

2018 ANNUAL REPORT



LEOPOLD CENTER
FOR SUSTAINABLE AGRICULTURE

IOWA STATE UNIVERSITY

Leopold Center for Sustainable Agriculture
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DIRECTOR'S MESSAGE

As we wrap up another year at the Leopold Center, it is important to recognize that it has been a year of introspection and re-evaluation. The Visioning Task Force completed its work after conducting several listening sessions around the state. They presented a summary of their conclusions to the Advisory Board in March. In July, we also received valuable suggestions from a panel of stakeholders assembled to conduct an academic review of the Center and its future direction. A note of appreciation goes out to the Task Force and review panel members for their time and efforts.

I will admit that in some ways it has been a challenging time as we were forced to make adjustments after the defunding. We were forced to make staffing, space and operational changes to fit within our new circumstances. But as Fred Kirschenmann, always the optimist, likes to say: "Challenges present opportunities!" and that is what I have tried to focus on this past year. We will do our best to keep the Center moving forward and in step with its mission. Admittedly we have had to prioritize and make some difficult decisions but we will continue to invest our limited funds on work that we feel is important to sustainable agriculture. I am also aware that I need to keep the Center grounded in its past while we make changes and focus on the future. I continue to work on developing and nurturing new relationships and I am always on the lookout for new ideas and opportunities.

In this annual report, you will note a significant shift in the scope and scale of our activities. But we remain proud of the work that has been accomplished with Center support and we hope you will continue to follow the Center into the future. I thank you for being loyal to the Center and I extend a special thanks to those staff members who are no longer with us and to those who have made donations to the Center. Maybe

I have not expressed my gratitude adequately in the midst of all of this change and turmoil but your efforts and resolute support of the Center have been invaluable and are recognized and appreciated.

And finally I will close by noting that we are still here and we are still trying to do work on behalf of Iowa and its citizens.

Mark Rasmussen

Thanks to Ed Adcock (CALS communication) and Ann Staudt (Iowa Learning Farms) for their assistance in preparation of this annual report.

ADVISORY BOARD

NEW MEMBERS JOIN ADVISORY BOARD



FREDRIC JANZEN
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Fredric Janzen, a professor in the Department of Ecology, Evolution and Organismal Biology, is a new Iowa State University representative. He succeeded Cathy Kling, who left the university.

Janzen's research focuses on ecology and evolution, including mechanistic work at the molecular and organismal levels, field studies that document the importance of phenotypic variation and a comparative view of the long-term consequences of this variation. In 2018, he was chosen as a fellow by the American Association for the Advancement of Science.

He earned a bachelor's degree in biology from North Central College; a master's degree in zoology from Colorado State University; and a doctorate in ecology and evolution from the University of Chicago in 1992.



ED TORMEY
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Ed Tormey, Iowa Department of Natural Resources acting administrator for the Environmental Services Division, joined the board as a representative of the Iowa DNR. He succeeded Bill Ehm.

He has been in this position since September 2018. Before that, he was the IDNR's general counsel. Prior to his work at the DNR, Tormey practiced environmental law in both the public and private sectors in Ohio.

He received his bachelor's and master's degrees from the University of Iowa and his law degree from the University of Iowa College of Law.



PAUL LASLEY
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Paul Lasley, Iowa State professor of sociology, was reappointed as a board member representing the university. He is a long-time member, having joined the advisory board in 2006.

Lasley has been an ISU Extension and Outreach sociologist since 1981. His research focuses on the organization of U.S. agriculture and how changes in agriculture affect rural communities.

CONTINUING BOARD MEMBERS

Dennis Dahms, University of Northern Iowa representative
Dale Farnham, State Soil Conservation Committee representative
Doug Gronau, Iowa Farm Bureau representative
Gail Hickenbottom, Practical Farmers of Iowa representative
Erin Irish, University of Iowa representative
Jody Kerns, State Soil Conservation Committee representative
Aaron Lehman, Iowa Farmers Union representative
Marc Linderman, University of Iowa representative
Michael Naig, Iowa Department of Agriculture and Land Stewardship representative
John Olthoff, Iowa Association of Independent Colleges and Universities representative (board chair)
Alicia Rosburg, University of Northern Iowa representative
Keith Summerville, Iowa Association of Independent Colleges and Universities representative
U. Sunday Tim, Iowa State University representative

ADVISORY BOARD MISSION STATEMENT

Leopold Center for Sustainable Agriculture Advisory Board

Approved December 5, 2018

The Iowa State Code states that the Leopold Center for Sustainable Agriculture shall conduct and sponsor research to identify and reduce negative environmental and socio-economic impacts of agricultural practices, research and assist in developing alternative practices and inform the agricultural community and public of its findings. Over the past 30 years, the Center has proven its ability to successfully achieve this mission. The Center has been at the forefront of new practices such as cover crops, buffer strips, alternative crops and food hubs, and sponsored research that improved the environmental and socio-economic resilience of communities throughout Iowa.

Farmers in Iowa face many challenges that risk the economic viability of individual farms, the ability to attract the next generation into agriculture and the long-term success of rural communities. As such, there is a significant and continual need to enhance the resilience of farms and rural communities throughout Iowa. The Center's contributions over the past 30 years have provided and supported research that improved the resilience of Iowa farms and rural communities.

Moving forward, enhancing resiliency will remain the priority for the Center. Resilience will require the ability to cope with changes in weather, new and changing markets and other factors that threaten fragile economies. For example, a focus on improving soil quality would buffer against extreme weather through improved infiltration rates, moisture holding capacity and retention of nutrients. Similarly, alternative crops may improve economic margins, increase value added businesses, and attract younger farmers.

Finally, connecting communities (from farms to towns and cities) will help farmers identify programs that incentivize or support changes that will make them more resilient and share the benefits of a more sustainable environment. Therefore, the objective of the Leopold Center for Sustainable Agriculture moving forward will be to leverage its continuing support from the community to focus on the education and research of alternative approaches and practices to promote resilient rural communities across Iowa.

2018 PROJECT REPORTS

THESE PROJECTS FUNDED BY THE LEOPOLD CENTER FILED REPORTS IN 2018:

Rebecca Cademartiri and Susana Goggi, Iowa State University, "Bio-based Antibacterial Seed Treatments to Improve Soil and Plant Health", Final Report.

Duane Bajema, Dordt College, "Promotion of the Continued Development of Beginning Bee Keepers", Final Report.

Emily Heaton, Nicolas Boersma and Ingrid Gronstal, Iowa State University, "Long-Term Assessment of Miscanthus Productivity and Sustainability", Final Report.

Beth Kersey, Iowa State University, "Farmers and Gardeners Saving Seed: Exploring the Re-skilling of a Traditional Agronomic Skill and its Benefits", Final Report.

Jim Russell and Iowa Beef Center, Iowa State University, "Pasture Management Guide for Livestock Producers", Publication.

Kathleen Delate, Cynthia Cambardella and Ann Johanns, Iowa State University, "Linking Soil and Water Quality with Crop Performance across a Continuum of Tillage and Management Strategies", Final Report.

Georgia Windhorst, Iowa Food Hub, "Fresh Innovation: Testing Fresh Processed Products to Increase Food Hub to School Sales", Final Report.



Georgia Windhorst, Iowa Food Hub, "Investigating Feasibility of Food Hub Node Expansion in Dubuque, Iowa", Final Report.

Jodie Huegerich, University of Northern Iowa, "Building Producer Capacity for Institutional Food Distribution", Final Report.

Courtney White, A West That Works, "Dirt to Soil: One Family's Journey Into Regenerative Agriculture", Publication.

Priyanka Jayashankar, Larry Tranel, Jennifer Bentley and Leo Timms, Iowa State University, "How to Pursue the Right Growth Strategy in a Changing Market? – The Case of the \$1 Billion Sustainable Cooperative Organic Valley", SAGE Business Cases, Publication.

Ned Bowden, Aliasger Salem and Erin Irish, University of Iowa, "Controlling the Location, Duration, and Amount of Released Hydrogen Sulfide to Improve the Growth of Corn using a Sustainable System", Final Report.

Diana Cochran and Bryn Takle, Iowa State University, "Optimizing Nutrient Management for Iowa Hop Production", Annual Progress Report.



THE FOLLOWING STATUS REPORTS WERE FOR PROJECTS AWARDED FUNDS BY THE LEOPOLD CENTER BUT SUBSEQUENTLY TRANSFERRED TO THE IOWA NUTRIENT RESEARCH CENTER FOR AWARD MANAGEMENT:

Shannon Hinsa-Leasure, Grinnell College, "Investigation of Bacterial Community Structure and Antibiotic Resistance and Genetic Mobility Gene Abundance in Soils Fertilized with Swine Manure".

Sara Berges, Allamakee SWCD, "Innovative Conservation Agriculture".

Neil Hamilton, Jennifer Zwagerman and Matt Russell, Drake University Agricultural Law Center, "Promoting Improved Water Quality from Iowa Farms".

Lisa Schulte and Mary Harris, Iowa State University, "Blurring the Lines Between Working and Conservation Lands".

Ranae Dietzel, Sotirios Archontoulis and Matt Liebman, Iowa State University, "What Will it Take to Restore Organic Matter to Iowa's Soils?"

Steven Hall, Amy Kaleita and Emily Heaton, Iowa State University, "Prairie Pothole Soils: Hotspots of Nitrogen Losses from Iowa Agricultural Landscapes".

Marshall McDaniel, Stefan Gailans and Sarah Carlson, Iowa State University, "Building the Soil Immune System".

Michael Thompson, Matt Liebman and Matt Helmers, Iowa State University, "Soil Health in Biofuel Cropping Systems".

John Sawyer and Antonio Mallarino, Iowa State University, "Integrating Rye Seed Production and Red Clover into Corn Systems and Nitrogen Management".

Ashley Kittle, University of Northern Iowa, "Scaling Up the Use of Native Perennial Vegetation for Water Quality and Landscape Diversity".

Amy Kaleita, Michelle Soupir, Andy VanLoocke and Emily Heaton, Iowa State University, "Does Increasing Landscape Diversity in Farmed Closed Depressions (Potholes) Increase Profitability and Ecosystem Services?".





Antonio Mallarino and Matt Helmers, Iowa State University, "Improving Soil Health and Water Quality Through Better Soil Phosphorus Assessment and Management".

Matt Liebman, Iowa State University, "Impacts of Contrasting Rotation Systems and Weed Management Regimes on Weed Dynamics and Agroecosystem Health".

Ross Evelsizer, Northeast Iowa Resource Conservation & Development, "Maximizing Conservation and Return of Investment on Farms in the Turkey River Watershed".

H. Joe Sellers and Lee Schulz, Iowa State University. "Sustainably Growing Iowa's Beef Herds".

Ashley Keiser, et al., Iowa State University, "How Does Soil Health Differ Between Perennial and Annual Cropping Systems Across Contrasting Nitrogen Fertilization Treatments?".

Kathleen Delate, Cynthia Cambardella and Ann Johanns, Iowa State University, "Impacts of Cropping System Diversity and Input Reduction on Greenhouse Gas Mitigation, Soil and Water Quality, and Economic Performance of Iowa's Grain System".

Erika Lundy, Dan Loy and Rebecca Vittetoe, Iowa State University, "Enhancing the Value of Cover Crops Through Utilization by Beef Stocker Cattle".

Roger Wolf, Iowa Soybean Association, "Precision Cover Crop Seeding with Existing Planting Equipment".

2018 FINANCIALS

ISU FOUNDATION ACCOUNTS

INCOME/ENDOWMENT EARNINGS

Restricted*	\$3,276
<u>Unrestricted</u>	<u>\$209,412</u>
Subtotal Income	\$212,688

EXPENSES

Operations	\$6,444
Restricted Expenses*	\$1,208
Unrestricted Expenses:	
Financial Support – ISU	\$56,600
Research Projects	\$43,127
<u>Organizational Support</u>	<u>\$7,711</u>
Subtotal Expenses	\$115,090

BALANCE

\$97,598

*Restricted accounts are funded by the Shivers and the Spencer family endowment funds.

LEOPOLD CENTER CONTINUES LEVERAGING LEGACY

The Leopold Center has been known for providing seed grants to investigators which has helped projects grow in scope and impact. We have continued this Leopold tradition in spite of the Center's changing fortune. We are proud to highlight several recent and ongoing projects that the Leopold Center has supported and helped get started.

Leopold grants to the *Iowa State University Long-term Assessment of Miscanthus Productivity and Sustainability project* (<https://www.agron.iastate.edu/tags/lamps>) helped the investigators obtain \$7.5 million in grants from DOE and USDA-NIFA. In cooperation with the University of Iowa, this power plant/biofuel project has more than 1,000 acres of miscanthus under production with about \$1.4 million going to farmer cooperators who supply miscanthus biomass to the University of Iowa power plant.

University of Iowa researchers were awarded a seed grant of \$10,000 in 2016 with which they were able to obtain preliminary laboratory data on their plant physiology project. With this preliminary data, they obtained \$850,000 in additional grant funds from the National Science Foundation and the USDA. The science behind the project has the potential to

improve plant growth, yield and tolerance to stress. The researchers have applied for patents on their discoveries and are forming a company for commercialization.

The Leopold Center provided matching funds (\$10,000) for a multi-state organic, no-till grain production and weed control project in 2018. With these matching funds, a \$2.2 million USDA-NRCS Conservation Innovation Grant was awarded to *Iowa State University, University of Wisconsin and the Rodale Institute*. Matching funds were a requirement for this type of grant. Once underway next growing season, the researchers plan to hold field days at farmer-cooperator sites in Iowa and Wisconsin describing the findings of their research.

Leopold Center funding of \$100,000 has been leveraged by *Water Rocks!* (<https://www.waterrocks.org/>) to more than \$1 million in additional funding. Water Rocks is a science-based youth outreach program focusing on Iowa's water, soil and other natural resources. Annually the program reaches 34,000 students in 180 schools and more than 250 teachers in workshops, with the program experiencing increased demand each year.

A three-year grant to the *Allamakee County Soil & Water Conservation District* (<http://allamakeswcd.org/>) provided funds for field days, speakers, newsletters, salary, meeting displays and demonstration sites. The Leopold grant ended in January 2019, but the project will continue with funds from a Regional Conservation Partnership Program (RCPP). Conservation cost-share and coordinator salary will be provided to the expanded program by the RCPP funding.



LEOPOLD CENTER PRESENTS SPENCER AWARD FOR SUSTAINABLE AGRICULTURE

The Leopold Center for Sustainable Agriculture at Iowa State University honored an agricultural policymaker and a conservation-minded farmer with its Spencer Award for Sustainable Agriculture.

Paul Johnson, who co-wrote Iowa's landmark Groundwater Protection Act as a state legislator, and **Seth Watkins**, who farms sustainably near Clarinda, will be presented the award at the 2019 Iowa Water Conference, which is scheduled for March 12-13, in Ames.

The Spencer Award is one of the largest and longest running awards of its kind in Iowa. Administered by the Leopold Center, the award recognizes researchers, teachers and farmers who have contributed significantly to the environmental and economic stability of the Iowa farming community.

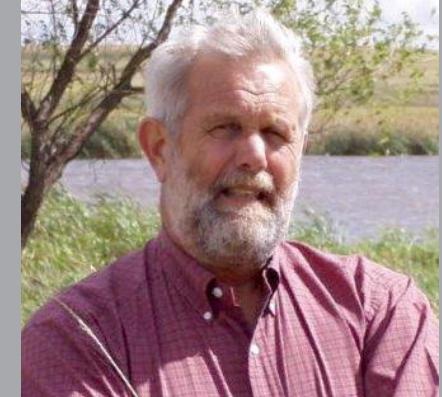
Johnson, who farmed in northeast Iowa, served in the Iowa House from 1985 to 1990. He was chair of its Agriculture and Natural Resources Appropriations Committee and co-author of the Resource Enhancement and Protection Law and the Energy Efficiency Law, besides the Iowa Groundwater Protection Act, which included a provision creating the Leopold Center.

He became chief of the USDA Soil Conservation Service in 1994, which was renamed the Natural Resources Conservation Service (NRCS) during his tenure, and served as director of the Iowa Department of Natural Resources from 1999 to 2000.

Watkins owns and operates Pinhook Farm, a crop and cattle enterprise in Page, Taylor and Adams counties. He has implemented a number of conservation practices including rotational grazing, restricted wildlife areas, riparian buffers, ponds, shallow water habitats, integrated pest management, prescribed burning, windbreak restoration, no-till, cover crops, tile, terraces, inter-seeded legumes, prairie strips and late-season calving.

He advocates for the sustainable practices he has adopted on his farm in presentations at the state and national level, and was the first farmer to incorporate prairie strips on his land through an ISU research program.

The Spencer Award honors Norman and Margaretha Spencer, who farmed in Woodbury County for 40 years. Graduates of ISU, the Spencers maintained an active relationship with the university and several professors, encouraging them to conduct research on sustainable practices and family farming. The Spencer family established the award in 2001 through an endowment. It includes a \$1,000 cash prize for each winner.



PAUL JOHNSON



SETH WATKINS

A RECORD OF ACCOMPLISHMENTS

The Leopold Center has sponsored and supported a wide range of projects and organizations over the years. This list summarizes some of the more significant work that the Center supported. It demonstrates a significant return on investment to Iowans for the funds provided to the Center since its creation in 1987.

RIPARIAN BUFFERS

Research conducted by the Leopold Center's Agroecology Research Team from 1990 to 2002 showed that riparian buffers can cut sediment in surface runoff by 90 percent, reduce nitrogen and phosphorus in runoff by 80 percent and remove up to 90 percent of groundwater nitrate. In 1998, the Bear Creek riparian management project became one of 12 National Agricultural Restoration Demonstration sites identified by the U.S. Department of Agriculture.

LIVESTOCK HOOP BARNs

From 1997 to 2012, the Leopold Center invested more than \$500,000 in research on alternative swine production systems that have been externally leveraged with an additional \$875,000. More than 770 Iowa farmers built 2,100 structures between 1996 and 2001, showing the rapid adoption of this technology. This alternative livestock housing research laid the foundation for niche pork production in the Midwest.

LOCAL FOOD SYSTEMS

A 2010 Iowa Local Food and Farm Plan developed by the Leopold Center grew into a statewide program. The Regional Food Systems Working Group now has activities in most of the 99 counties in Iowa. The Local Foods Group was spun off with continued financial support from the Leopold Center as an independent entity of ISU Extension and Outreach in 2015.

NUTRIENT MANAGEMENT, N AND P

The Leopold Center played a major role in development of the late-spring soil test for nitrogen in 1990, developed at Iowa State by the late agronomist Alfred Blackmer. The N-Trak soil test kit developed by Blackmer was marketed by Hach Co. The Leopold Center also funded much of the research that led to development of the P-Index, a tool to manage phosphorus in soil.

LIVESTOCK MANURE MANAGEMENT

The Leopold Center provided five years of research support to the Manure Management Issue Team and financially supported ISU Extension's Manure Management Education Initiative. Research support provided funds for manure distribution and nutrient content studies as well as nitrogen and phosphorus availability and bacterial transport studies.

GRAPES AND WINE

Center support helped build the wine industry in Iowa. The Leopold Center supported nearly all of the early research in wine and grape-growing in Iowa. Funding was provided for research plus direct financial support was provided through a three-year memo of understanding to help create the Midwest Wine and Grape Industry Institute.



PRAIRIE CONSERVATION STRIPS

The STRIPs project began with a research grant from the Leopold Center in 2004. In-field data were collected from the first installation at the Neal Smith National Wildlife Refuge. The Leopold Center continued to provide in-kind collaborative outreach and communications support as the project grew and prospered.

COVER CROPS

The Center was a founding partner in the Iowa Cover Crop Working Group and the Midwest Cover Crops Council. The Leopold Center supported various projects related to cover crop outreach including the development of a cover crop cost calculator, decision tool and seeding rates. More recent work investigated the relationship between use of cover crops and soil health.

PRACTICAL FARMERS OF IOWA

The Leopold Center has provided long-term financial support to PFI especially during several critical years. Funding was routinely provided for PFI's cooperators program, field days and the Niche Market Working Group. Leopold Center support was important to the organization and helped put PFI on a path to success.



HIGH TUNNELS

The Leopold Center has supported research since 2007 on the use of high tunnels in Iowa to extend the growing season for fruit and vegetable production. High tunnels are now used widely in Iowa for fruit and vegetable production and for Iowa's local foods movement.

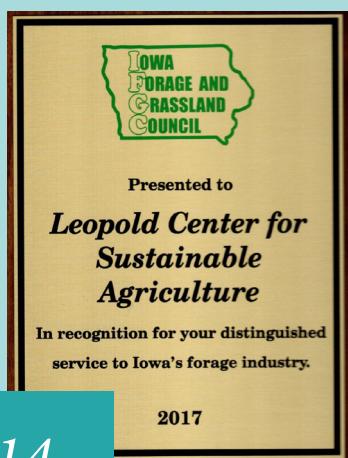
GRAZING SYSTEMS

The Leopold Center has been a supporter of the Iowa forage industry for many years. Much of the grazing and forage research and education/outreach that had been conducted in Iowa over many years were sponsored totally or in part by the Center. This support began in 1988 with the Animal Management Issue Team and continued with support of the Pasture Management Guide for Livestock Producers, now in a 2018 revised and updated edition.

WATER QUALITY

The Center provided the initial financial support on research to develop nearly all of the practices described in the Iowa Nutrient Reduction Strategy. Center support began many years before the Nutrient Reduction Strategy was formalized in 2012. Additionally, the Leopold Center supported infrastructure development at Iowa State's Northeast Iowa Research and Demonstration Farm near Nashua. Funding by the Leopold Center enabled the installation of a state-of-the-art water quality monitoring field system at this farm, which has been used for several long-running water quality research projects.

CENTER HONORED FOR COMMITMENT TO FORAGES



The Iowa Forage and Grasslands Council in 2018 recognized the Leopold Center for its significant contributions to funding grazing and forage research and education in Iowa over the last 20 years.

The Council periodically recognizes individuals or organizations for promoting forages in Iowa and helping producers manage them.

FORMER CENTER STAFF MEMBER RETIRES

Mary Adams, former outreach and policy coordinator at the Leopold Center, retired from ISU in December 2018. Although her last months were not spent working at the Leopold Center due to the defunding, we wish to note her dedication and thank her for her service to the Leopold Center. We wish her well in retirement.

THIRTY YEARS AGO AND THIRTY YEARS AHEAD

By Frederick Kirschenmann, Leopold Center distinguished fellow

Thirty years ago the Leopold Center was created by a small number of creative thinkers who anticipated some important changes that needed to be addressed. From their perspective the concept of agricultural sustainability needed to be addressed ecologically. Many thought this was unrealistic and unnecessary, some even thought it was a threat to modern agriculture.

Today, its principles are increasingly being adopted by farmers. Today, as we again anticipate important changes, a few creative thinkers are, once again, recognizing that we need to creatively prepare, to meet potential future challenges, among them climate change and the depletion of natural resources, which have provided the inputs for our input-intensive agriculture system of the past century.

Farmers are, of course, already beginning to experience some of the challenges of climate change as they increasingly have to cope with more extreme weather events—more flooding and more drought periods—and the most recent Intergovernmental Panel on Climate Change report warns us that we only have about “12 years” in which to make major design changes in order to prevent climate changes from becoming “catastrophic” to life on the planet. And, as many have already pointed out, a redesigned agricultural system could become an important part of that new design. Farming practices that restore soil health so that it sequesters more carbon, rather than adding more carbon to the atmosphere, can play an important role in that new design.

Similar design changes are beginning to address aspects of the “unlimited economic growth” culture, of which our modern input-intensive agriculture of the past century is an integral part. In this regard, John Thackara, who has devoted much of his life searching for actual examples of what a sustainable future could look like, gives us some hope. In his recent book, *How to Thrive in the Next Economy* (2015), he provides numerous examples of creative ways that people in many parts of the world, including California, are beginning to develop new economies that are focused on how to “renew life on earth” in their own bio-regions.

In this new world, citizens of local ecologies, including farmers, increasingly recognize that the ultimate measure of wealth is the “health of living systems” and “growth” is redefined as “how to renew life on earth” instead of the traditional “unlimited economic growth.” In this emerging culture, personal well-being is no longer the primary issue because one must also consider how we do this together for the common good. And artists, as well as scientists, play an important role in fostering this important transition, a transition in which Thackara sees modest, regional actions beginning to initiate great transitions.

I firmly believe that as the Leopold Center repositions itself to contemplate the “30 Years Ahead” of us, these are among the new challenges and opportunities on which our leaders should focus, just like the leaders 30 years ago focused on challenges and opportunities that many thought were unrealistic. This can be our moment.



IOWA STATE UNIVERSITY

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