

Funding Impact Brief #2: Long-Term Agroecological Research (LTAR)



The LTAR experiment

Principal investigator: Kathleen Delate, Professor of Agronomy and Horticulture, Iowa State University

Iowa farmers expressed interest to the Leopold Center in learning more about organic practices, and requested a long-term study comparing the viability of organic crop rotations with conventional corn-soybean rotations. This request resulted in the LTAR experiment. LTAR is a randomized, side-by-side comparison of organic and conventional agriculture near Greenfield, Iowa—one of the longest running replicated comparisons in the country. The project began in 1998 with support from the Leopold Center as part of the Organic Agriculture Program at ISU. The project compares various crop rotations of corn, soybeans, oat, alfalfa, wheat and red clover using identical crop varieties. Each trial is repeated four times in 44 plots.

By the Numbers

- **\$900,000** awarded by the Leopold Center (1998-2012)
- **\$2,390,969** externally leveraged funds
- **21** key organizational, agency and institutional partners
- **100** organic and transitioning producers reported an 11-20% increase in farm income

What did we learn?

- Averages from 14 years of the LTAR experiment show that yields of organic corn, soybean and oats have been equivalent to or greater than conventional counterparts. A 13-year average for alfalfa and 9-year average for winter wheat also show no significant difference between organic yields and the county averages.
- On average, returns to management for organic systems are roughly \$200 per acre greater than conventional returns.
- Organic systems have lower production costs because they eliminate the need for expensive herbicides and synthetic fertilizers; organic crops have higher value on the market.
- Researchers measured higher concentrations of carbon, potassium, phosphorous, magnesium and calcium in the organic soils, and total nitrogen increased by 33 percent in the organic system.
- Results suggest that organic farming can create greater efficiency in nutrient use and higher carbon sequestration potential.

Why does it matter?

Delate surveys clientele every 5 years to determine the growth of organic agriculture in Iowa and the impact of the ISU Organic Agriculture Program. In November 2007, a survey was distributed to 500 organic and transitioning producers and processors in Iowa. Twenty percent of respondents reported an 11-20 percent increase in farm income, 28 percent of respondents reported an increase in soil quality on their farms, and 54 percent of respondents supported expansion of organic research/extension at ISU.

Personnel supported

- 1 ISU faculty member
- 32 undergraduate students
- 11 graduate students

LTAR experiment plots near Greenfield, Iowa

Credit: Kathleen Delate

Photo on back:

Graduate student Dan Cwach poses in LTAR rye plot

Credit: Kathleen Delate





About this series

Purpose: To communicate the impacts of long-term Leopold Center investments made in sustainable agriculture research, education and outreach on Iowa's communities, economies and landscapes. This brief is the second in a series of six featuring:

1. Low-Input High-Diversity Systems (\$357,479; 2004-2012)
2. Long-Term Agroecological Research (\$900,000; 1998-2012)
3. Hoop Houses for Alternative Hog Production (\$526,451; 1997-2012)
4. Regional Food Systems Working Group (\$922,837; 2003-2012)
5. Bear Creek Riparian Buffer Project (\$900,000; 1990-2012)
6. Practical Farmers of Iowa (\$100,000; 2011-2012)

Each brief was prepared based on data gathered from project publications, and 2012-13 interviews with principal investigators and/or key partners.

The analysis showed that for every dollar invested in these six projects, an additional \$4.60 was leveraged complement or expand the work. Get all briefs: www.leopold.iastate.edu/change

Products

- 38 presentations at professional meetings with 2,792 participants
- 31 extension workshops with 1,453 participants
- 537 presentations to scientific, farm, and student audiences with 29,520 participants
- 1 ISU course developed, "Organic Agriculture: Theory and Practice" (HORT/AGRON/SUSTAG 484/584)
- 10 Iowa Organic Agriculture Conferences reaching 2,439 farmers and agriculture professionals
- 65 field days involving 5,036 farmers and agriculture professionals
- 20 international visiting scientists have worked on LTAR

LTAR research partners

- 8 public sector partners:
USDA-Agriculture Research Service's Laboratory for Agriculture and the Environment; Natural Resources Conservation Service; Farm Services Agency; USDA-Sustainable Agriculture Research and Education; ISU Research and Demonstration Farms; USDA-Organic Research and Extension Initiative; USDA-Organic Agriculture Consortium, National OrganicAgInfo webpage
- 4 civic sector partners:
The Rodale Institute, Iowa Organic Conference, Practical Farmers of Iowa, the Iowa Organic Association
- 6 collaborating Iowa State University departments:
The Departments of Nematology, Entomology, Food Sciences, Economics, Agronomy, and Horticulture

Leverage

LTAR projects funded by the Leopold Center leveraged substantial amounts of additional funds totaling \$2,390,969:

- \$1,100,000 from the USDA-Sustainable Agriculture Research and Education, the Rodale Institute, and other industry groups
- \$599,000 from the USDA for the ISU Organic Program
- \$691,969 from the USDA's National Institute of Food and Agriculture for the Organic Transitions Program at ISU

Future opportunities

Current research evaluates alternatives to the traditional corn-soybean rotation in Iowa and investigates agroecological production. This research is designed to reduce off-farm energy demand and to increase the resilience of agroecosystems which will help increase adaptability to potential climate changes.

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