keeney friend who would follow him into retirement just a few months later. David Williams, a farmer, friend, and member of the Leopold Center Advisory Board, also offered some reminiscences about Keeney's time with the Center. Keeney then took to the podium to make a heartfelt speech of thanks and benediction to his friends and coworkers.

Center staff presented Keeney with a memory book, videotape of the reception with appropriate musical scoring, and an addition to his extensive collection of moose-themed memorabilia.

FY2000
FEDERAL CENTER FOR SUSTAINABLE AGRICULTURE
ADVISORY BOARD



Lyle Asell
interim director
Iowa Department
of Natural Resources

Leon Burmeister
professor of health sciences
University of Iowa
(board chair for 1999-2000)

Thomas Fogarty
professor of geography
University of Northern Iowa

Kathleen Gannon
*Iowa Association of Independent
Colleges and Universities Mingo**

Connie Greig
*farmer, District Soil and
Water Commissioner*
Estherville

Neil Hamilton
professor of agricultural law
Drake University

Kurt Johnson
farmer
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Paul Mugge
farmer
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of Iowa, Sutherland

Mary Jane Olney
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Iowa Department of Agriculture
and Land Stewardship

Jim Penney
*manager, Heart of Iowa Cooperative
Agribusiness Association of Iowa*

Robert Sayre
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University of Iowa

Colin Scanes
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Plant Sciences Institute,
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Marvin Shirley
farmer
Iowa Farmers Union, Minburn

Craig Struve
*Agribusiness Association
of Iowa, Calumet*

Allen Trenkle
professor of animal science
Iowa State University (also
interim Center director)

Paul Whitson
professor of biology
University of Northern Iowa

David Williams
farmer
Villisca

Wendy Wintersteen
senior associate dean
College of Agriculture,
Iowa State University

**Board member serving
for a portion of the year*



Life

AT THE CENTER



budget

STAFF

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(through June 2000)

John Lane
Secretary*
(through August 2000)

Dennis Keeney
Director
(through December 31, 1999)

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**partial Extension appointment



Advisory Board members: (left to right) (first row) Neil Hamilton, Marvin Shirley, Wendy Wintersteen, (second row) Allen Trenkle, Kurt Johnson, Kathleen Gannon, (third row) David Williams, Lyle Asell, Paul Whitson, (back row) Paul Mugge, Tom Fogarty, Colin Scanes

	Operations	Research	Education & Outreach	Totals
Funding:				
AMA	1,100,000			1,100,000
GPR		390,000	170,000	560,000
Balance	392,320	706,080	401,600	1,500,000
Total Funds	1,492,320	1,096,080	571,600	3,160,000
Expenditures:				
Salaries & Benefits	293,970	64,530	119,500	478,000
Office expenses	51,350	30,550	48,100	130,000
Competitive Grants		536,000	264,000	800,000
Issue Teams			250,000	250,000
Long-term Agroecological Research Initiative		50,000		50,000
Bear Creek & Raccoon River Watersheds		50,000		50,000
Hoop Initiative		75,000		75,000
Practical Farmers of Iowa Partnership			50,000	50,000
Director's Research		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 FY2001	660,000			660,000
Total Expenditures	1,005,320	1,096,080	571,600	2,673,000
Fund Balance	487,000	0	0	487,000



The Agroecology Issue Team continues its long and successful run with a mixture of practical research, student involvement, work with different partners, and eye-opening tours. Led by Richard Schultz and four other ISU scientists, this issue team offers a look at the best of multidisciplinary research.

WATERSHED CELEBRATION HELD

In September, the team hosted a field day and dinner for about 100 watershed residents and other project cooperators. The event celebrated the designation of the Bear Creek Watershed as a National Restoration Demonstration Watershed under the Clean Water Action Plan in June 1999. Experiencing the stream table and going up in the boom truck for a “bird’s-eye” view of the project were popular activities.

NEW BUFFER SITES ADDED

An additional one-half mile of on-farm buffer was established in the lower portion of the Bear Creek Watershed on the Jim Cooper farm. This site is highly visible from the southbound lane of Interstate 35 where Bear Creek flows between the two rest areas north of Ames. The team is also working with two landowners to extend the length of contiguous buffer to five miles in 2001, beginning near the original Ron Risdal farm site.

GRADUATE RESEARCH AND EDUCATION

A primary objective of the issue team has been to provide graduate student training. To date, 15 graduate students have conducted their research on the riparian buffer project. Students have come from the United States, Nepal, India, Liberia, Venezuela, Turkey, South Korea, and China. Students who finished within the last year conducted research on topics such as

- spatial modeling in an agricultural watershed,
- stream bank erosion adjacent to different land-use practices,





Cross-section of a riparian buffer on the Lon Strum farm within Bear Creek National Demonstration Watershed. The seven-year old buffer contains zones of switchgrass (foreground) and mixed trees and shrubs. This section is part of over five miles of buffer established within the watershed.

- ❖ effectiveness of buffers for sediment and nutrient removal,
- ❖ fate and transport of nitrate in groundwater, and
- ❖ microbial biomass and nitrogen immobilization under buffer vegetation.

Five papers have recently been published from these student efforts. Several of these students are now employed in environmental consulting firms, while others are continuing their graduate education.

NEW “BUFFER” TECHNOLOGY DEMONSTRATED

Alteration of watershed hydrology by humans has created many stream channels that have down-cut 10 to 15 feet into the land. This has increased the velocity and energy of floods that can erode stream banks and cause exaggerated stream meandering. In an effort to reduce this problem, team members are in the midst of installing a series of grade-control structures or boulder weirs within an eroding reach of Bear Creek. These structures will reduce the energy of the water and stabilize the channel, thus reducing bank erosion and the sediment production associated with them.

This also will improve water quality and aquatic habitat because of the reduced sediment load and improved aeration. Team members are working with resource professionals from the Illinois Water Survey in this “first-time-in-Iowa” application of the technology.

TEAM RECEIVES GRANTS

The team was awarded a grant from the U.S. Department of Agriculture’s Sustainable Agriculture Research and Education (SARE) program to look at the long-term effects of two contrasting buffer vegetation types—cool-season and warm-season grasses—on soil carbon cycling and storage,

and soil food webs. The work will take advantage of the different aged buffers within the Bear Creek Watershed and with knowledge gained will contribute to the design of improved riparian buffers in the Midwest.

The team also has been awarded a grant from the Iowa Department of Natural Resources to look at the carbon sequestration potential within restored native prairie ecosystems at the Walnut Creek National Wildlife Refuge. Extensive efforts also continue on an EPA-University of Missouri grant in northeastern Missouri where the team is conducting comparison studies in watersheds of similar size to Bear Creek.

At year’s end, the agroecology team was beginning work with the Iowa Cattlemen’s Association and the Center’s Animal Management Issue Team on a study of the impact of grazing management on riparian and stream health, including assessing the contributions of phosphorus inputs to stream waters. Support for the work will come from U.S. Environmental Protection Agency 319 funds.

TOURS, TOURS, TOURS

The Agroecology Issue Team hosted more than 25 tours of the Bear Creek sites for visitors from all over the world and made more than 30 presentations at regional and national meetings. The team has continued to work with Trees Forever on the Iowa Buffer Initiative that is now in its third year. To date, this program has been involved in the establishment of 60 buffer demonstration sites across Iowa. The associated field days at these sites are a prime opportunity to transfer buffer technology to landowners and natural resource professionals.

ANIMAL MANAGEMENT

ISSUE TEAM MANAGES IN THE PASTURE

Spring



Now in its tenth year of operation, the Animal Management Issue Team

continues to investigate many aspects of animal feeding and grazing in Iowa, as well as surveying their impacts on animal production. ISU animal scientist James Russell coordinates the activities of the team. Some recent research highlights for the multidisciplinary group:

ALFALFA AND LEGUMES

Incorporating legume forage species like alfalfa into cool season grass pastures will increase animal production while reducing N-fertilization costs. But the low plant persistence and bloat problems associated with legumes have limited their use in pastures. Animal Management Issue Team studies showed that incorporation of a grazing-tolerant alfalfa hybrid into cool season grass pastures did not improve legume persistence or animal production compared to use of a hay-type alfalfa. Use of alfalfa in a complementary system did improve legume persistence, but this change decreased calf production compared to grazing alfalfa throughout the entire grazing season.

GRAZING BT CORN RESIDUES

Feeding of stored feeds is the largest cost in beef cow-calf production, therefore optimal grazing of corn crop residues is the largest factor separating high- and low-profit beef cow-calf producers in Iowa. In the 1990s, some corn hybrids were genetically modified to contain the Bt insecticide produced by the bacterium *Bacillus thuringiensis* (Bt) to protect corn from the European corn borer. Little research has been done on the nutritional value of the Bt corn crop residues, and producers had questions about digestibility and palatability of Bt corn residues. The team conducted an experiment to investigate the nutritional composition of the crop residues from Bt hybrids and their effects on the performance of pregnant beef cows. Although chemical analysis of corn crop residues sampled during the winter of 1999-2000 continues, no differences in the concentrations of digestible dry matter, crude protein, and fiber constituents of crop residues related to the presence of Bt proteins were observed. Body scores were equivalent and no grazing selection preferences were observed. Results imply that the presence of Bt protein in corn crop residues has little effect on their value for grazing by pregnant beef cows.



ISSUE

TEAMS & INITIATIVES

Photo courtesy of Jim Russell. Cows that rotationally grazed alfalfa had 17 percent greater calf production per acre than cows grazing smooth bromegrass.



YEAR-ROUND GRAZING

Previous team research has shown that use of rotational grazing and incorporation of legume forage species will increase the profitability of cow-calf production from summer pastures by increasing calf production per acre. Other research has shown that grazing of corn crop residues and/or stockpiled perennial forages will decrease cow-calf production costs by reducing the need for stored feeds during winter. However, because each of these management practices affects forage availability and cow nutrient status in other seasons of the year, it is necessary to evaluate these practices in systems over the entire year. Preliminary results from further team research imply that winter grazing of corn crop residues and stockpiled forages will significantly reduce the amounts of stored feeds required to maintain both spring- and fall-calving cows during winter. Grazing of stockers with spring-calving cows before pregnant fall-calving cows in a lead-grazing, rotational system will maintain pasture quality and total growing animal production in a manner similar to a minimal land system in which a first-cutting hay harvest was used to maintain pasture quality and provide the winter feed supply.

Additional research funded by the Animal Management Issue Team deals with winter grazing of stockpiled kura clover used as a permanent strip crop for corn production. Evaluation of the effects of corn crop residue grazing on soil properties and subsequent crop production is funded by Leopold Center and USDA-Foreign Agricultural Service Competitive grants.

OUTREACH

The Animal Management Issue Team members gave presentations on their research at the:

- ❖ Annual Management Intensive Grazing symposium,
- ❖ In-service training of ISU Extension and USDA-Natural Resources Conservation Service personnel,
- ❖ Iowa Communications Network class on organic farming, and
- ❖ Pasture walks and field days in Clay and Butler counties as well as in Ohio and Wisconsin.



CENTER & CHEEC SURVEY AIR QUALITY IN SWINE PRODUCTION

How does the air quality differ between large-scale hog confinement units and hooped houses, both inside the structures and outdoors? The Leopold Center has committed \$25,000 to a 15-month project to study this important question for swine production facility planners. The research is being conducted by Iowa State University's agricultural and biosystems engineering department in tandem with the Center for Health Effects of Environmental Contamination (CHEEC), the Leopold Center's counterpart at the University of Iowa. Project coordinators are Dwaine Bundy at ISU, Peter Thorne at the University of Iowa, and Peter Weyer at CHEEC.

RESEARCHERS WILL ATTEMPT TO

- 1) Quantify airborne contaminant concentrations and exposure duration in hooped houses and conventional confinement units, and
- 2) Compare exposure of airborne contaminants around and downwind of hoop structures and conventional confinement operations.