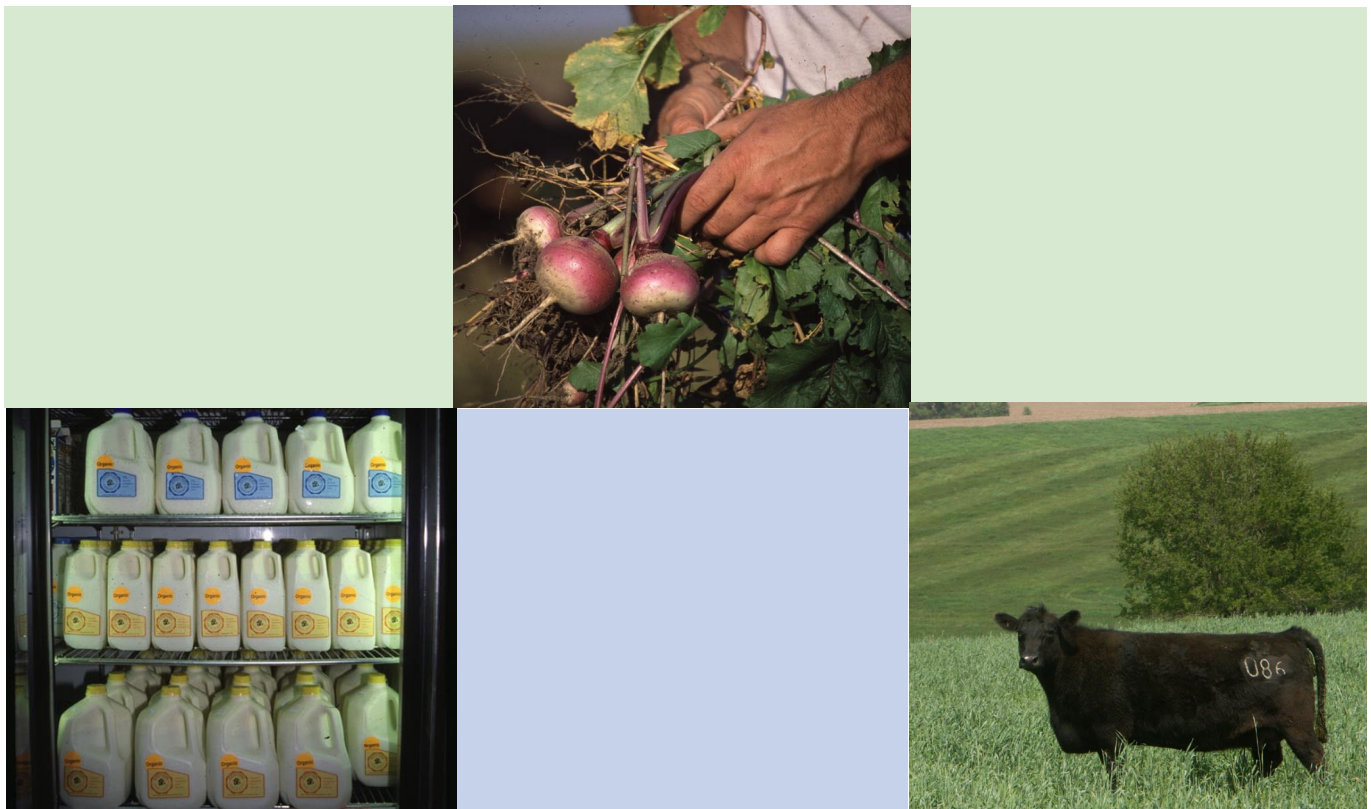


Food Facts: Results from Marketing and Food Systems Research

*Key research findings from projects supported by the
Leopold Center's Marketing and Food Systems Initiative
and the Regional Food Systems Working Group
of the Value Chain Partnerships project*

Revised April 2009



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Key research findings from projects supported by the Leopold Center's Marketing and Food Systems Initiative and the Regional Food Systems Working Group of the Value Chain Partnerships project coordinated by the Leopold Center

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How to use this document

Use information in this publication to:

- Conduct market research for your farm or business enterprise,
- Prepare a grant proposal or journal article,
- Write an article for a newspaper or magazine, or
- Learn more about markets and food systems.

Information in this document also is on the Web at:

http://www.leopold.iastate.edu/research/marketing_files/food/food.htm

Photos by Jerry DeWitt

Originally published March 2008; Revised April 2009.

The Leopold Center for Sustainable Agriculture explores and cultivates alternatives that secure healthier people and landscapes in Iowa and the nation. The Leopold Center was established by the Iowa Legislature as part of the Iowa Groundwater Protection Act of 1987. Its legislatively mandated goals are to identify and reduce negative environmental and socio-economic 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.

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About this document

❑ Here are key findings from research, demonstrations, studies and surveys that have been supported since 2000 by the Leopold Center's Marketing and Food Systems Initiative and the Regional Food Systems Working Group of the Value Chain Partnerships project.

❑ Links to the full research report or related information are included with each project, as well as an appropriately formatted citation for further use and reference. Summaries of all completed projects supported by the Leopold Center also are published each year in *Center Progress Report* publications.

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Introduction

Since its establishment by the Iowa Groundwater Protection Act of 1987, the Leopold Center for Sustainable Agriculture at Iowa State University has funded more than 300 competitive grant projects with more than \$10 million in funding from the state of Iowa. At the completion of each Leopold project, a report is prepared by the project investigator and made available to the public. The Center also provides a summary of each project report through its *Center Progress Report* publications.

The Center often is challenged by its advisory board and various partners to more effectively synthesize project findings to make them more readily available for use in a variety of applications.

Among the possible applications are:

- Data and knowledge for use in farmer production and marketing decisions;
- Information to be incorporated into presentations, articles, speeches, and reports on a variety of topics;
- Research results that can be cited in proposals for potential grant funding as well as articles for peer-reviewed journals; and
- Background or lead information for use by the media in articles or segments on sustainable agriculture-related topics.

Synthesis of research results also may lead to increased insights in our understanding and management of sustainable agriculture systems that can better serve Iowa's citizens, businesses, and natural resources.

To respond to these requests for re-packaged project results, the Center is piloting the release of synthesized project results for the past seven years of projects funded in the Marketing and Food Systems Initiative as well as the Regional Food Systems Working Group. A web URL and appropriately formatted citation are provided so that the results can be used and referenced in a variety of formats. This publication is a first step in the Center's efforts to make its research results more accessible for use in multiple ways. Other options, such as wiki portals, RSS feeds, and other promising communication technologies are among the future possibilities for dissemination.



Community-Based Food Systems

Collaborative Community Supported Agriculture

- ❑ A research project showed that collaborative Community Supported Agriculture (cCSA) serves as a business incubator for new growers and helps existing growers expand and diversify their operations. The project also found the following:
 - ❑ Nearly half of producers said participation in cCSA helped them start, expand, or plan new farm-related enterprises.
 - ❑ Producers report that participation in cCSA prepares them for off-farm careers in sustainable agriculture.
 - ❑ Participation in cCSA increases practical farming knowledge; improves producers' marketing skills; allows producers to specialize in specific crops; increases grower confidence and pride; assists producers to make critical decisions about starting their own CSA; is essential for helping new producers enter local food system production; and in rare cases, helps producers make educated decisions on leaving local food system production.
 - ❑ Women producers receive more social and cultural benefits than do men.
 - ❑ Benefits to participating in a cCSA were based on six categories of capital: financial/built, human, social, political, natural, and cultural. In contrast to producers, members ranked financial capital to be the greatest benefit. Political capital benefits were ranked last among members, preceded by social capital (fourth) and cultural capital (fifth).

Bregendahl, Corry. 2006. The Role of Collaborative Community Supported Agriculture: Lessons from Iowa. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: <http://www.ncrcrd.iastate.edu/projects/csa/leopoldworkshop.pdf>

CSAs in the Midwest

- ❑ According to a 2002 survey of upper Midwest Community Supported Agriculture (CSA) operations in the United States:
 - ❑ The typical upper midwestern CSA farmer is 45 years old and has 14 years of farm experience.
 - ❑ The farmer and his or her partner are likely to be college graduates.
 - ❑ Just over half the farmers are female and have farmed for about eight years.
 - ❑ Primary motivations to start a CSA operation were environmental and social values.
 - ❑ CSA farms have been in operation for more than five years, on average.
 - ❑ The average CSA serves 33 members and membership has increased by 350 percent since start-up.
 - ❑ The average CSA occupies just over 30 acres including the CSA operation.
 - ❑ Almost two-thirds of the farms raise only produce, as a CSA or a CSA/market garden combination.
 - ❑ When determining share price, most CSA farmers consider what they believe to be consumers' willingness to pay rather than the market price for their products.
 - ❑ In terms of labor, half of the respondents have an off-farm job but also farm 20 to 98 percent of the time.
 - ❑ Family members often provide a majority of the labor—doing 75 to 100 percent of the CSA work.
 - ❑ Two-thirds of the respondents hire other labor and spend \$2,920 on average per season.
 - ❑ Just over half of the respondents also offer working shares to members, but for 70 percent of these,

members provide just up to 5 percent of the operations' labor needs.

- ❑ Average net return per acre for these CSA farmers is \$2,467. This figure is quite high when compared to return per acre of corn (\$172.11), soybeans (\$134.46), and wheat (\$38.10) in the United States.
- ❑ In terms of family income, farm enterprises and off-farm work both provide about half the annual income. CSA operations account for about one-half of farm income on average, even though CSA land as a percentage of total land farmed is 37 percent on average, and 12 percent for those farms with additional operations beyond CSA and market garden production.
- ❑ When asked if their share price provides them with a fair wage, over half (57 percent) of these CSA farmers replied negatively.
- ❑ However, 97 percent of respondents claim to be completely satisfied or satisfied most of the time with their CSA operations.
- ❑ These CSA farmers believe their members are completely satisfied (17 percent) or satisfied most of the time (83 percent).

Tegtmeier, Erin and Michael Duffy. 2005. Community Supported Agriculture (CSA) in the Midwest United States: A regional characterization. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.leopold.iastate.edu/pubs/staff/files/csa_0105.pdf



Economic Impacts - Local, Organic

Significant Gains in Local Food Sales

- ❑ As a result of the Northern Iowa Food and Farm Partnership (NIFFP), significant gains have been made. A decade ago, when the University of Northern Iowa started its "Buy Fresh, Buy Local" initiative, leaders tracked \$110,000 of local food sales per year. Only three buyers—UNI, a restaurant called Rudy's Tacos, and a hospital—bought locally-grown products. Now, after ten years of building community connections, 27 restaurants, grocers, and institutions buy more than \$2 million of food from local farmers and processors.
- ❑ For every grant dollar raised to do the work of the Northern Iowa Food and Farm Partnership, \$14.60 was invested in local/regional food and farm business—a tremendous return on investment.
- ❑ Rudy's Tacos sources 71 percent of all the food it purchases from local and regional sources. That is a total of \$168,000 per year added to build the regional economy. Because each dollar spent by Rudy's cycles through the region more than once, local buying by the restaurant contributes \$326,000 to the local economy—creating more jobs and recycling \$68,000 more money in the region than if bought from distant suppliers. Also, Rudy's Tacos now has more customers who are more satisfied with their food, and the business is more profitable than before.
- ❑ Although the region's farmers produce \$1.19 billion of food commodities per year (1999-2005 average), they spend \$1.24 billion to raise them. This means farmers lose an average of \$51 million in production costs each year, for a total loss of \$357 million over the last seven years. These losses makes them highly dependent on \$184 million of subsidies that are given to farmers each year. Despite these subsidy payments, one of every three of the region's farmers reported net losses in 2002.
- ❑ In 1914, Black Hawk County was the site of the first egg cooperative in Iowa. Jesup was the site of the state's largest dairy. By 1923, Black Hawk County alone supported eight creameries. Orange Creamery butter was featured in New York restaurants. The Rath packing plant sold \$1 billion dollars of pork that year. One-sixth of Iowa's canned corn was packed in three Cedar Falls/Waterloo plants.
- ❑ An economic analysis determining the industrial output, labor income, and job multipliers of selected Iowa farms and restaurants showed that the farms and restaurants in the study have an overall higher multiplier than the average regional grain farm and restaurant. Among the study's findings:
- ❑ Farms in the study have an industrial output multiplier of 1.92, which is higher than the 1.35 multi-

plier of the average regional grain farm

- ❑ The labor income multiplier for the studied farms is 1.86, and the regional average is 1.44.
- ❑ The farms in the study have a 1.83 jobs multiplier, and the job multiplier for an average regional grain farm is 1.56.
- ❑ The industrial output multiplier of the studied restaurants is 1.94, while the job multiplier for the average regional restaurant is only 1.53.
- ❑ The labor income multiplier gap is smaller, with the studied restaurants having an income multiplier of 1.65 and the average regional restaurant at 1.54.
- ❑ The jobs multiplier for the restaurants in the study is 1.54 while the average regional restaurant has a multiplier of 1.20.

Enshayan, Kamyar 2008. Community Economic Impact Assessment for a Multi-County Local Food System in Northeast Iowa. Leopold Center for Sustainable Agriculture Final Report M08-05

Find it on the Web: <http://www.uni.edu/ceee/foodproject/>

Potential Impact of Increased Local Food Consumption

- ❑ An economic study of five northeast Iowa counties was conducted to determine the results of increasing the consumption of apples, tomatoes, broccoli, spinach, carrot, squash, and potatoes to meet the recommended daily requirement. If 25 percent of the annual need for these commodities (three months' worth of consumption) could be produced in the region, more than 4,300 acres would be required to produce the commodities. At the producer level, productivity on the farm will support a total of 97 jobs and \$3.65 million in labor income for the region.
- ❑ If farmers were direct sellers of half of their produce, assuming that there are sets of distributors across the region where farmers sell their produce to consumers while the remaining half of their produce is distributed via wholesalers to existing grocers, the sales outlets would support 398 jobs making \$4.75 million. Once all of the transactions and input requirements are multiplied through the regional economy, 457 jobs and \$6.3 million in labor income would be supported while the stores were in operation.

Swenson, Dave. 2008. Estimating the Production and Market-Value Based Impacts of Nutritional Goals in NE Iowa. Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.leopold.iastate.edu/research/marketing_files/NEIowa_042108.pdf

Organic Crop Conversion

- ❑ A study of the potential region-wide economic impact of switching from conventional farming to an organic alternative showed that organic rotation farming produced 52 percent more gross sales revenue, 110 percent more value added, and 182 percent more labor income than from the same 1,000 acres farmed using conventional corn-soybean rotation practices.
- ❑ The study also showed that conventional rotation produces \$379,205 in annual output, while the organic corn, soybean, oat, and alfalfa (CSOA) rotation produces \$510,750 annually.

Swenson, David, Liesl Eathington, and Craig Chase. 2007. Determining the Methods for Measuring the Economic and Fiscal Impacts Associated with Organic Crop Conversion in Iowa. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.leopold.iastate.edu/research/marketing_files/woodbury.htm

Increased Produce Production, Consumption

- ❑ A study on the economic impact of increasing fruit and vegetable production and consumption in Iowa showed that eating five servings of fruit and vegetables every day could mean an additional \$302 million in sales and more than 4,000 jobs added to the Iowa economy if just 25 percent of the extra fruit and vegetables are Iowa grown.
- ❑ The study used the following crops: apples, squash, tomatoes, carrots, and spinach. Based on current

estimates, only 25 to 50 percent of the apples, 12 percent of the squash, 10 percent of the tomatoes, 5 percent of the carrots, and 1 percent of the spinach consumed on a fresh weight basis in Iowa are grown within the state.

- ❑ The study used production estimates generated by the Iowa Produce Market Potential Calculator.

Swenson, David. 2006. *The Economic Impacts of Increased Fruit and Vegetable Production and Consumption in Iowa: Phase II*. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.leopold.iastate.edu/pubs/staff/files/health_0606.pdf

Whole Animal Local Meat Purchases

- ❑ A study of three northeast Iowa institutions showed that it is possible to buy locally raised and processed meat (traceable to a particular farm with a known method of production) at a price that is competitive with conventional sources.

Gomes, Jason and Kamyar Enshayan. 2005. *Documenting the costs and benefits of whole animal local meat purchases by three northeast Iowa institutions*. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.leopold.iastate.edu/research/grants/2005/2004-M6_Institutional_Purchases_of_Local_Whole_Animals_-_Consumer_Food_Systems_.pdf

Iowa Farmers' Markets

- ❑ According to an economic analysis of Iowa's farmers' markets, these markets not only are a great place to get fresh produce, flowers and baked goods, they also may generate an estimated \$20.8 million in sales and more than 325 jobs for the Iowa economy.
- ❑ In 2004, Iowa had around 160 farmers' markets, the highest per capita in the nation. At least 55,000 people went to at least one farmers' market, and total seasonal attendance was estimated at 135,000.
- ❑ Based on interviews with more than 4,500 customers, these markets generated \$20.8 million in total sales in 2004. Those sales, in turn, resulted in an additional \$12.2 million of economic activity, of which \$4.3 million represents the supplies and services purchased by vendors and growers, and \$7.2 million in induced (payroll) effects. The analysis showed that farmers' markets represent an estimated 325 jobs in Iowa, plus an additional 146 full-time jobs created by the secondary impacts of the farmers' markets.

Otto, Daniel and Theresa Varner. 2005. *Consumers, Vendors, and the Economic Importance of Iowa Farmers' Markets: An Economic Impact Survey Analysis*. Ames, IA: Iowa State University.

Find it on the Web: http://www.leopold.iastate.edu/research/marketing_files/markets_rfswg.pdf

Vegetable Production Budgets

- ❑ An education and demonstration project analyzed three components related to the production of food products and potential markets for those products. One of the components was the profitability of growing vegetables, herbs, and fruit. The project showed that returns vary by product, but they yield an average of \$70 to \$80 per 100-foot by 4-foot bed. With 70 beds per acre, returns would average around \$5,000 per acre.

Leopold Center for Sustainable Agriculture. *Marketing and Food Systems and Regional Food Systems Working Group Project Abstracts*. 2005. Ames, IA: Leopold Center Marketing and Food Systems Initiative Workshop.

Find it on the Web: <http://www.extension.iastate.edu/Publications/pm2017.pdf>

Food Economies - Wright County

- ❑ A 2004 study of Wright County, Iowa showed that in 2001, farmers earned \$167 million from farm commodities, but spent \$187 million to produce those same commodities, which is a \$20 million loss.
- ❑ Wright County consumers spend \$30 million annually for food; \$17 million for food eaten at home and \$13 million for food eaten away from home. Of the dollars spent for food at home, \$7 million is going toward purchases of meat, poultry, and fruits and vegetables—items that can be supplied by local

producers. However, according to USDA statistics (1997), only eight farms were listed (1997) as selling directly to consumers. These farms generated only \$10,000 in sales. This represents significant potential for local producers to meet local demand.

- ❑ The combined out-of-county purchases for farm inputs and food represent a loss of \$125 million.
- ❑ Seven hundred farms received \$25 million in subsidies while 400 people received \$300,000 in food stamp support.

Libbey, Jan. 2004. Local Food Capacity in North Central Iowa: Nutritional Need, Economic Strategy. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: [http://www.leopold.iastate.edu/research/grants/2005/2004-M21_Connecting_Local_Consumption_to_Local_Production_\[Education\].pdf](http://www.leopold.iastate.edu/research/grants/2005/2004-M21_Connecting_Local_Consumption_to_Local_Production_[Education].pdf)

Melons Compared to Commodity Crops

❑ A muskmelon commercial budget was developed in 1996 and distributed by ISU Extension. The budget indicated production costs were about \$5,000 per acre. Assuming production costs have risen 10 percent to \$5,500 per acre since 1996 and yields are 40,000 lbs. per acre, a price of \$1,375 per cwt (hundredweight) would be needed just to cover production costs. A watermelon budget was developed as well and indicated production costs of \$2,640 per acre and a 40,000 lb. yield. A breakeven price of \$6.60 per cwt would be needed to cover production costs.

❑ There were 816 Muscatine County farms in 2002 selling \$72.1 million worth of agricultural products. Of the 816 farms, six produced cantaloupe and muskmelons on 49 acres. Assuming average sales of \$7,200 per acre, a total of \$352,800 in sales would occur from these farms. However, if farmers in Muscatine County reverted to their 1964 production of 271 acres, total sales would be about \$1.95 million. Assuming watermelon average sales of \$3,600 per acre, a total of \$298,800 in sales would occur from the 58 acres in 2002. Again, reverting back to 1964 acres would have provided \$1.36 million.

❑ Average net cash returns for a corn-soybean rotation would be estimated at \$1,700 per acre and \$960 per acre for watermelons. If Muscatine farmers reverted back to 271 acres of cantaloupe and 379 acres of watermelon, total net returns would be approximately \$825,000. Average net cash income for a corn-soybean rotation would be around \$20 per acre. To achieve a total net cash income of \$825,000, 41,250 acres of corn and soybean harvested acres combined would be needed in Muscatine County. Purely from a net cash income viewpoint, the 650 reverted cantaloupe and watermelon acres would equal 26 percent of all corn and soybean acres and would significantly contribute to the economic activity of the county.

Futrell, Sue and Craig Chase. 2004. Muscatine Melon: A Case Study of a Place-based Food in Iowa. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.leopold.iastate.edu/research/grants/files/2004-MSP9_melon.pdf

Local Food Purchases in Black Hawk County

❑ In 2006, the University of Northern Iowa Local Food project worked with 27 institutions that purchased \$881,000 in local food. Since 1998, there has been an increase of 24 institutions and \$770,000 in local food purchases. In 1998, the institutions included one restaurant, one college, and one hospital. In 2006, the 27 institutions included 12 restaurants, one college, one hospital, five retirement homes, seven grocery stores, and one elementary school.

Enshayan, Kamyar. 2007. New champions expanded scope: Developing an action plan for building an expanded regional food economy in Black Hawk and surrounding counties. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: <http://www.uni.edu/ceee/foodproject/> [Northern Iowa Food & Farm Partnership]

Finding Food in Northeast Iowa

❑ Northeast Iowa farmers in Allamakee and Winneshiek Counties earned \$1.8 billion more (in 2002 dollars) selling farm commodities (in 2002 dollars) than they spent producing those crops during the period from 1969 to 2002.

- ❑ Farmers in Allamakee and Winneshiek Counties received \$634 million in farm subsidies over the past 34 years. Government payments have been at least 50 percent and at times more than 100 percent of net farm income each year since 1999.
- ❑ Iowa farmers have lost \$3.4 billion (in 2002 dollars) producing crops and livestock from 1998 to 2002.
- ❑ Iowa farmers received \$120 billion in farm subsidies from 1969-2002. At the end of that period, farmers increasingly relied on non-production income to pay for the costs of farming. "Other" farm-related income earned by Iowa farmers rose to \$3.7 billion in 2002, which is nearly as much as all federal subsidies received that year.
- ❑ For all Iowa farmers, even though farm productivity nearly doubled between 1969 and 1996, the balance of cash receipts and production costs fell to one-fourth their 1973 level.
- ❑ Both 2003 and 2004 data show that farm cash receipts have plummeted steadily since the "grain-for-oil" era in the 1970s. Farmers are earning less producing crops in 2002 than they did in 1969—despite doubling their productivity.

The northeast Iowa region's consumers spent \$70 million buying food in 2000, primarily from external sources, even as their neighbors lost money producing food commodities. The region's consumers purchase an estimated \$9.5 million of meats, poultry, fish, and eggs each year; \$6.6 million in fruits and vegetables; \$6 million of cereals and bakery products; and \$4 million in dairy products.

Meter, Ken. 2004. Finding Food in Northeast Iowa. Ames, IA: Leopold Center for Sustainable Agriculture.



Food Miles and Greenhouse Gases

Local Food Distribution Fuel Efficiency

- ❑ A study was conducted to determine the fuel efficiency and CO₂ emissions of Consumer Supported Agriculture (CSA) in Iowa. Findings showed that delivery by the farmer using a Toyota Prius resulted in 2.77 times lower fuel usage and CO₂ emissions than consumer pick-up using U.S. average fuel economy for passenger vehicles. However, if all CSA customers used vehicles for pickup, farmer distribution would still be more fuel efficient, but only 1.35 times more than that of customer pick-up.
- ❑ Increased efficiencies for delivery routes, optimized placement of pick-up centers to minimize travel, combining and/or minimizing car trips to pick up or buy food, and use of more fuel efficient vehicles or non-fossil fuel powered transportation are all options that farmers and their customers should consider to reduce the environmental impact of the CSA in the local food distribution system.
- ❑ Combining or minimizing car trips to shop for food offers an option that could be enhanced by co-operation across market venues. For example, having farmers markets in the parking lots of retail food stores could decrease consumer fuel use and CO₂ emissions as well as increase overall sales for both the direct market farmers and the food retailer.
- ❑ Direct farm food delivery may increase net profitability for the farmer, but delivery likely will decrease interaction among CSA members and their farmer partners.

Pirog, Rich and Rebecca Rasmussen. 2008. Assessing Fuel Efficiency and CO₂ Emissions of Two Local Food Distribution Options in Iowa. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: <http://www.leopold.iastate.edu/pubs/staff/files/fuel0608.pdf>

Multiple Ingredient Food Product

- ❑ According to a study that calculated the weighted total source distance of multiple ingredient food products, the primary ingredients for an eight-ounce container of strawberry yogurt—milk, strawberries, and sugar—travel more than 2,200 miles before reaching the supermarket shelf. The average distance (based on percent weight in the final product) the ingredients travel is about 277 miles, with a total travel distance of 2,216 miles.

Pirog, Rich and Andrew Benjamin. 2005. Calculating food miles for a multiple ingredient food product. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.leopold.iastate.edu/pubs/staff/files/foodmiles_030305.pdf

Local vs. National

□ According to research done on food miles, in 2001, the average weighted average source distance (WASD) for locally grown produce to reach institutional markets was 65 miles, while the conventional WASD for the produce to reach those same institutional points of sale was 1,494 miles, nearly 27 times further. Conventional produce items traveled from eight (pumpkins) to 92 (broccoli) times farther than the local produce to reach points of sale.

□ In 2001, the sum of all WASDs for 16 produce types to reach institutions was 716 miles for the locally grown data set; slightly less than the distance from Des Moines, Iowa, to Denver, Colorado. The sum of all WASDs for 16 produce types to reach the same institutional markets was 25,301 miles for the conventional source estimations. This is the distance from Des Moines north (longitudinally) to the North Pole, south to the South Pole and back to Des Moines, with an additional 439 miles of travel north to within 70 miles of the Canadian border.

Pirog, Rich and Andrew Benjamin. 2003. Checking the food odometer: Comparing food miles for local versus conventional produce sales to Iowa institutions. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.leopold.iastate.edu/pubs/staff/files/food_travel072103.pdf

Food Travel, Greenhouse Gas Emissions, Economics

□ The U.S. Department of Agriculture Agricultural Marketing Service produce arrival data from the Chicago, Illinois terminal market were examined for 1981, 1989, and 1998, and a weighted average source distance (WASD) was calculated for arrivals by truck within the continental United States for each year. Produce arriving by truck traveled an average distance of 1,518 miles to reach Chicago in 1998, a 22 percent increase over the 1,245 miles traveled in 1981.

□ A WASD was calculated for a sampling of data from three Iowa local food projects where farmers sold to institutional markets such as hospitals, restaurants, and conference centers. The food traveled an average of 44.6 miles to reach its destination, compared with an estimated 1,546 miles if these food items had arrived from conventional national sources.

□ The conventional system of transporting food used four to 17 times more fuel than the Iowa-based regional and local systems, depending on the system and truck type. The same conventional system released from five to 17 times more CO₂ from the burning of this fuel than the Iowa-based regional and local systems.

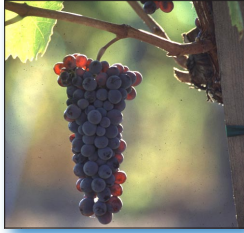
□ Growing and transporting 10 percent more of the produce for Iowa consumption in an Iowa-based regional or local food system would result in an annual savings ranging from 280 to 346 thousand gallons of fuel and an annual reduction in CO₂ emissions ranging from 6.7 to 7.9 million pounds, depending on the system and truck type.

□ Based on consumption estimates of a selected 28 fruits and vegetables, if an additional 10 percent of these produce items were grown and sold in Iowa, it would result in \$54.3 million in sales for Iowa farmers (based on wholesale prices). These dollars would multiply several times in Iowa communities rather than communities in other states or countries.

□ A common dinner of chuck roast, potatoes, carrots, and green beans could travel a collective distance of 5,375 miles through conventional channels before reaching the dinner table while the same meal grown locally could travel a collective distance of just 90 miles before reaching the dinner table.

Pirog, Rich, Timothy Van Pelt, Kamyar Enshayan, and Ellen Cook. 2001. Food, Fuel, and Freeways: An Iowa perspective on how far food travels, food usage, and greenhouse gas emissions. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.leopold.iastate.edu/pubs/staff/ppp/food_mil.pdf



Grape and Wine Industry

A Regional Wine Culture

- ❑ Iowa's grape industry has historical roots with the state ranking sixth nationally in the production of grapes in the early 1900s. In 2007, the Iowa Wine Growers Association estimated that Iowa had more than 275 commercial vineyards and more than 60 bonded wineries.
- ❑ For six years, a total of seven eastern Iowa growers have marketed their grape harvest to one eastern Iowa winery. Attesting to its resulting potential, seven wines that were 100 percent produced in eastern Iowa have won gold medals and "Best of Class" awards in 17 international competitions since 1999.
- ❑ The Iowa Wine Trail began with five participating wineries and has grown to seven wineries at the beginning of 2007.
- ❑ A survey of Iowa Wine Trail visitors yielded these results:
 - o Over half of visitors have previously visited the wineries and were familiar with the Iowa Wine Trail. The main sources of information used were word of mouth, websites, brochures, and newspapers.
 - o The main motives for visiting the wineries were to taste wine and locally produced foods. Over 90 percent of respondents were very satisfied with their experience at northeast Iowa wineries, and repeat visitors expressed higher levels of satisfaction than first-time visitors.
 - o Sixty percent of visitors were on a day trip, the rest stayed on average 1.63 nights in the area, most often in hotels or bed and breakfast establishments. Most of the visitors were Iowa residents, age 26 to 45, college educated, and traveling in a party of two or four. The mean travel party size was 3.5 people (median 2). Sixty percent of visitors were females. Over 45 percent of the visitors indicated their 2004 household income as \$50,000-\$99,999 per year, which is higher than the median income in Iowa and on the federal level.
 - o Lodging was the highest spending category, followed by buying wine at the winery, restaurant and bar meals and drinks, shopping, admissions, transportation/gas expenses, and groceries. The average total spending was \$206.52 per travel party, which is higher than the mean total spending of visitors to place-based food festivals in northeast Iowa, but lower than the mean total spending of the visitors to Silos and Smokestacks National Heritage Area.
 - o Initial wine visitors' expenditures of \$1.82 million generated \$2.65 million in terms of sales, \$1.35 million in terms of personal income, and created 53 new jobs. For every dollar spent by wine visitors, an output of \$1.45 was generated in terms of sales. Furthermore, an estimated income multiplier of 1.46 and employment multiplier of 1.23 were generated. These multipliers are slightly lower than those generated by place-based food tourism and visitors to Silos and Smokestacks National Heritage Area, which in part is explained by the smaller area under examination (ten counties compared to 30 counties).

Lankford, Sam, Oksana Grybovyh, and Jill K. Lankford. 2006. Development of a Regional Wine Culture in Iowa. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.leopold.iastate.edu/research/marketing_files/workshop06/presentations/wine.pdf

Iowa Grape Juice

- ❑ A survey of buying clubs showed that its respondents were more concerned with characteristics related to the perceived healthiness or nutritional value of a food product rather than where it was grown or its appearance. "Certified organic" and "price" were ranked as important by nearly 67 percent of the people who responded.
- ❑ When asked about alternative grape juice products, 90 percent of the respondents indicated they would be willing to purchase a locally grown organic product. Fifty percent of the respondents said they would be willing to purchase a local product if the producers used limited pesticides, meaning the product is not organic. Only 35 percent of the respondents were interested in a product sweetened with sugar, while 83 percent preferred a product sweetened with other fruit juices.
- ❑ One-third of the respondents said they would be willing to pay more for a locally grown grape product, while 68 percent were interested in purchasing a local sparkling grape juice product.

Leopold Center for Sustainable Agriculture. "Let the vineyards be fruitful: A study of the potential market for Iowa grape juice." Center Progress Report. July 2004. 68-70

Find it on the Web: [http://www.leopold.iastate.edu/research/grants/2004/2003-M3_Grape_Juice_Mkt_\[Consumer_Food_Systems\].pdf](http://www.leopold.iastate.edu/research/grants/2004/2003-M3_Grape_Juice_Mkt_[Consumer_Food_Systems].pdf)

Iowa Grape Industry

- ❑ According to the 1860 U.S. Agricultural Census, Des Moines, Iowa, Mills, Muscatine, and Van Buren counties led Iowa in production of farm-processed wine. Grape production in Iowa grew steadily as the state was settled. Nationally, Iowa ranked ninth in grape production in 1869 with nearly half a million pounds.
- ❑ The 1900 U.S. Agricultural Census showed that Iowa produced 7,403,900 pounds of grapes and 76,301 gallons of farm-processed wine.
- ❑ Iowa was sixth in grape production in 1919 with more than 12 million pounds. Linn, Pottawattamie, and Polk counties produced approximately one-third of Iowa's grapes in 1919, with Pottawattamie and Polk producing 1,863,000 and 1,374,000 pounds, respectively. Most of the grapes grown in these three counties were produced near the cities of Cedar Rapids, Council Bluffs, and Des Moines.
- ❑ Because of a reputation for better quality fruit than that grown elsewhere, grapes marketed by the Council Bluffs Grape Growers Association brought its members a \$56.00 per ton average for the 1926 season, \$16.00 per ton higher than the U.S. average price.
- ❑ According to research done on Iowa's grape industry, using 1998 Iowa population figures (2.862 million people), Iowa would need an estimated 279 acres of wine grapes and 54 acres of table and juice grapes to supply 5 percent of Iowa's wine and table grape consumption and 1 percent of Iowa's grape juice consumption.

Pirog, Rich. 2002. *Grape Expectations: A food system perspective on redeveloping the Iowa grape industry*. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: <http://www.leopold.iastate.edu/pubs/staff/grapes/Grape.pdf>



Market Research

Rising Food Prices, Food Safety, Climate Change

- ❑ The Leopold Center's Marketing and Food Systems Initiative conducted a marketing survey in August 2008 to examine consumer perceptions of the complex relationships among rising food and fuel prices, food safety, greenhouse gas emissions and climate change, and food systems of varying scales (local, regional, national).
- ❑ Survey respondents were more likely to react to rising food and fuel prices by taking fewer vacations and recreational trips, buying more food items on sale, eating out less, and purchasing fewer desserts. Overall, the respondents said that price increases led to a decrease in fuel use and a reevaluation of their food shopping and eating habits. Seventeen percent said they were unlikely to cope with rising prices by increasing their purchases at farmers markets or by canning or freezing more fruits and vegetables.
- ❑ The majority of respondents (55 percent) perceived the U.S. food system to be safe. However, a Leopold Center survey conducted in July 2007 found that 70 percent of respondents thought the U.S. food system was safe. There was considerable concern with a global food supply chain; only 15 percent of respondents viewed such a system as safe, compared to 74 and 73 percent, respectively, for a local or regional system.
- ❑ More than 50 percent of respondents saw value in retailers putting carbon labels on their food products, with the majority willing to encourage use of such labels only if their food costs did not increase. More than 60 percent of respondents said they would not pay more for a produce item that contributes 50 percent fewer greenhouse gas emissions.
- ❑ When asked specifically about the role their carbon footprint plays in greenhouse gas emissions,

only 11 percent of respondents viewed themselves as responsible for their carbon footprint. This contrasts with 37 percent of British respondents in a July 2007 consumer survey who believed they were responsible for the emissions related to their carbon footprint.

❑ Fifty percent of respondents saw the loss of natural habitat as a more important environmental issue than climate change, with more than 40 percent viewing water pollution as a more important environmental concern than climate change.

❑ More than two-thirds of the respondents said that local food traveled 100 miles or less from the farm to point of purchase, while only a third viewed the “local” definition as “grown in their state or region.” Respondents from larger western states were less likely to choose the option “25 miles or less” as their definition of local compared to their counterparts in the rest of the country.

Pirog, Rich and Rebecca Rasmussen. 2008. Food, Fuel and the Future: Consumer Perceptions of Local Food, Food Safety and Climate Change in the Context of Rising Prices. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: <http://www.leopold.iastate.edu/pubs/staff/consumer2/report.html>

Demand Among Institutions for Local Foods

❑ According to a southwest Iowa institutional survey administered to determine the demand among regional institutions for locally grown natural, conventional, organic, or source-verified food products, 83 percent of respondents would “purchase” local products with 48 percent willing to consider buying either fresh or processed items.

❑ The survey also asked food providers to identify the type and quantity of local foods they would use in their preparation process. The top ten food categories (in descending order) were:

1. Tomatoes
2. Peppers/Potatoes
3. Onions
4. Lettuce
5. Eggs
6. Strawberries
7. Apples
8. Green Beans/Carrots
9. Beef
10. 2% Milk

Ladd, Alan and Steve Adams. 2008. Southwest Iowa Institutional Foods Survey and Producer Training Program. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.leopold.iastate.edu/research/marketing_files/workshop/presentations/InstitutionalSurvey.pdf

Organic Agriculture Education and Training

❑ A study was completed to determine the extent of interest in or demand for organic agriculture credit classes at Western Iowa Tech Community College. The survey addressed the following questions:

1. Are the participants concerned about the safety of foods that are not produced using organic farming methods?
2. If they are, are they interested in learning organic farming methods and taking courses in organic farming?
3. Do they prefer face-to-face, online, hybrid or independent study for course delivery?
4. Do they have specific scheduling preference(s)?
5. What specific areas of organic farming interest them most?
6. What barriers are hindering them from pursuing organic agriculture classes?

❑ Overall, the survey showed that women are more concerned about food safety. People who were born between 1950 and 1970 seem to be more interested in organic agriculture. Based on the findings of the survey, these participants have little or no interest in pursuing a college degree, diploma or certificate related to organic farming; however, there is some interest learning about organic farming on a non-credit basis.

Environmental Issues and the Food System

- ❑ The Leopold Center for Sustainable Agriculture designed a survey to address people's perceptions regarding food safety and product origin, greenhouse gas emissions in the food system, willingness to pay for food products with lower emissions, and perceptions surrounding health benefits of local food.
- ❑ Respondents to the survey placed high importance on food safety, freshness (harvest date), and pesticide use on fresh produce they purchase, with somewhat lower importance on whether the produce is locally grown, the level of greenhouse gas emissions it took to produce and transport the produce, and whether the respondent could contact the farmer who grew it.
- ❑ Seventy percent of respondents perceived the U.S. food system to be safe. When asked about the safety of fresh produce based on continent of origin, North America was perceived as the most safe (85 percent) followed by Europe (50 percent) and Australia (48 percent). When asked which specific countries raised the most concern, China was cited most frequently, with 31 percent of respondents singling it out. Eighty-five and 88 percent of respondents, respectively, perceived local and regional food systems to be somewhat safe or very safe, compared to only 12 percent for the global food system.
- ❑ Nearly half of respondents were willing to pay a 10 to 30 percent premium, but a similar percentage was not. However, when looking at those respondents who had shopped at venues where locally-grown foods were more likely to be for sale, 58 percent were willing to pay more (compared to those who did not shop at venues where locally-grown foods were likely for sale), and 38 percent indicated they would pay the same.
- ❑ Fifty-seven percent of respondents in this survey "somewhat" or "strongly" agreed that organic food was healthier than conventional. More than two-thirds of respondents (69 percent) "somewhat" or "strongly" agreed that local food is better for their personal health than food that has traveled across the country.
- ❑ When respondents were asked if they perceived that science had indeed proven that local food was healthier than distant food, 40 percent of respondents "somewhat" or "strongly" agreed.

Pirog, Rich and Andy Larson. 2007. Consumer perceptions of the safety, health, and environmental impact of various scales and geographic origin of food supply chains. Ames, IA: Leopold Center for Sustainable Agriculture.

Selling to Retail, Food Service Distributors

- ❑ According to a set of interviews conducted to identify what it takes to bring together small and medium-sized producers and retail and food service distributors:
 - o Distributors recognize a need to consider buying locally;
 - o Producers would benefit by meeting with distributors;
 - o Consistent and constant supply is important for food distributors;
 - o Producers need to follow basic guidelines regarding storage, packing, and shipping of products to maintain product quality and ease of handling; and
 - o Formation of producer supply groups would facilitate contacts with and shipments to distributors.
- ❑ According to a survey of foodservice distributors, "reasonable price" is the most commonly preferred attribute of a product and many distributors qualified this answer by stating that "value" surpassed "price" as the important attribute of a product.
- ❑ More than half of the distributors responded that "locally grown or produced" foods were preferred by customers and that products that "appeal to regional tastes" would hold interest for their customers. Sustainability and non-factory farm production, certified organic, and "natural" products would be preferred by the customers of at least one-third of the distributors.
- ❑ Retail product distributors also were surveyed, and they responded strongly (80 percent of distributors) to the following attributes: locally grown, sustainable, appealing to regional tastes, organic, and reasonably priced.

- ❑ Similarly to foodservice distributors, the retail distributors stated that “price is not everything,” but that customers would pay what they thought was a reasonable price for “value” in the product. “Natural,” “free of antibiotics” and “contain no hormones” attributes were thought to be preferred by customers of 40 percent of retail distributors.
- ❑ The foodservice distributors who were not purchasing from local producers point to packaging, product availability, or consistency of supply as reasons why they are not purchasing from local producers.
- ❑ Distributors were somewhat frustrated that relatively few local producers contacted them to sell their products. Both foodservice and retail distributors stated that local producers usually make the first contact with a distributor when the product is ready to sell, rather than contacting the distributors in the planning process and before the food product was actually available.
- ❑ Distributors were asked if they thought the ability to buy from local producers gives them a truer sense of the quality of the product. Eighty-five percent of foodservice distributors and 60 percent of retail distributors replied “yes” to the question.
- ❑ All distributors replied that they expect producers to help promote their products to increase sales.
- ❑ Both foodservice and retail distributors emphasized the importance of having a “product with a story,” where the story became part of the value for which customers are willing to pay.
- ❑ Among retail distributors unique products that were produced locally were rated highly in the meats, poultry, and fish categories.
- ❑ Retail distributors rank high quality of most importance in fruits and vegetables. They also see growth potential in “organic” produce, and extra value in being able to sell unique varieties and “natural” characteristics for higher prices.
- ❑ Locally produced dairy products are more commonly purchased for retail sales than for foodservice distribution.
- ❑ Responses provided by foodservice distributors suggest that their customers would prefer products that are locally grown as long as the supply could be consistent or predictable.
- ❑ Inadequate supply and inconsistent product quality were named as reasons that distributors would avoid regular purchases from individual producers.

Hardy, Connie, Mary Holz-Clause, Nicole Bogenreif. 2007. Bridging the Gap: What does it take to bring small and medium-sized producers and retail and food service distributors together? Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.leopold.iastate.edu/research/marketing_files/workshop06/presentations/gap.pdf

Using Contracts

- ❑ Based on focus groups, marketing agreements may be best used as a door opener at a requested time for producers to prove their ability to provide desired quantity and quality of products. Agreements also may be beneficial to producers wanting to expand but needing some assurance of guaranteed markets to help with production planning decisions. Interest in using local produce may be present in Iowa foodservice industry, but the willingness to expend extra time and re-sources to develop such relationships or to help this relationship flourish may be lacking.

Ellis, Jason D. 2006. Using Contracts to Expand Produce Market Opportunities. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.leopold.iastate.edu/research/marketing_files/workshop/presentations/ContractOpportunities.pdf

Consumer Perceptions - Place-Based Foods

- ❑ According to an email survey of consumers in the United States, respondents were more likely to choose a local food product that benefits farmers and the community over a product that does not benefit the local economy. Respondents also were more likely to pay amounts above the conventional price for place-based food products grown in their state rather than place-based products from another state. A majority believed it to be at least somewhat likely that taste and quality of meat, produce and

dairy products are influenced by the natural resource characteristics of the region where the product is grown.

Leopold Center for Sustainable Agriculture. "Consumer perceptions of place-based foods, food chain profit distribution, and family farms." Center Progress Report. July 2006. 32-3.

Find it on the Web: [http://www.leopold.iastate.edu/research/grants/2006/2004-MSP05_Place_Consumer_Local_Foods_\[Consumer_Food_Systems_\].pdf](http://www.leopold.iastate.edu/research/grants/2006/2004-MSP05_Place_Consumer_Local_Foods_[Consumer_Food_Systems_].pdf)

Consumer Attitudes - Beef Products

□ Results from surveys that assessed the features consumers consider when choosing a steak showed that region of origin, use of growth promotants, cost of cut, whether the steak is guaranteed tender, and traceability were considered the most important steak features while farm ownership, animal feed used, steak cut, animal breed, and whether the product is certified organic were the least important factors.

Mennecke, Brian, Anthony Townsend, Dermot Hayes, and Steven Lonergan. 2006. *A Study of the Factors that Influence Consumer Attitudes Towards Beef Products Using the Conjoint Market Analysis Tool*. Ames, IA: Iowa State University.

Find it on the Web: <http://www.agmrc.org/NR/rdonlyres/2F7A4F83-8D26-4457-B2BB-7D6D30D74FBF/0/AStudyofFactors.pdf>

Consumer Knowledge - Regional Food Systems

□ Research consisting of focus groups and a telephone survey were conducted to assess Iowans' understanding of regional food systems. The research showed that focus group participants would support a regional food system if the outcomes would benefit them with respect to reasonable prices, high-quality products, and convenient accessibility.

□ The research also showed that 93.6 percent of the telephone survey respondents were not familiar with the regional food system concept. Food safety, higher food quality, convenient access, financial sustainability, and reasonable prices were the most important outcomes of a regional food system to the respondents who were familiar with the regional food system concept.

Palan, Kay M. 2005. *Examining Awareness of and Support of Regional Food Systems in Iowa: Establishing a baseline of consumer knowledge about regional food systems and communication preferences*. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.leopold.iastate.edu/research/marketing_files/regionalfood_rfswg.pdf

Direct Meat Marketing

□ The data collected in a direct marketing study for meat in Iowa can be used as a guide to estimate potential for different marketing scenarios. For example, based on the estimates derived in this study, a local pork producer could expect monthly deliveries to a 50-person Community Supported Agriculture (CSA), priced 31 percent above conventional prices, in bundles only, to be 129 lbs. This figure could similarly be derived for beef (107 lbs.), poultry (primarily chicken-124 lbs.), and eggs (417). These calculations could easily be done for buying clubs as well.

□ Buying club households surveyed in this study ate 15.47 eggs per week. A local egg producer could expect deliveries twice monthly to a 20-person buying club, priced 42 percent above conventional prices, to be about 37 dozen.

Huber, Gary, Rick Hartmann, and Todd Kimm. 2005. *Supporting Direct Meat Marketing in Iowa*. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: [http://www.leopold.iastate.edu/research/grants/2006/2004-M17_Direct_Market_Meat_WTP_\[Education_\].pdf](http://www.leopold.iastate.edu/research/grants/2006/2004-M17_Direct_Market_Meat_WTP_[Education_].pdf)

Iowa Produce Market Potential Calculator*

- ❑ According to the Iowa Produce Market Potential Calculator, if Iowa farmers supplied just 25 percent of the leaf lettuce eaten in Iowa, compared to less than 1 percent currently, annual sales would be about \$9 million.
- ❑ Iowans eat 25.9 million pounds of carrots each year, and only 5 percent are grown in Iowa.
- ❑ Nine Iowa counties produce 28,000 pounds of apricots, which is only 7 percent of what Iowans eat, and nearly half are grown in Decatur and Dallas counties.
- ❑ Linn County is the hub for blackberry growers, producing more than half of what is grown in Iowa.
- ❑ Thirty percent of the 5.8 million pounds of green beans eaten every year by Iowans, 1.7 million pounds, come from Iowa.
- ❑ Iowans eat an estimated 8.3 million pounds of garlic each year but less than 1 percent, which is 25,000 pounds, is grown in Iowa.
- ❑ Iowa farmers would need to plant an additional 420 acres of potatoes to supply 25 percent of Iowa's fresh market demand for this crop.

*Leopold Center for Sustainable Agriculture. 2005. "New Web Tool Explores Potential Produce Markets," news release, November 28. * Tool is being revised in 2009.*

*Find it on the Web: http://www.leopold.iastate.edu/news/newsreleases/2005/calculator_112805.htm
Calculator link: <http://www.leopold.iastate.edu/research/calculator/home.htm>*

Consumer Perceptions - Ecolabels

- ❑ According to a 2003 Internet survey of Midwestern consumer perceptions of ecolabels and local foods:
 - o More than 70 percent of respondents who viewed the simplified set of ecolabels with one tagline comparing locally grown strawberries delivered to the food store within 24 hours of harvest with strawberries grown in the United States without a "freshness" claim thought of reasons why they would buy the locally grown berries. In addition, more than 90 percent of these respondents preferred the locally grown label with the "freshness" claim over the more generic strawberry label stating the product was grown in the U.S.A.
 - o When asked how closely terms such as grown locally, pesticide-free, organic, grown in your state, product of U.S.A., and humanely raised were related to the term "family farm," the majority of respondents believed that grown locally was the most closely related term (68 percent for those who viewed ecolabels and 60 percent for those who did not). None of the other terms were viewed as being most closely related to the term family farm by more than ten percent of respondents.
 - o Fifty-two percent of respondents viewing the more text-heavy set of ecolabels with two taglines thought of reasons why they would buy local strawberries.
 - o Nearly 37 percent of those respondents who did not view ecolabels selected "grown 25 miles or less from purchase point" compared to 32 percent for those who did view ecolabels. Thirty-four percent of respondents who viewed ecolabels selected "grown in your state" compared to 29 percent who did not see the ecolabels.
 - o Only 12 percent of respondents who viewed ecolabels (compared to 10 percent who did not) perceived that more than 50 percent of the fresh meat, poultry, and produce available for sale in their community were raised within their county of residence. Upon widening the question from county to state, respondents' perceptions of the percent for sale grown locally in the 26 to 50 percent range increased by more than 15 percent if those food items available were grown within their state.
- ❑ Nearly 30 percent of respondents in Iowa and adjacent metropolitan areas in Nebraska and Illinois indicated they are frequently mindful about where and how their food is produced. This group of respondents is clearly interested in locally grown foods, with more than 50 percent indicating high to very high levels of interest.
- ❑ Twelve to 18 percent of consumer respondents in the Iowa-based study were willing to pay 30 percent or more for food products (depending on the food item) that combine the attributes of locally grown with environmental and community stewardship.
- ❑ Less than 16 percent of the respondents believed that more than half of their food items came from

within their state. When asked how closely the terms grown locally, pesticide-free, organic, grown in your state, product of U.S.A., and humanely raised were related to the term “family farm,” the majority of respondents, 68 percent of those who viewed the ecolabels, cited grown locally as the closest match.

❑ In a second, smaller, Iowa-based Internet survey, 12 to 18 percent of consumer respondents were willing to pay 30 percent or more for food products (depending on the food item) that combine the attributes of locally grown with environmental and community stewardship.

Pirog, Rich. 2004. Ecolabel Value Assessment Phase II: Consumer Perceptions of Local Foods. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.leopold.iastate.edu/pubs/staff/files/050504_ecolabels2.pdf

Consumer Perceptions - Food Company Green Policies

❑ According to a 2004 survey about company environmental and societal positions, overall opinion about a producer is more positive for producers using environmentally-friendly policies as compared to those that have no environmental safeguards. Similarly, respondents also had a more favorable opinion of companies with a positive community reputation as compared to firms with a negative community reputation.

❑ In addition, the survey also showed that respondents were more likely to purchase produce from firms using environmentally-friendly policies as compared to firms without environmental safeguards. Respondents also were more likely to buy produce from companies with a positive community reputation than a negative reputation.

❑ Respondents would pay significantly less than the average price for produce from companies using no environmental safeguards as compared to companies that use environmentally-friendly practices in their processes. When the company is locally owned and operated, respondents were willing to pay significantly more for produce from companies with a positive community reputation.

❑ Respondents perceived higher quality for more environmentally-friendly firms in comparison to companies that have no environmental safeguards. Respondents also associated significantly higher quality with produce offered by locally owned and operated companies versus larger conglomerates.

❑ Respondents had perceptions that firms using more environmentally-friendly policies would have fresher produce as compared to companies with no environmental safeguards. Results also suggest that respondents believed that larger conglomerate firms offered fresher produce than did smaller, locally owned producers. Respondents perceived fresher produce was coming from firms that have a positive community reputation than from firms with a negative community reputation.

❑ Respondents provided more favorable corporate social responsibility evaluations for firms using more environmentally-friendly policies than other companies. The results also suggest that respondents had a more positive opinion of a firm's support of charitable causes if that firm had a positive versus negative reputation in the community.

❑ Respondents believed that firms with more environmentally-friendly policies provide more support for the local community than do other companies. Respondents also perceived that larger conglomerates provide stronger community support from firms with a positive rather than a negative community reputation.

❑ Respondents perceived more environmentally-friendly firms as using more sustainable agricultural processes than other companies. Respondents also associated sustainable agricultural processes to a greater extent with companies with a positive reputation than firms with negative reputations.

DeCarlo, Thomas E. and Michael J. Barone. 2004. Company Environmental and Societal Positions as Sources of Competitive Advantage: Implications for Sustainable Agriculture Producers. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: [http://www.leopold.iastate.edu/research/grants/2006/2005-M07_Environmental_Marketing_Economics_\[Consumer_Food_Systems_\].pdf](http://www.leopold.iastate.edu/research/grants/2006/2005-M07_Environmental_Marketing_Economics_[Consumer_Food_Systems_].pdf)



Niche Beef

Beef Management Systems

❑ Niche market producers could benefit from better utilization of record systems, according to results from an educational assessment. First, there is a lack of understanding of the need for using organized record systems and the economic benefits that these systems can offer. Second, few niche market producers currently are using any computerized management system. However, as input costs have been rising steadily, there is increased interest in determining and managing the pig flow and cost structure in the cooperating niche market farms. It will take a long-term, carefully focused effort for these farms to transition from more traditional production attitudes to a more business-oriented mindset.

❑ Tools developed to assist in these efforts include:

Sow Group Tracker software to help producers lower costs of production by more efficiently managing their sow herd, labor, facilities, and other resources

Educational materials describing different market access or value-added programs and their requirements

Stewardship Management System program (a curriculum and manual showing producers how to develop management systems for their farms), which focuses on continuous process improvement that helps farmers see cost saving benefits in nutrient management, labor efficiency and cost of production tracking, and the

Management System Template developed by the Iowa Beef Center along with training for extension field staff in farm management, agricultural engineering, and beef, pork, and dairy production in the use of the template.

Lawrence, John, John Mabry, and Mary Holz-Clause. 2008. Functional Quality Management Systems for Livestock Producers. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.leopold.iastate.edu/research/marketing_files/2007grants.htm

Sow Group Tracker link: <http://www.ipic.iastate.edu/information/ST.brochure.pdf>

Organic, Natural and Grass-Fed Beef

❑ The seven-year net present value for a conventional beef system is \$201,341, \$232,382 for a slow conversion to organic grain-fed beef, \$217,845 for a slow conversion to organic grass-fed beef, \$287,351 for organic grain-fed beef with converted Conservation Reserve Program (CRP) land, and \$237,166 for organic grass-fed beef with converted CRP land.

❑ A cash flow analysis showed that at organic premiums over 30 and 40 percent, the grain-fed organic system produced a higher net present value than the conventional system. Grass-fed systems needed premiums of 60 and 70 percent over conventional to produce a higher net value.

❑ Conventional beef production is the most profitable system. Natural beef was the second most profitable, given the premiums assumed. The natural niche is a rapidly growing beef market and there is greater market access than even two years ago.

Lawrence, John D., Margaret Smith, and Nicolas Acevedo. 2006. Organic, Natural and

Grass-Fed Beef: Profitability and Constraints to Production in the Midwestern U.S. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.iowabeefcenter.org/content/Organic_Natural_Grass_Fed_Beef_2006.pdf



Niche Pork

Pork Quality Considerations

- ❑ The cost of taking one measurement of pH for 2000 pigs per week was projected to be \$0.057 per hog or \$0.021 per cwt (hundredweight) of live weight. It was further determined that to achieve an acceptable accuracy level at least three pH measurements are needed per hog. Given this, the total cost per hog for pH measurements would be \$0.17. Analysis showed that about 57 percent of the hogs would need to be measured and cost would be reduced to \$.097 per hog with this level of testing.
- ❑ Using pH as a predictor of pork quality through an ordered logit model is moderately reliable with approximately 30 to 40 percent of the observations correctly predicted by this method, while about 75 percent of the observations were predicted within an error of ± 1 . More than 95 percent of the observations were predicted within an error of ± 2 .
- ❑ When Instron testing, an evaluation of the amount of pressure required to cut a cooked meat sample, and marbling are combined with pH in the analysis, the accuracy of predicting eating quality of pork increases dramatically. Approximately 50 percent of the observations were correctly predicted by this method. More than 94 percent of the observations were predicted within an error of ± 1 , while more than 99 percent of the observations were predicted within an error of ± 2 .
- ❑ An increase in the pH level was positively associated with a more desirable value for each of the eating quality variables, which are flavor, juiciness, tenderness, and texture.
- ❑ If the 90 percent confidence level is selected, and the mean value of the producer will be in a range of plus or minus 0.5 units, it is necessary to sample the following:
 - o 27 percent of the hogs for color by load or 3 percent of the hogs for color by year
 - o 34 percent of the hogs for firmness by load or 4 percent of the hogs for firmness by year
 - o 40 percent of the hogs for loin eye area and marbling by load or 5 percent of the hogs for loin eye area and marbling by year
 - o 58 percent of the hogs for flavor or 10 percent of the hogs for flavor by year
 - o 52 percent of the hogs for juiciness or 8 percent of the hogs for juiciness by year
 - o 59 percent of the hogs for tenderness and texture or 11 percent of the hogs for tenderness and texture by year
- ❑ Collecting measurements on approximately 2000 hogs per week, the equipment cost of taking one measurement of pH is around \$0.0072 per hog or \$0.0027 per carcass cwt.
- ❑ The total cost of taking one measurement of pH for 2000 hogs delivered each week is approximately \$0.057 per hog or \$0.021 per cwt. of live weight and \$0.029 per carcass cwt.
- ❑ To achieve an acceptable accuracy level at least three pH measurements are needed per hog which represents a total cost of \$0.17 per hog. Following the same reasoning and measuring 57 percent of the hogs would decrease the sampling cost by \$2820/year or \$0.027/hog but at the expense of a lower level of accuracy.

Kliebenstein, James, Brent Hueth, and Maro Ibarburu. 2007. Business Organization and Coordination in Niche Hog Marketing. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: <http://www.agmrc.org/NR/rdonlyres/0D9B7914-3CB9-43CA-9C24-DF9FCEDCF399/0/marketing-specialtyhogs.pdf>

Pork Management Systems

- ❑ Niche market producers could benefit from better utilization of record systems, according to results from an educational assessment. First, there is a lack of understanding of the need for using organized record systems and the economic benefits that these systems can offer. Second, few niche market producers currently are using any computerized sow management system. However, as input costs have been rising steadily, there is increased interest in determining and managing the pig flow and cost structure in the cooperating niche market farms. It will take a long-term, carefully focused effort for

these farms to transition from more traditional production attitudes to a more business-oriented mindset.

❑ Tools developed to assist in these efforts include:

Sow Group Tracker software to help producers lower costs of production by more efficiently managing their sow herd, labor, facilities, and other resources

Educational materials describing different market access or value-added programs and their requirements

Stewardship Management System program (a curriculum and manual showing producers how to develop management systems for their farms), which focuses on continuous process improvement that helps farmers see cost saving benefits in nutrient management, labor efficiency and cost of production tracking, and

Management System Template developed by the Iowa Beef Center along with training for extension field staff in farm management, agricultural engineering, and beef, pork, and dairy production in the use of the template.

Lawrence, John, John Mabry, and Mary Holz-Clause. 2008. Functional Quality Management Systems for Livestock Producers. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.leopold.iastate.edu/research/marketing_files/2007grants.htm

Sow Group Tracker link: <http://www.ipic.iastate.edu/information/ST.brochure.pdf>



Niche Poultry

Meat Quality and Production System

- ❑ A survey was done to compare certain features of organic, free-range, and conventional broiler chickens. The survey yielded these results:
- * Ultimate pH (pHu) for organic breast meat was higher ($P < 0.05$) when compared to free range and conventional. Organic thigh meat pHu was only higher ($P < 0.05$) than the free range.
 - * Raw organic breasts and thighs were lighter and less yellow ($P < 0.05$) in color when compared to free range and conventional.
 - * Raw free range breast and thigh thiobarbituric acid (TBA) values were lower ($P < 0.05$) when compared to that of organic and conventional.
 - * Protein composition of raw organic and free range light and dark meat was higher ($P < 0.05$) compared to conventional.
 - * Cooked color values for organic and free range breast, thighs, and skin remained less ($P < 0.05$) yellow compared to conventional.
 - * Cooked organic breast and thigh protein content was higher ($P < 0.05$) when compared to conventional, consistent with raw basis comparisons.
 - * Conventional and free range broilers yielded a higher ($P < 0.05$) percentage of breast meat compared to organic.
 - * Free range whole carcass cooked yields were similar to organic ($P < 0.05$) but higher when compared to conventional.
- ❑ Fatty acid analysis showed that organic breasts and thighs were lower ($P < 0.05$) in saturated and mono-saturated fatty acids and higher ($P < 0.05$) in polyunsaturated, omega-3 and omega-6 fatty acids when compared to free range and conventional. Additionally, organic breasts and thighs yielded higher percentages of omega-3 and omega-6 fatty acids.
- ❑ A trained sensory panel evaluated breasts and thighs for chicken aroma, tenderness, chewiness, moistness and chicken flavor. Results from the panel indicated that conventional thighs were more tender ($P < 0.05$) and less chewy ($P < 0.05$) when compared to thighs from free range and organic broilers. Other sensory parameters were not significantly ($P < 0.05$) different among attributes for breasts and thighs.

Sebranek, Joseph G., Ryan Husak, Dong Ahn, and Sam Beattie. 2007. A survey of commercially available broilers originating from organic, free-range and conventional production systems for cooked meat yields, meat composition and relative value. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.leopold.iastate.edu/research/marketing_files/workshop06/presentations/poultry.pdf



Place-Based Foods

Iowa Foodways Project

According to research done by the Iowa Foodways Project: Taste of Place, most of the foods that Iowans and others identify with Iowa fall into four categories.

1. Food that is grown and processed in Iowa and has a heritage basis such as pork tenderloins, Maasdam's sorghum syrup, Amana® rhubarb wine, mettwurst, black walnuts, Muscatine melons, and pawpaws.
2. Food that is processed here and has a heritage basis such as Dutch letters, lefse, kolaches, Swedish pancakes, Norwegian kringle, Danish aebleskiver, Mexican flour and corn tortillas, and other ethnic dishes.
3. Food that is grown and processed in Iowa but has no substantive heritage basis such as several kinds of salsa, cows' milk and goat milk cheese from Cresco and the Goat Sisters, Java chickens and most other heritage poultry, emerging vineyards and wineries, a variety of local organic and natural dairy products, and farmed fish from western Iowa.
4. Food that is grown and processed here that does have a heritage basis but is not produced organically or naturally. Examples are buffalo from northwest Iowa, Amana® meats, pork tenderloins, Maidrite® sandwiches, hybrid sweet corn, and soy nuts.

Saltzman, Rachelle H. 2006. Taste of Place: Place-based Foods in Iowa. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.leopold.iastate.edu/research/marketing_files/workshop/abstracts/PlaceBasedFoods.htm
Iowa Place-Based Food: http://www.iowaartscouncil.org/programs/folk-and-traditional-arts/place_based_foods/index.htm

Iowa's Geography of Taste

- ❑ In 1920, the number of different crops produced for sale on at least 1 percent of all Iowa farms was at a high of 34 crops. In 1997, the number of different crops fell to just ten.
- ❑ Most Iowans are not aware that Iowa was a top apple-producing state through the 1920s and that the Delicious apple is of Iowa origin.
- ❑ For the past decade the percentage share of the market for the Delicious apple has waned significantly, as other varieties have become more popular with U.S. consumers.
- ❑ Harrison County, in particular the hilly areas in the bluff-line along the Missouri River near Mondamin, was known to be one of the best Jonathon apple-producing regions in the country during the early part of the 20th century.
- ❑ Iowa was the sixth-largest grape producing state in the nation in 1919, with more than 12 million pounds produced. Historically, one of the largest commercial grape-growing regions in Iowa was within the Missouri Loess soil area near Council Bluffs.
- ❑ The sandy soils along the Mississippi River south of Muscatine have been renowned since the late 1800s as a source of exceptionally sweet and juicy melons.
- ❑ A number of Germans who settled in Scott County near the Mississippi River began growing onions after the Civil War. By the 1920s, the Pleasant Valley section of Scott County and the St. Ansgar area in Mitchell County were the two most prolific onion-producing areas in Iowa.
- ❑ Ida and Sac counties remained the primary popcorn growing regions in Iowa in the 1920s. In 2002, Iowa's popcorn was grown primarily in western Iowa with Sac, Crawford, and Monona as the production leaders.
- ❑ More than 80,000 acres of potatoes were cultivated in Iowa in the mid-1920s, while the 2002 Agricultural Census indicated that there were slightly more than 1,000 acres in production.
- ❑ According to a 1922 report, Iowa led the world in canned sweet corn production. In 1924, Iowa processed locally grown sweet corn at 58 canning factories in 36 different counties. According to the 2002 Agricultural Census, sweet corn is produced on nearly 4,900 acres on 462 Iowa farms.

- ❑ Throughout the 1930s, southeastern Iowa was part of the commercial sweet potato-growing region for the central states—one of three primary sweet potato growing regions in the United States.
- ❑ In 2004, 27 food festivals were held across Iowa. Of these food festivals, five featured apples, 11 featured sweet corn, four featured strawberries, and seven featured watermelons.

Pirog, Rich and Zach Paskiet. 2004. A Geography of Taste: Iowa's Potential for Developing Place-based and Traditional Foods. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: <http://www.leopold.iastate.edu/pubs/staff/files/taste.pdf>

Muscatine Melons

- ❑ An estimated 90 percent of the open-pollinated melon varieties available 100 years ago are extinct and today growers in the Muscatine area plant the same varieties as in other parts of the country.
- ❑ By 1921, production of melons from Muscatine County totaled 750 carloads of watermelons, produced on around 2,000 acres of land; and 100 carloads of muskmelon and cantaloupe, grown on around 500 acres.
- ❑ The number of farms growing cantaloupe and watermelons, like most U.S. agricultural products, fell dramatically from the 1960s to today. By 2002, there were only about 17,600 farms compared to 36,800 in 1964. The number of acres where cantaloupe is grown has remained relatively constant at about 105,000 to 115,000 acres. Watermelon acres, however, have fallen nearly one-third to 165,000 acres. California and Texas alone contribute about 117,000 acres from 2,300 farms. In Iowa, both the number of farms and acres have fallen by a little more than half since 1964. In 2002, there were 155 farms in Iowa growing cantaloupe and watermelon on 623 acres.
- ❑ Per capita melon consumption from 1970 to 2000 rose about 25 percent from 21.6 lbs. to 26.9 lbs. Demand has increased as a result of Americans making more healthy food choices with products available year-round. Approximately 40 percent of this increase has come from imports.
- ❑ Cantaloupe per capita consumption has approximately doubled over the past 20 years from 5.8 to 10.8 lbs./person. Roughly one-half of the increase in demand is met through increasing imports as consumers want a product available year-round.
- ❑ According to the U.S. Department of Agriculture, there are 12 commercial melon growers left in Muscatine County who are producing cantaloupe and watermelons on 107 acres. There likely are another 10 to 20 producers growing small quantities.
- ❑ The Muscatine Island Grower's Association had 50 dues-paying members for 2004, of which about 30 were actual producers. Twenty years ago there were three times as many: 120 members, 90 of them growers. All of the association growers have small-scale operations of ten acres or less.

Futrell, Sue and Craig Chase. 2004. Muscatine Melon: A Case Study of a Place-based Food in Iowa. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.leopold.iastate.edu/research/grants/files/2004-MSP9_melon.pdf



Transaction and Business Costs

Capital Flow to Niche Ag Producers

- ❑ How does capital flow to niche agriculture producers in Iowa? A survey administered to potential providers of capital to niche agricultural producers yielded these results:
 1. Primary reasons for funding rejections are lack of applicant collateral, weak/nonexistent business plan, and failure to meet funding criteria.
 2. Improving the flow of capital to producers calls for increased technical assistance and more capital being available to the granting agency.
 3. Little technical assistance is being offered by providers of capital.
 4. The flow of capital is limited because dissemination of information is scarce; few, if any, applicants have a comprehensive understanding of capital availability; and funding agency advertising likely fails to reach many producers.

- ❑ Niche agricultural producers also were asked about their knowledge of the flow of capital. Their survey responses showed that:
 1. Producers are most familiar with capital from the U.S. Department of Agriculture, friends/family, community banks, and savings. Producers are not familiar with other potential sources of capital.
 2. Capital is obtained primarily from USDA, friends/family, community banks, and savings. Few other sources of capital are accessed.
 3. Community banks are the most common source of technical assistance. Few other agencies are used for technical assistance.
- ❑ Findings from the two surveys were combined to illustrate both aspects of the flow of agricultural capital. These were the joint results:
 1. Information dissemination appears to be ineffective.
 2. Little coordination occurs between funding agencies.
 3. The gap in providing technical assistance to applicants is significant.
 4. Producers are likely to acquire capital from those lenders who are familiar to them.

Van Auken, Howard. 2008. Development of a Niche Agriculture Small Business Money Map and Process to Disseminate Information. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: <http://www.leopold.iastate.edu/research/grants/2008/M2007-06.pdf>

Selling Local Food to Retail, Foodservice Markets

- ❑ Producers face a gap between the growing demand for local foods in larger markets and the high volume of food supplied to distributors from non-local sources. Foodservice distributors were interviewed and provided these thoughts about the future for local food.
- ❑ Distributors recognize a need to consider buying locally.
- ❑ Producers would benefit from meeting with distributors to learn what products the distributors' clients want to buy.
- ❑ Consistent quality and quantity of product supplies are important to food distributors, although they recognize that some high-demand products are seasonal.
- ❑ Producers need to follow basic guidelines regarding storage, packing, and shipping of products to maintain quality and offer ease of handling.
- ❑ Formation of producer supply groups would facilitate contacts with and shipments to distributors.
- ❑ Responses from foodservice distributors suggest that their customers would prefer products that are locally grown as long as the supply is consistent or predictable for seasonal products. Supply and consistency problems could be mitigated with more effective coordination between producers and distributors. Ultimately, producer supply groups may be able to provide adequate and consistent supplies, and the presence of sales managers acting as intermediaries would help improve communications with the distributors.

Hardy, Connie and Mary Holz-Clause. 2008. Bridging the Gap: What Does It Take to Bring Small- and Medium-sized Producers and Retail and Foodservice Distributors Together? Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: <http://www.leopold.iastate.edu/research/grants/2008/M2006-05.pdf>

Restaurant Operations and Iowa Growers

- ❑ Research consisting of interviews with ten local and independently owned restaurants in Iowa and a mail survey of chefs and managers in foodservice organizations showed that time until de-livery was longer for local products with an average of 1.4 days compared to 0.76 days from national sources.
- ❑ The time spent sourcing local products was 128 hours, compared to 92 hours for national products.
- ❑ The study also showed that actual food costs per pound of all foods purchased were lower for local foods at an average of \$3.80 per pound compared to \$4.30 per pound for products from national vendors.
- ❑ Average receiving time was 8.3 minutes with the local supplier compared to 8.2 minutes with national supplier. The researcher found that local deliveries may be longer due to the relationships that

have been developed between the vendor and purchaser or that some time was spent discussing availability of products.

❑ When offered menu choices between local products and national products, the 323 patrons surveyed showed some willingness to pay a premium for local food. The local menu option was selected by 41 percent of the participants, with about 45 percent being unwilling to pay a premium, 31 percent accepting a \$1 premium, and 24 percent willing to pay \$2 extra.

Sharma, Amit. 2007. Economic Viability of Local Food Marketing for Restaurant Operations and Growers/Producers in Iowa. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.leopold.iastate.edu/research/marketing_files/workshop06/abstracts/EconomicViability.html

Transaction Costs Case Studies

❑ “Buying local” is perceived by many consumers as benefiting the economy as well as themselves, both in terms of obtaining quality foods and supporting local producers. Another basis for supporting local foods may be that food distributed locally is viewed as more energy-efficient because it has been hauled fewer miles.

❑ Farmers or groups of growers and processors gave some consideration to the individual cost components that are considered to be transaction or logistics costs when they determined which customer groups to serve and which to forgo. However, few made a conscientious effort to compile or measure separately the costs involved in physically fulfilling a transaction.

❑ The locally grown label presents both an attractive selling point and a challenge in terms of logistics costs. Because of the physical differences in delivery vehicles, transportation costs for local foods are likely to be higher than those for food products delivered to grocery stores and restaurants by the semi-truckload.

❑ Local producers often are providing superior products—in terms of taste, freshness, and variety or in perceived benefits, including “customized delivery”—compared to mass-market grocery stores. Their pricing and promotion need to highlight the enhanced value of their products.

❑ Despite local growers’ expressed concerns about discount outlets, additional analysis probably will show distinct product and service differences between the two types of businesses. The local producer often is not in direct competition with the discounters.

Walter, Clyde K. and Randy Boeckenstedt. 2007. Case Studies and Benchmark Transaction Costs for Select Food Products. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: <http://www.leopold.iastate.edu/research/grants/files/2006-M02.pdf>



Other Research

Organic Feed Costs

- ❑ Based on information from organic corn producers in Iowa, buyers were paying 1.6 times more (about \$5.45/bushel) for organic corn than conventional corn in late 2005. Prices have moderated somewhat since that time, with prices about \$5.00/bushel in Fall 2006.
- ❑ The organic soybean meal market has behaved similarly to the organic corn market. Price fluctuates considerably and its availability can vary from year to year. For an assumed price of \$604.5/ton, organic soybean meal (48 percent protein) carries a premium of 2.1 times the regular soybean meal price.
- ❑ Annual cost per acre of organic grass-legume pasture is \$113.69 assuming a productivity of 3 tons/A of dry matter and \$0.19 per pound of harvested forage. As budgeted, the organic costs per acre and ton are less than for the conventional pasture in which fertilizer and pesticide are used.

Lawrence, John D., Margaret Smith, and Nicolas Acevedo. 2006. Organic, Natural and Grass-Fed Beef: Profitability and Constraints to Production in the Midwestern U.S. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.iowabeefcenter.org/content/Organic_Natural_Grass_Fed_Beef_2006.pdf

Natural Dyes

- ❑ A 2003 study on natural dyes showed that natural dyes are able to produce strong, clear color that is suitable to consumer use. Of the dyestuffs studied, 25 are potentially able to produce marketable natural dyes. These dyes produce good color and met minimal performance standards for colorfastness to light and washing. Color consistency from year one of the study to year two or from source one to source two was not acceptable. Possible sources of variations in dye lots include growing conditions, soil type and condition, mordanting, extraction, and dyeing.
- ❑ Potentially marketable dyestuffs include apple bark, apple wood, apple twigs, asparagus, blue grass seeds, bracken, chamomile, carrots, elderberries, elm bark, geraniums, goldenrod, grapes, henbit, horehound, horseweed, Jacob's ladder, lambs quarter, mint, mums, onions, pears, pear bark, tomatoes, walnuts, watermelon, wild marjoram, and white heath aster. Some are listed more than once, because different components were used.

Kadolph, Sara J. 2004. Identification of Plant Residue with Commercial Potential as Natural Dyestuffs. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: [http://www.leopold.iastate.edu/research/grants/2005/2003-M6_Plants_For_Dyes_\[Other_\]pdf](http://www.leopold.iastate.edu/research/grants/2005/2003-M6_Plants_For_Dyes_[Other_]pdf)

Energy Systems in Agriculture

- ❑ This project estimated the energy needs of commercial aquaculture and greenhouse operations to determine if there would be sufficient waste energy from Iowa's dry-grind ethanol plants to provide a significant portion of the total energy requirement for either operation. Key issues identified include: selection of high-value crops or fish species; sufficient low-cost energy to overcome the high cost of heat and light during the winter months; planning for back-up power sources; and assurance of coordinated management between the ethanol plant and greenhouse/aquaculture facility to avoid costly mistakes.
- ❑ In selected regions in the United States, both greenhouse and aquaculture facilities have been operated next to power plants to reap energy savings by using waste energy from the plant. This arrangement can be beneficial, but some operators have experienced problems that forced their operations to close. Because power plants need to shut down periodically for maintenance, interruptions in power to greenhouses have killed the crops, resulting in large financial losses. Similarly, aquaculture operations have suffered fish kills after chemicals in the water coming from the power plant were transferred directly into the fish tanks.
- ❑ Coordinated management of both facilities is required and back-up heaters are a must. Water from the power plant should be used only as a source of heat, not as a water supply for either greenhouses or aquaculture tanks.

❑ Heat energy from a 50-million gallons-per-year plant could be gathered from flue gas, resulting from burning of natural gas to power the plant, and from water in the cooling towers that cool the fermenters. Stack flue gas could yield 6 to 12 million Btu/h, and cooling tower water could yield 3 to 5 million Btu/h. This amount of heat energy could heat up to five acres of greenhouses on Iowa's coldest days or up to 100 30,000-gallon aquaculture tanks at an ambient temperature of 65 degrees Fahrenheit.

Hansen, Ray and Connie L. Hardy. 2008. *Potential to Operate Greenhouses and Aquaculture in Conjunction with Iowa's Ethanol Plants*. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: http://www.leopold.iastate.edu/research/marketing_files/workshop08/present/greenhouse.pdf
<http://www.leopold.iastate.edu/research/grants/2008/M2007-08.pdf>

Food Safety - Local and Organic Food

❑ Iowa State University Extension developed a one-day workshop to help local food producers interested in selling products to foodservice operations better understand the needs and concerns of these potential buyers. This project created messages and materials to illustrate food safety concerns of retail foodservice operators and increase awareness of on-farm safe food handling, thus leading to greater potential for direct marketing.

❑ Information was provided on a Web site with information from the workshops; a workshop manual with helpful information for producers to use in establishing an on-site food safety plan and in approaching the foodservice market; and a series of ISU Extension publications that address procurement regulations Iowa foodservice establishments must follow when purchasing foods, on-farm food safety practices a producer should follow with information on how to work with foodservice establishments, and information for retail foodservice establishment buyers.

Strobehn, Catherine H., Sam Beattie and Neric Smith. *Safe Food Handling Practices on the Farm: Meeting the Needs of Foodservice Operations*. 2008. Ames, IA: Leopold Center for Sustainable Agriculture.

Find it on the Web: <http://www.iastatelocalfoods.org>



Food System Tools and Resources

Iowa State University Extension publications

Find all publications at: <https://www.extension.iastate.edu/store/>

On-farm Food Safety: Guide to Good Agricultural Practices (GAPS), PM 1974a

On-farm Food Safety: Guide to Food Handling, PM 1974b

On-farm Food Safety: Guide to Cleaning and Sanitizing, PM 1974c

Iowa Vegetable Production Budgets, PM 2017

Web-Based Tools

U.S. Food Market Estimator <http://www.ctre.iastate.edu/marketsize/>

Iowa Market Maker <http://ia.marketmaker.uiuc.edu/>

Iowa Produce Market Potential Calculator <http://www.ctre.iastate.edu/produce/>

Produce Profitability Calculator <http://www.iastatelocalfoods.org/calculator>

Users Manual http://www.leopold.iastate.edu/research/marketing_files/profitability_0108.pdf

Where Do Your Fruits & Vegetables Come From? <http://www.leopold.iastate.edu/resources/fruitveg/fruitveg.php>

Useful Web Sites

Iowa Beef Center <http://www.iowabeefcenter.org> ISU Viticulture <http://viticulture.hort.iastate.edu>

Iowa Pork Industry Center <http://www.ipic.iastate.edu> Value Chain Partnerships <http://www.valuechains.org>

Organic Food Processing <http://www.organicfoodprocessing.org>

