

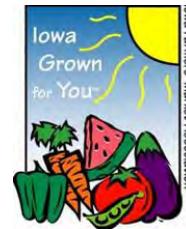
Iowa Commercial Horticulture Food Crop Survey Results

2015 data compiled for release spring of 2017

By Arlene Enderton, Corry Bregendahl, Dave Swenson, and Leigh Adcock
Production by Alexa Wahl and Alice Topaloff
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Photo: Linda Naeve

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Executive Summary

The Iowa Department of Agriculture and Land Stewardship commissioned three Iowa Commercial Horticulture Surveys for Food Crops to track the edible horticulture industry in Iowa (1989, 2000, 2015). Data and conclusions are drawn from the 2015 survey, based on responses from 882 horticulture farmers. The 2015 survey data was collected in 2016 and compiled and analyzed for release in the spring of 2017.

Here are some highlights from the survey:

- **The majority of Iowa's edible horticulture farmers are new** (10 years or fewer) to horticulture production, although some may have farmed commodity crops prior to engaging in horticulture production.
- However, **while beginning horticulture farmers are replacing retiring horticulture growers in terms of number** (a trend contrary to commodity agriculture), **these new horticulture farmers are not farming as many acres.**
- **Most horticulture farms are 2 acres in size** (the median farm size), unchanged in the past 15 years. What *has* changed is the **average horticulture farm size, which decreased from 13 acres in 2000 to roughly 8 acres in 2015.**
- We see a statistically significant difference in terms of crop diversity by farm size. **Farms sized more than 10 acres produce more crops on average (seven) than smaller farms (five).**
- **The top five crops in 2015** based on the number of (responding) farms producing them were tomatoes, pumpkins, cucumbers, green beans, and winter squash. In 2000, sweet corn was the top crop, followed by tomatoes, green beans, cucumbers, and sweet peppers.
- **Melon production declined markedly from 2000 to 2015**, with possible causes being high labor costs, volatile markets, local land development, and competition from melon producers in other states and countries.
- By contrast, **grape production was up significantly from 2000 to 2015**, a change attributed to the rise in wine grape production.

Iowa's horticulture producers use a variety of markets (an average of two) to sell their products. About **half market exclusively through direct-to-consumer markets** including farmers markets, farm stands, community supported agriculture, you-pick, and online sales. However, **reliance on sales direct-to-consumers has been shifting to more wholesale markets** given that farmers markets in particular, while widely used by horticulture farmers, yield relatively less in sales than other kinds of markets. **The top four markets by dollar value of sales were wholesale-type markets**, including brokers and wholesalers, contract processors and buyers, retail stores and groceries, and produce auctions. **Beginning horticulture producers are more likely**

to sell exclusively through wholesale markets than more experienced growers, primarily because opportunities abound for new growers to sell wine grapes and vegetables to contract buyers and processors as direct markets become saturated. Finally, **marketing options vary by crop or cropping system**. For example, more high-tunnel produce is sold at produce auctions. More grapes and aronia berries are sold to contract processors and buyers. Aside from these and honey, all other crops are sold primarily through farmers markets.

We drew these conclusions about industry-associated economic activities and impacts:

- Total edible horticulture sales of survey respondents doubled from nearly \$10 million in 2010 to nearly \$20 million in 2015. More than half of farmers reporting in both 2010 and 2015 (nearly 400) saw a 10 percent sales increase.
- Despite these data, all three surveys show producers derive only a small percentage of their gross income from the sale of horticultural crops. In 1989, nearly one in five received 1 percent or less of their income from horticulture sales; in 2015, nearly half did. On the flip side, in 1989, 14 percent derived 71 percent or more of their gross family income from horticulture whereas only 4 percent did in 2015. While sales are increasing, producers are deriving less gross family income from horticulture production.
- Responding farmers generated nearly \$30 million in direct sales and an additional \$20 million in value-added commerce (such as labor income, returns to farm owners and investors, and tax payments) for a total of nearly \$50 million in economic activity. Of this, 306 jobholders earned \$13 million in labor income.
 - These results were used to make estimates for the entire population in the state of Iowa. In 2015, Iowa's horticulture industry generated \$48 million in direct sales and an additional \$32 million in value-added commerce. Of this, 503 jobholders received more than \$21 million in labor income, much earned and spent locally.

This report will be useful to growers, consumers, policy makers, educators, and researchers working to foster enhanced commercial opportunities for Iowa's diverse edible horticulture producers.

Introduction

Horticulture is the art and science of producing, improving, marketing, and using fruits, vegetables, flowers, and ornamental plants for human use.

Nearly three decades ago in 1989, the Iowa Department of Agriculture and Land Stewardship (IDALS) conducted the first Iowa Commercial Horticulture Survey for Food Crops to fill information gaps about the industry. The USDA's Census of Agriculture, administered every five years, is the primary tool for measuring agricultural production. However, it only gathers data on the number of farms and acres by type of crop as well as sales, which makes the information gathered for the Iowa Commercial Horticulture Survey for Food Crops especially useful.

Those seeking more detailed data on horticultural crop production (such as pounds of produce and market outlets) have had to rely on other tools for such information. Yet, no survey measures have been administered on a consistent or regular basis, nor have they been comprehensive in scope. Take horticultural crop marketing channels, for example. Below are four “big buckets” of marketing venues for edible horticultural crops.

- 1) Direct sales to individuals (CSA, farmers markets, farm stands, etc.),
- 2) Sales to restaurants and retailers,
- 3) Sales to institutional and/or residential food service such as schools, hospitals, care facilities, and prisons, and
- 4) Sales to intermediaries including food hubs, wholesalers, processors, and brokers.

As recently as 2012, the USDA's Census of Agriculture measured agricultural sales direct to individual consumers (1) but not sales regarding (2), (3), or (4). The USDA Farm to School Census began collecting data on school participation in farm to school activities in 2011 (part of 3). Data also have been collected by the Economic Research Services (ERS)/NASS Agricultural Resource Management Surveys from 2008 to 2011, but those

reports gathered data only on (1) and (2) but not (3) or (4). In response, by mid-2016 the USDA began conducting a Local Food Marketing Practices Survey that included local food sales in all four market categories. However, most data is available only at the multi-state regional and national levels. This makes it difficult to draw useful conclusions about change in the industry at the state level, although some limited data is available.

The Iowa Commercial Horticulture Survey for Food Crops is meant to fill that gap. The survey, conducted by IDALS in 1989, 2000, and again in 2015, has been modified along the way in response to changes in the commercial horticulture industry. Each of the three surveys focused on edible horticulture, as opposed to all horticulture, thus removing ornamental plants and (inedible) flowers from the analysis. Furthermore, the surveys focused on commercial production, which encompasses these crops that enter the formal economy.

The 2015 project team strived to maintain the same data collection protocols used in past surveys. This included attempts to do a census of all horticulture farmers as opposed to a select subset of farmers (based on earlier protocols which were chosen presumably because differences among horticulture farmers are vast, thus making it difficult to make generalizations based on a select sample). We chose to invite all growers who produced and sold horticultural crops in 2015, irrespective of the value of their sales. Thus, even growers who might not meet the USDA definition of a farmer (having annual gross sales of \$1,000 or more) could respond. These data supplement and inform previous studies on the economic impact of local food production in Iowa¹⁻⁸ as well as USDA Census of Agriculture data collected on the number of farms and acres in horticultural crop production in Iowa.



Photos: Hannah Fisher

History of Horticulture Crop Production

This section offers a brief history of horticultural crop production in Iowa, from the 1800s to today.

Indigenous and Immigrant Crop Production

Edible horticultural crop production in Iowa has a long and varied history, beginning with Iowa's first people. Although we know little about the extent to which crop production was commercialized through trading or bartering, 20 Indian tribes cultivated their own food crops in what we now know as Iowa prior to the arrival of white Europeans in the mid-1800s⁹. These tribes maintained wild varieties of domesticated plants to cross-pollinate, developed varieties best suited to specific micro-climates, and practiced plant breeding long before European settlement¹⁰. And while European immigrants brought coveted seeds for food to plant in the new world¹¹, they also brought with them aggressive weeds and plant diseases, all of which threatened the survival of indigenous flora. Moreover, federal military, farming, and Indian resettlement policies changed indigenous plant production in short order. Native corn varieties, beans, and other crops were supplanted in the 1800s by new crops, including apples, grapes, potatoes, popcorn, and sweet corn.

By the 1920s, Iowa was a top apple-producing state¹¹. Nearly 10 million bushels represented peak apple production in Iowa in 1911¹². Apple production declined from that point as row crop production well suited to Iowa's flat land increased. Other states, such as Washington, Michigan, and New York, took over much of the nation's apple cultivation. Apple production in Iowa, along with other types of fruit tree production, was ultimately dealt a nearly lethal blow by a killing freeze in 1940, which wiped out many of the fruit trees¹³.

At the height of apple production in 1919, Iowa also was the sixth largest grape-growing state in the nation, producing more than 12 million pounds¹¹. According to the ISU Midwest Grape and Wine Industry Institute, there were three primary reasons why Iowa's grape industry disappeared in the mid-1900s:

- 1) The Armistice Day blizzard on November 11, 1940, that also destroyed Iowa's apple industry;
- 2) Iowa's crop base moved to more row crop production, due, in part, to the USDA farm subsidy programs;
- 3) Starting in the mid-1940s, row crops and grapes were no longer compatible field neighbors due to the use of the highly volatile 2,4-D herbicide formulations on corn and pastures that severely damaged grapevines¹⁴.

After a precipitous decline and years of languishing, vineyards once again have flourished from 2000 to the present. In 2000, Iowa had approximately 30 acres of grapes in production. By 2015, there were 97 wineries and 300 commercial vineyards covering over 1,250 acres in Iowa¹⁴.

Other horticultural crops (melons, onions, popcorn, potatoes, squash, sweet potatoes, corn, and various fruits) also have been historically significant to Iowa, many reaching peak production in the 1900s. After the Civil War, settlers of German descent began growing onions in Scott County along the Mississippi flood plain, with 500 acres in production in the 1920s¹¹. At the same time, more than 80,000 acres of potatoes were grown in Iowa, whereas the 2012 agricultural census showed slightly more than 1,000 acres in production^{11,15}. The popcorn industry exploded in west central Iowa's Ida and Sac counties in the 1920s, and remains strong today. In 2002, six counties produced between 2.5 and 6.1 million pounds of shelled popcorn.

A second wave of white European immigrants had further impact on the state's horticultural production. Old Order Amish immigrated to Kalona in 1846, while Old Order, New Order, and Beachy Amish and Mennonites settled in various parts of the state. Amish and Mennonite agriculture in Iowa has been highly intense and resilient¹⁶. Amish farms are typically small (80-160 acres), produce much of their own food, and are labor-intensive, relying on the farm family to carry out the majority of work.

Unfortunately, no source of aggregate data conveys the overall contribution of Amish farmers to Iowa's horticulture production. However, the Iowa Amish often host large produce auctions, which pool products from Amish and non-Amish farmers alike. These horticulture products are purchased and resold at farmers markets and to individuals, retailers, and other high-volume buyers. According to the Cedar Valley Produce Auction's website, the auction sells more than \$3 million of flowers, fresh produce, and some bulk foods at wholesale prices annually¹⁷. A report produced by the Leopold Center for Sustainable Agriculture (LCSA) at Iowa State University lists four Amish- or Mennonite-led produce auctions in Iowa¹⁸.

Edible Horticultural Crop Processing

Along with horticultural production comes the need for the companion industry of food processing. In 1922, Iowa led the world in canned sweet corn production¹⁹ with 58 canneries in 36 counties²⁰.

The Meskwaki Food Sovereignty Initiative

Food is central to every culture. For the Meskwaki Nation, reviving their rich traditional foods heritage is a matter of survival: not just of foodways and indigenous knowledge, but to combat modern diet-related health concerns, such as obesity and diabetes.

In 2012, this community of 1,400 tribal members living on 8,000 acres of land they own in east-central Iowa began the process of planning for food sovereignty: the right to define sustainable and culturally appropriate food and land policies. The resulting strategic plan states: "The community and the Meskwaki Tribal Council identified the creation of a sustainable community food system as a priority in ensuring the long-term success of the Tribe."

According to local foods coordinator Mary Augustine, who began her work in February 2015, the Meskwaki Food Sovereignty Initiative has been so successful that they have accomplished several of their goals earlier than planned.

The Initiative consists of four elements:

- **Red Earth Gardens** is a tribally run organic production farm, begun in 2013 on 40 acres of land formerly in corn and soybeans. "We will complete our organic certification at the farm in 2017," Mary said. The farm provides economic and community development opportunities, workforce development, and healthy food. The farm sells produce to the tribal casino, local HyVee grocery, at a farm stand on the settlement, the Toledo farmers market, and through shares in a "tribally supported agriculture (TSA)" program structured like a CSA. "It's a good way for people to interact, walk around the farm, and get to know what's happening in each season," said Mary.
- The **Elder Garden** is connected to the Meskwaki Senior Center. Community volunteers work with residents to grow traditional foods (corn, beans, squash) and organic vegetables that are incorporated into their daily lunches. The elders have passed down traditional seeds and the knowledge that goes with them, of Meskwaki planting techniques and other indigenous farming knowledge. "The garden is an educational tool," Mary said the day she was interviewed. "Youth are drying squash out there [with the elders] this afternoon."

- Tribal youth also benefit from the third element, a robust **Farm to School** program. Students at the Meskwaki Settlement School (300 pupils in pre-K through 12) and the associated Meskwaki Youth Center help tend and use a large garden on school grounds. Similar to the Elder Garden, the youth grow traditional foods as well as organic vegetables from heirloom seeds, and the fruits of their labors are incorporated into school lunches. "Two or three times a month, we do a cooking club and traditional foods club with middle school and high school students," added Mary.

- Many other activities fall under the fourth element, **Community Education**. Mary and her colleagues offer community workshops throughout the year on gardening, canning, and preserving. They host four traditional foods meals per year, in celebration of the seasons. (The winter meal features wild game.)

The Meskwaki Food Sovereignty Initiative is lifting nutrition and cultural education into the mainstream dialogue of the tribe, and Mary has noticed an increase in the number of young people helping in their grandparents' gardens. She stressed that the Initiative is not introducing anything new to the community; rather, it is recovering and honoring a strong tribal tradition of "growing really amazing food here on the settlement." She said that the Meskwaki Nation is a tribe with a strong horticultural tradition.

"Cultural preservation is key," she said. Growing food has been a long-standing tradition of the Tribe. Tribal lifeways teach that all the tribe's needs are provided for, both in the physical and spiritual sense. "Farming started early at the settlement, and our creation stories and ceremonies all have to do with farming and food."

To learn more, visit <http://www.meskwaki.org/LocalFoods.html>. Facebook: Meskwaki Food Sovereignty Initiative



Photos: Meskwaki Food Sovereignty Initiative

Early large-scale horticulture production in Iowa focused on efficient use of a well-developed food transportation and logistics infrastructure to reach markets across the country. The canning industry appeared in Iowa in the late 1870s and expanded steadily, as agriculture grew more industrialized. Meanwhile new and improved processing and distribution techniques such as frozen transport and canning technology were developed. Iowa had 17 canneries by the turn of the century, and 52 by 1923²¹. However, when farmers switched from growing sweet corn to growing feed corn for animals and ethanol production, this spelled the end of Iowa's canning industry²². According to the 2012 Census of Agriculture, 94 percent of harvested cropland in Iowa was field (not sweet) corn and soybeans, while only 0.05 percent was in edible horticultural crop production (vegetables, orchards, and berries). Organic Sno Pac™ and conventional Birds Eye™ are frozen vegetable companies sourcing heavily from Iowa. In 2013, frozen food processor Iowa Choice Harvest was started by 13 Iowa farmers, and sources product (sweet corn, apples, aronia berries, and carrots) only from Iowa²³.

Edible Horticultural Crop Production and the Local Food Movement

Since the 2000 survey, the local food movement, with its focus on place-based foods, shortening the distance from farm to plate, and food insecurity, has brought renewed interest to horticultural crop production in Iowa. Place-based food production relies on producing differentiated products resulting from a unique combination of geography, climate, history, soils, and culture.

Historical Highlights of the Iowa Local Food Movement

Much of the history of the local food movement in Iowa dates back to the mid-1980s. The movement stemmed in part from three forces:

- 1) the economic farm crisis,
- 2) emerging environmental awareness, and
- 3) growing desire in Iowa and the nation as a whole to preserve and strengthen traditional ties to the land—as well as create new social

and economic avenues between rural and urban citizens and enterprises.

A host of initiatives, programs, non-profit organizations, and state legislation supporting this movement emerged in the mid-1980s and continues today. Described in this section are a few critical developments in how local Iowa food systems work.

In 1987, the Leopold Center for Sustainable Agriculture (LCSA) was established by the Iowa legislature as part of the Iowa Groundwater Protection Act. The act arose out of concern that the manufacture, storage, handling, and use of agricultural pesticides and fertilizers posed a threat to groundwater. The LCSA, funded by taxes on commercial pesticides and fertilizers, had a three-pronged mission to: 1) identify and reduce the negative environmental and social impacts of agriculture, 2) support new ways to farm profitably while conserving natural resources, and 3) work with Iowa State University Extension and Outreach to disseminate results. The LCSA started funding Iowa food systems research as early as 1996²⁶. In 2001, the Center's general competitive grants program was divided into four initiatives that now serve as the primary vehicles through which these objectives are achieved. One is the Marketing and Food Systems Initiative (MFSI). By 2002, MFSI helped support its first local foods-based working group—the Pork Niche Market Working Group—with funding from the W.K. Kellogg Foundation, the LCSA, Iowa State University, and Sysco Corporation²⁶. Over the next decade, the Center added seven additional local food, fiber, and energy working groups. Fourteen years later, only one remains; the Regional Food Systems Working Group.

The Regional Food Systems Working Group (RFSWG) began in 2003 based on a needs assessment of Iowa local food practitioners. They determined that they needed a mechanism to support education, conduct research, and facilitate partnerships to increase support of regional food enterprises. In 2006, the group shifted its focus from an issues-based group to one that engaged partners working in specific geographic areas²⁶. Grant funding then supported

What is local? Local foods usually are defined simply in geographic terms as those produced within a certain distance of where they are consumed. There is no commonly accepted definition of “local food,” although the U.S. Congress in the 2008 Farm Bill defined it as a food product that travels less than 400 miles from its origin or stays within state lines²⁴. Furthermore, locally grown food also is commonly defined in terms of the relatively shorter “distance” between farmers and consumers, i.e., through direct marketing arrangements or those in which there are far fewer intermediaries²⁵. Studies of “local food,” therefore, can be tricky given that one local food buyer may define local as within the state, while another may define it more narrowly within a 50-mile radius or simply knowing the farmer who produced the food. Unpublished results from a Leopold Center study^a showed that among buyers responding to a local food purchasing survey in 2013 (which included institutions as well as grocery stores and restaurants), nearly half of the buyers defined “local” as within a specified distance in miles of their institution, with an average of 113 miles cited.

^a For more information on how buyers define local, please see: Enderton, A. and Bregendahl, C. 2013 Economic Impacts of Iowa's Regional Food Systems Working Group. (2014). http://lib.dr.iastate.edu/leopold_pubspapers/36

the first regionally based group, called the Northeast Iowa Food and Farm Coalition. Shortly thereafter, two additional geographically based food groups received seed funding. Today, 20 initiatives representing 83 of Iowa's counties are participating members of the regional working group.

Grassroots Organizations and the Local Food Movement

Farmer participation in change efforts is a hallmark of Iowa agriculture. In the midst of the 1980s farm crisis, farmer Dick Thompson began hosting field days on his Boone County farm to share the results of his on-farm research trials with other farmers. After attending one of Thompson's field days in 1984, Larry Kallem invited Dick to present at a workshop on low-input farming. Following the workshop, farmers showed enormous interest in Thompson's on-farm work²⁷. In 1985, Thompson, along with his wife Sharon, and Kallem, formally created the farmer-led, non-profit group Practical Farmers of Iowa (PFI), with Thompson as president. The early mission of PFI was to help farmers 1) conduct their own on-farm research that promoted farm practices that benefited the economics and environment of the farm and farming community, and 2) share their ideas with the group²⁸.

Today the non-profit organization is fully independent, with a membership of nearly 3,000 and a staff of 15 based in Ames. The mission remains the same: to strengthen farms and communities through farmer-led investigation and information sharing. PFI's members represent a wide range of operations and beliefs, and include livestock, field crop, and fruit and vegetable farmers, as well as non-farming "friends of farmers." PFI holds over 100 farmer-led events each year, many of which directly address production of local foods, including fruits and vegetables. Peer-to-peer learning is an essential part of Practical Farmers of Iowa programming, including:

- PFI annual conference where fruit and vegetable farmers learn from each other via networking and formally organized sessions,
- Research Cooperators' Meeting where results are reported from applied on-farm collaborations between farmers and researchers,
- CSA workshop retreat,
- Dozens of field days and webinars, and
- PFI-organized mentorships and business planning for aspiring and beginning farmers, many of whom are interested in growing for local markets.

Two other important groups that play key roles in fostering learning among horticulture producers and stakeholders are the Iowa Fruit and Vegetable

Growers Association (IFVGA) and the Iowa Farmers Market Association (IFMA). The IFVGA was established in 1984 to promote the interests of fruit and vegetable growers. The group holds meetings, an annual conference, and field days, all of which are designed to provide growers access to information, and research through ISU Extension and Outreach, as well as offering networking and mentoring opportunities²⁹. The IFMA was incorporated in 2002 with the goal of increased networking, collaboration, and education among the state's farmers market managers and vendors, as well as educating the public on the benefits of purchasing locally grown fresh food. With an active board that meets regularly, IFMA currently has 63 members. The group holds an annual workshop, and provides speakers and expertise at other group meetings in the state.

In 1996, about a decade after the LCSA, Practical Farmers of Iowa, and the IFVGA emerged, a loosely organized group held a workshop for five community supported agriculture (CSA) producers in Iowa. Participants in the workshop saw a need for continued networking among CSA organizers and growers and with financial support from the USDA's Sustainable Agriculture, Research, and Education (SARE) program, a new group was created as the Iowa Network for Community Agriculture (INCA). During its lifetime, INCA served the needs of CSA growers and branched out to support other community food growers and local food system supporters. Although the group is now defunct, it served as a critical grassroots catalyst by providing information and enterprise opportunities to a growing peer network of local food farmers and champions interested in strengthening direct-to-consumer local foods marketing.

State Involvement in the Local Food Movement

In 1999, then-secretary of agriculture Patty Judge appointed a Local Food Task Force. This was the state of Iowa's first official foray into the local foods arena by a government agency. The task force researched and collected information on how Iowa foods were produced, processed, distributed, and consumed, and the impact these activities were having on Iowa's communities. A year later, then-Governor Tom Vilsack issued two executive orders authorizing the Iowa Food Policy Council (IFPC). This 21-member body set out to advance local food systems, enhance family farm profitability, and combat hunger and malnutrition³⁰. The primary goal was to identify policy actions that state and local governments could take to create opportunities in Iowa's food system. Governor Vilsack appointed Neil Hamilton, director of the Drake University Agricultural Law Center, to chair the effort.

The council secured a \$560,000 USDA grant to provide low-income seniors with coupons to purchase Iowa-grown produce at farmers markets³¹. It reported directly to the governor, who had goals of improved food security, diversified agricultural production, and expanded rural economic development. Six subcommittees and several task forces were formed, including the Food Security and Health Task Force, Institutional Purchasing Task Force, and the Promoting Local Foods Task Force³⁰. Activity of the IFPC halted in 2006 when the state's administration changed hands. In 2010, the W.K. Kellogg Foundation provided a one-year grant to continue the work of the IFPC in the form of the new Iowa Food Systems Council (IFSC)³⁰. Although now dissolved, the group was a non-profit food policy council whose mission was to recommend policy, research, and program options for an Iowa food system that supports healthier Iowans, communities, economies, and the environment.

Subsequent to the Iowa Food Policy Council's \$560,000 USDA grant to provide low-income seniors coupons for use at local farmers markets, the Iowa Department of Agriculture and Land Stewardship (IDALS) formally established the Senior Farmers Market Nutrition Program. Through annual grants from the USDA, this program complements its sister program, the Iowa Farmers Market Nutrition Program, designed for Women, Infants, and Children^a clients. The Senior Farmers Market Nutrition Program (also administered by IDALS) began in 1989. From 2001 through 2015, these programs have combined to support more than \$13 million in USDA food dollars moving from coupon-holders to participating market vendors for the purchase of locally grown fresh fruits and vegetables. The Iowa Senior Farmers Market Nutrition Program has one of the highest redemption rates in the nation—consistently more than 80 percent of all checks distributed.

In 2004, IDALS began to administer and distribute USDA funds through the Specialty Crop Block Grant Program. These grant funds are used to enhance the competitiveness of specialty crops (defined as fruits, vegetables, tree nuts, dried fruits, horticulture, and nursery crops). To date, the Iowa program has received more than \$2.6 million to fund various projects hosted and led by staff at the state's three public universities, the Iowa League of Resource Conservation and Development, Inc. (RC&Ds), IDALS, and other stakeholders.

In 2007, the Agricultural Diversification and Market Development Bureau of IDALS launched the Iowa

Farm to School Program, supported by \$80,000 from the Iowa legislature. The farm-to-school program encourages the purchase of locally and regionally produced or processed food to improve child nutrition and strengthen local and regional farm economies. The Farm to School Program—which continues to operate today—provides directories and resources for schools seeking to establish farm-to-school activities in their own districts.

Other state departments within Iowa also have administered important programs that have benefitted the local food movement. For example, the Iowa Wireless Electronic Benefit Transfer Project, overseen by the Iowa Department of Human Services, began in 2005. The program, which uses electronic debit (EBT) machines, allows credit and debit sales and transfer of Supplemental Nutrition Assistance Program (SNAP) benefits to farmers market vendors and farm stand operators via wireless point-of-sale machines. In 2015, 129 Iowa producers participated, generating more than \$1.36 million in credit/debit sales and SNAP transactions.

By 2010, federally funded USDA offices in Iowa were playing a significant role in local food system development as well. Iowa's RC&Ds (once an arm of the Natural Resources Conservation Service) received a major grant from Iowa's USDA Rural Development office. This enabled the League of RC&Ds to hire six local food coordinators to build the capacity of local food farmers. These coordinators, along with others from ISU Extension and Outreach and a few Iowa non-profits, advanced the local food coordination work of the LCSA-funded Regional Food Systems Working Group. They coordinated grassroots work at the local level in connection with local partners. Their legacy is well documented in two reports published by the LCSA on the economic impact of their work^{7,8}.

At the same time, the state of Iowa continued to support expansion in local food systems^b. In 2010, the Iowa legislature asked the LCSA to develop a "Local Food and Farm Plan" for the state to include policy and funding recommendations for supporting and expanding local food systems²⁶. The plan was completed and submitted to lawmakers in January 2011³². Based on the Local Food and Farm Plan, the Iowa legislature created the Local Food and Farm Program. The bill passed in spring 2011, and was signed into law July 1, 2011, as Chapter 267A of the

b AMENDMENT—LOCAL FOOD AND FARM PLAN. To the extent feasible, the Leopold Center for Sustainable Agriculture established pursuant to section 266.39 shall prepare a local food and farm plan containing policy and funding recommendations for supporting and expanding local food systems and for assessing and overcoming obstacles necessary to increase locally grown food production. The Leopold Center for Sustainable Agriculture shall submit the plan to the general assembly by January 10, 2011. The plan shall include recommendations for short-term and long-term solutions, including but not limited to the enactment of legislation.

a WIC is a federal supplemental health and nutrition program for low-income pregnant women and mothers with infants and children.

“Invisible” Horticulture Production

The 2015 survey captured the value of horticultural products produced in Iowa and entered into commerce. However, the survey did not measure items that were produced but *never sold*. This “invisible” horticulture production skirts formal financial transaction streams, occurring in places like home and community gardens, institutions (such as schools or prisons) that grow food for their own consumption, and businesses (such as restaurants) that grow some of the food they sell as prepared food.

Therefore, the level of production we measured in our survey is only one piece of the horticultural production picture in Iowa. Two industry groups, the National Garden Association (NGA) and the Garden Writers Association, conduct annual surveys to track gardening trends nationally, and claim that vegetable gardening popularity increased beginning around 2008. In fact, the NGA states that 36 million U.S. households (31 percent) gardened for food in 2008 and that number was expected to increase to 43 million households in 2009³⁴. In contrast to this information found in private research, scholarly literature and publicly gathered data have largely ignored the amount of gardening that occurs.

To gather a more complete picture of total horticultural production in the state, we were able to piece together pertinent information from the list of sources shown that track weight (pounds) produced. Horticulture crops are being produced in other ways in Iowa, but are not being counted in a comprehensive way:

- The USDA's Farm to School Census³⁵ documented the existence of 108 **school gardens** growing in Iowa in 2015. The produce from these gardens may be served in school lunches or snacks, donated to other outlets, or taken home by students for their families. FoodCorps Iowa estimates that school gardens supported by FoodCorps staff produced 3,249 pounds of food in 2015, the vast majority of which was donated.
- Each **prison** in Iowa has gardens that generate produce for consumption by offenders housed there and/or for donation. The Newton correctional facility donated 69,934 pounds of produce to the Food Bank of Iowa in 2015. The Iowa Correctional Institution for Women (ICIW) donated an estimated 850 pounds in 2016.
- **Food banks** are another source of information on invisible horticultural production in Iowa, thanks to the Farm to Food Donation Tax Credit Program. Beginning with the 2013 growing season, thanks to this Iowa Department of Revenue program, farmers could deduct from their taxes produce donated to food pantries, food banks, and similar organizations. Four of Iowa's eight food banks shared how much Iowa-grown produce was donated to their food banks in 2015, reporting a total of 142,286 pounds³⁶⁻³⁹.

- **Community gardens** in Iowa have been established with the express purpose of donating fresh produce to food banks and pantries. Glenwood's Giving Garden is a 1-acre garden that donated 7,600 pounds of food to food pantries in 2014⁴⁰. The Waverly Community Garden donated more than 3,700 pounds in 2015⁴¹. Up from the Earth, a program that organizes donations from gardeners to food pantries in Iowa and Nebraska, donated 19,000 pounds of produce in 2015⁴².

- In 2016, Iowa's **Master Gardener** program, hosted by Iowa State University Extension and Outreach, provided \$20,000 in mini-grants to Master Gardeners for projects to increase access to garden produce among low-income Iowans. The program also established demonstration gardens at seven ISU Research and Demonstration Farms to produce food for food banks and plants for pollinators. The project donated 66,700 pounds of fruits and vegetables in 2016, which includes produce donated by grantees and the demonstration gardens at ISU farms⁴³.

- Local **Plant-A-Row for the Hungry** programs have donated thousands of pounds of produce to food pantries and agencies in their communities. For example, Story County Plant-A-Row has collected more than 70,000 pounds of produce over the past 12 years from home gardeners, agency and church gardens, and farmers market vendors. In 2015, volunteers distributed 8,000 pounds of fresh produce to three food pantries and two agencies in Story County.

In total, we tracked 321,319 pounds of Iowa-grown produce donated in 2015. Of course, our figure is just a fraction of “invisible” horticultural production in Iowa; even these data are incomplete. First, we were able to obtain information on produce donated to only four of Iowa's eight food banks, which did not include donations made directly to Iowa's 182 local food pantries (**foodpantries.org**). Food banks act as a warehouse to supply local food pantries within a given region; food pantries may receive additional donations on a local scale and distribute food to individual households. We also have no data on horticultural production that was grown but not donated, which might encompass much of what was produced in school, home, and community gardens. The fact that we were able to document additional non-commercial horticulture production shows that this survey does not reflect the complete role it plays in the (informal) economy.



Iowa Code^c. The legislation was designed to promote the expansion of local food production, processing, distribution, and marketing, increase consumer and institutional spending on Iowa-grown food, and enhance the profitability of farmers and farm businesses, and expand the number of jobs in the farm and farm business sector. While the Food and Farm Plan was developed by the LCSA, funding for the next phase, the Local Food and Farm Program, was directed to ISU Extension and Outreach.

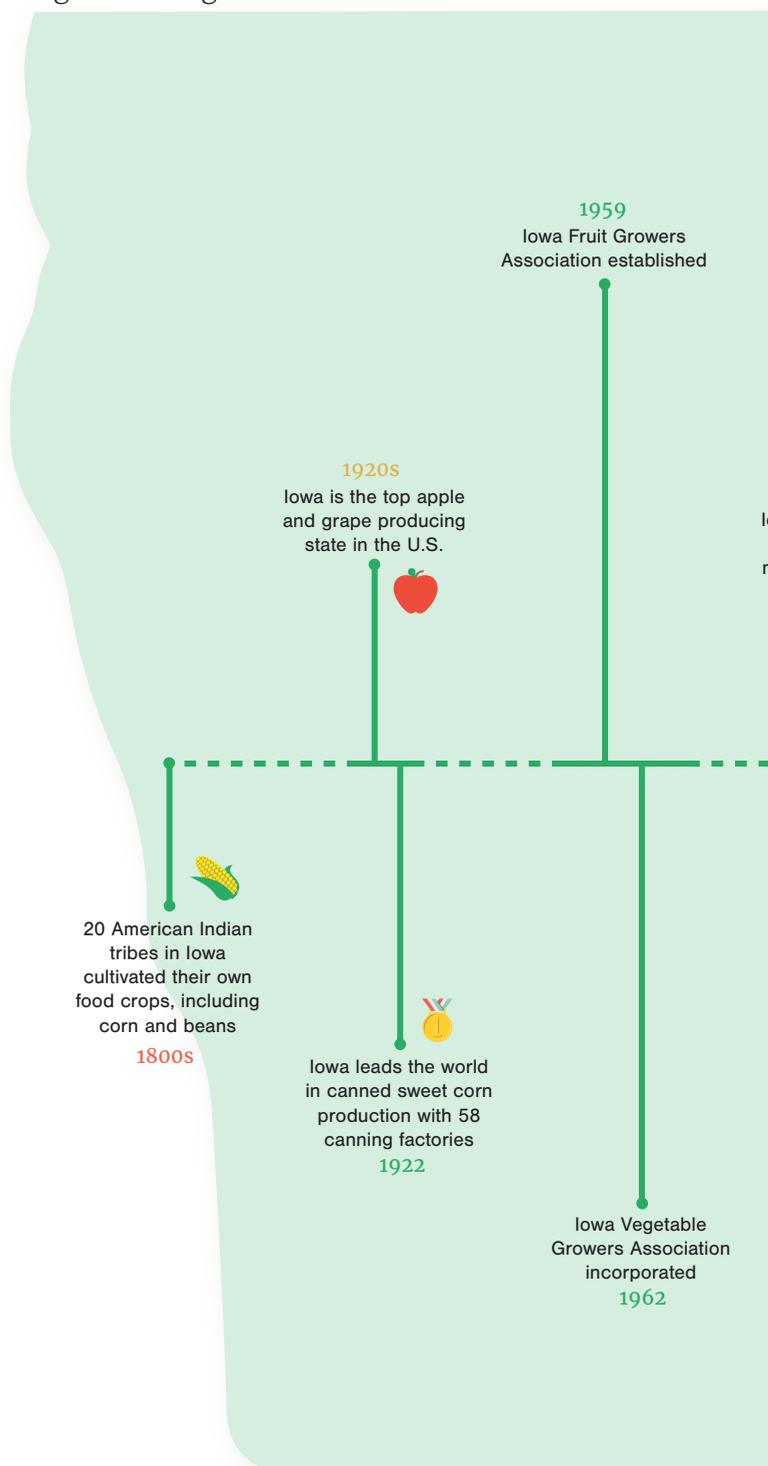
The entry of ISU Extension and Outreach into the local foods movement began earlier with local county office involvement via work in northeast Iowa, and then ramped up to the state level. The Northeast Iowa Food and Farm Coalition began in 2006 with funding from the LCSA. Local leadership in northeast Iowa eventually launched ISU Extension and Outreach into work at the statewide level in the fall of 2010, when it created the Local and Regional Food Systems Task Force. Led by ISU Extension and Outreach staff active in local foods work already taking place in northeast Iowa, this task force was to look at ways to integrate research and outreach currently conducted by the various colleges, departments, and extension units.

In 2012, the task force submitted the first of two proposals to the Vice President of ISU Extension and Outreach for developing connections between campus and the field staff, forming an extension-based group named the Iowa Food Systems Working Group (IFSWG). This grant enabled campus staff and some county extension staff working on local and regional food systems issues to meet regularly, share ideas, and build capacity within ISU Extension and Outreach to support the work³³. These grants and additional funding marked a new era for ISU Extension and Outreach's financial support, which eventually became the seed for a new Local Foods Program within ISU Extension and Outreach³³. As their work in local foods grew, and LCSA staff worked more closely with their ISU Extension and Outreach colleagues, it became apparent to the LCSA director that in order to promote greater coordination and consistency, a plan was needed that transferred LCSA's outreach work in local foods to the ISU Extension and Outreach Local Foods Program. That transition plan went into effect in October 2015, and the LCSA continues to maintain the Marketing and Food Systems Initiative as part of its competitive grants program.

Between the 1990s and today, a number of branding programs have come and gone in the state. These

programs have included *Iowa Grown for You*, *Taste of Iowa*, *Choose Iowa*, and *Buy Fresh Buy Local*. *Taste of Iowa* and *Choose Iowa* no longer serve as active branding programs in the state. *Iowa Grown for You* continues to be used by the Iowa Farmers Market Association, and *Buy Fresh Buy Local* is still available for growers in various parts of the state.

Today, those engaged in the local food movement are increasingly concerned with social justice, addressing issues of food access, health, obesity, and hunger. Although environmental concerns and



^c The purpose of this chapter is to empower farmers and food entrepreneurs to provide for strong local food economies that promote self-sufficiency and job growth in the agricultural sector and allied sectors of the economy (<https://www.legis.iowa.gov/docs/code/2016/267A.pdf>).

desires to create and preserve urban-rural ties still propel many farmers to grow and sell local food and consumers to buy it, many additional motivations drive demand for local foods. Data contained in this report will help those who are considering the future of edible horticulture and its contributions to Iowa's local food movement, as well as the impact it will have on Iowans in years to come.

Figure 1 summarizes a few key developments influencing the commercial horticulture industry in Iowa since the 1800s. The formation of producer

associations is both a response to and reflection of growth in the industry. Moreover, the role of IDALS has shifted over time as demonstrated by state agency and legislative involvement in the launch or support of various programs and initiatives. The parallel evolution of commercial horticulture production and a rising (state and national) local food movement also have led to significant developments shown in the timeline below, particularly since 2000.

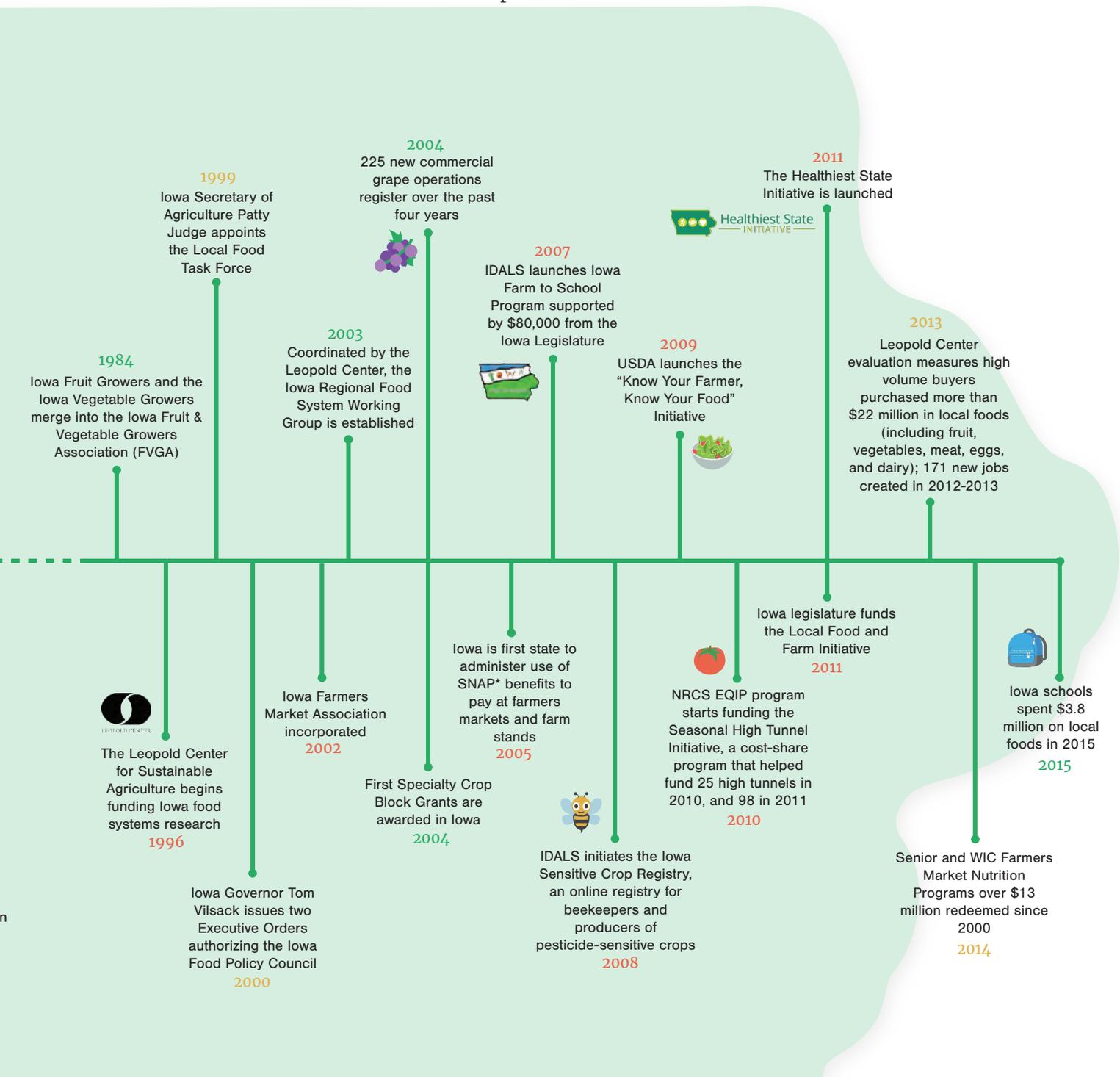


Figure 1: Key horticultural events in Iowa, 1800-2015

Methods

The project team attempted to duplicate survey methods from previous years (1989, 2000) when possible.

To begin, IDALS and ISU Extension and Outreach each contributed names to a list of all known horticulture producers in Iowa. The National Agricultural Statistics Service (NASS) curated a master list of these producers and distributed the surveys, received the surveys, and recorded the data to create the initial dataset. Producers received no incentives for participating in the survey. The first contact was made by mailing a hard copy of the survey to 4,676 individuals in January 2016. NASS sent a second mailing in February to 3,966 individuals who had not yet responded (85 percent of those initially contacted). NASS made follow-up phone calls in April through June 2016, to conduct surveys verbally with people who had not submitted a paper copy. A total of 2,566 completed surveys were received. Of those, 882 respondents qualified as horticulture producers in 2015, because they both produced a horticultural crop *and* sold it or were intending to sell it. The remaining surveys (1,684) were returned by individuals who did not qualify to take the survey for a variety of reasons (summarized in *Figure i* in *Appendix B*). The most common reason for disqualification was that respondents grew horticultural crops in 2015, but did not sell them.

Accounting for surveys that were not deliverable for various reasons (the recipient moved, was deceased, etc.), the response rate to the 2015 survey was 29.5 percent, similar to the response rate (28.7 percent)

to the 2000 Iowa Commercial Horticulture Survey for Food Crops, summarized in *Table 1*.

ISU Extension and Outreach’s Local Foods Team analyzed the data, using IBM SPSS® software. For the horticultural crop production tables, we imputed missing values for production area and pounds of production using a multiple imputation process using Statistical Analysis System® (SAS) software. Only imputed estimates for which the standard error of the estimate was 33 percent or less of the estimate itself are included in this report. We did not extrapolate the results to a larger population beyond those responding to the survey because the survey sampling procedures, collection process, and survey instrument were not designed for this.

Limitations

We encountered several limitations when analyzing and interpreting the data, primarily caused by a poor response rate to several survey questions. These limitations are described in detail in *Appendix A*.

Table 1: Iowa commercial horticulture survey for food crops response rate

Survey Year	2015	2000	1989
Qualifying Respondents	882	572	1,400
Response Rate	29.5%	28.7%	unknown



Findings

Results summarize data shared by the 882 respondents who indicated they met the dual criteria for inclusion: all grew horticultural products in 2015 and sold or intended to sell those products.

Where are horticulture farms located?

We received a high proportion of surveys from horticulture producers in urban areas. We do not know whether response rates are simply higher from urban areas or if there is actually a preponderance of horticulture farms in these areas.

Since the majority of horticulture farmers in Iowa use direct-to-consumer marketing strategies, it is advantageous for those farmers to operate close to their consumer base. However, since NASS protects (i.e., does not release) personal information of farmers they contacted for this survey, we do not know—nor can we analyze—whether the response rates are simply higher among urban-serving farmers or whether the data are indicative of the actual distribution of horticulture farmers. The 2017 Census of Agriculture may shed some light on this question, as it will include related questions.

Farmers from all but two Iowa counties responded to the survey as shown in Figure 2. The highest number of respondents farmed in or near counties with the highest populations: the Des Moines metro area (Polk [39 respondents], Warren [35] and Story [30] counties) and the Cedar Rapids/Iowa City area (Linn [29] and Johnson [26] counties). In contrast, Figure 3 shows that the highest concentration of all farms in Iowa (not just horticultural farms) occurs in northwest and eastern Iowa, which includes regions with relatively low population densities as well as the higher population areas of Cedar Rapids/Iowa City and Dubuque.

Figure 4 shows the total acres in horticultural production by county for those who responded in 2015. Comparing this map with Figure 2 indicates that total acreage in horticultural production may not be directly associated with the number of producers reporting. For example, one would expect that if a county had 40 horticulture producers, it would have more acres in horticulture production than a county with 10 producers. This is not necessarily the case. A few counties stand out, because relatively few producers from these counties responded to the survey, but they reported high acreage: Boone, Buchanan, Greene, Kossuth, and Muscatine. On average, respondents in these counties have higher-acreage farms than in other counties. These farms also are farther from population centers, which may indicate that larger horticultural farms selling to wholesale markets may be located in more rural areas, whereas small farms that sell directly to consumer tend to locate near population centers.

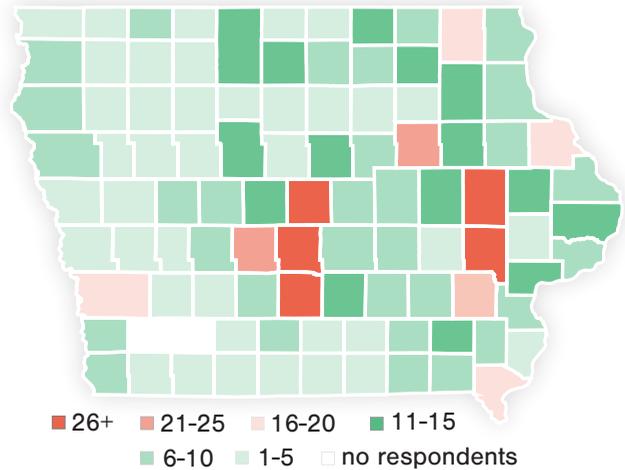


Figure 2: Number of respondents by county

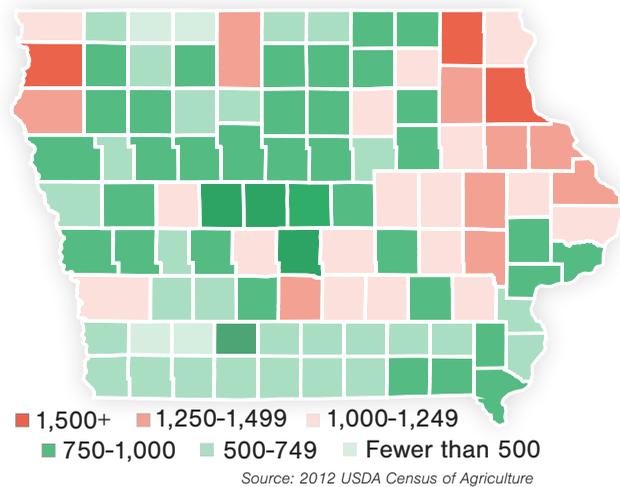


Figure 3: Total farms in Iowa by county

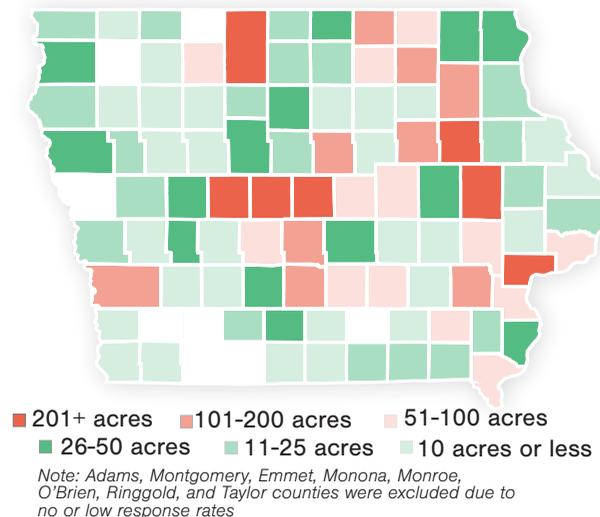


Figure 4: Number of acres in horticulture crops by county

Horticulture Farm Size and Farmer Characteristics

Iowa's 2015 horticulture farmers are relatively new to their careers, operate small operations in terms of acreage and sales, and use horticultural farming to supplement their incomes.

Beginning Horticulture Farmers

The majority of Iowa's horticulture farmers are new to horticulture production.

Well over half of responding farmers in 2015 (59 percent, 496 farmers) grew horticultural crops for 10 years or less, demonstrating that a large number of these farmers are relatively new to horticultural production. The USDA defines beginning farmers as those farming 10 years or fewer, so many of our responding farmers are beginning horticulture farmers, although some may have been farming other types of crops such as corn and soybeans prior to engaging in horticultural production. Therefore, throughout this report, we will refer to those growing horticultural crops for 10 years or fewer as "beginning horticulture farmers."

A large number of beginning horticulture farmers responded to the survey in 2000. If the same farmers who farmed five years or fewer in 2000 took the survey again in 2015, we would expect a higher percentage to be in the 16–20 year category for 2015 than in 2000. However, that is not the case, indicating that a significant number of beginning horticulture farmers in 2000 may have ceased production by 2015. While some farmers likely quit for business or personal reasons, some may farm horticultural crops for a shorter time because they begin horticultural production as a second career and retire within 10 to 15 years. The 2013 Economic Report to the President⁴⁴ states that one-third of beginning farmers nationwide are 55 or older, and concludes that these farmers are entering farming after retiring from another career⁴⁴. While not specific to horticulture farmers, it may be true of beginning horticulture farmers in Iowa.

Farm size

Median horticulture farm size is small (two acres) in both 2000 and 2015.

Responding farmers grew horticultural crops on very small parcels of land in both 2000 and 2015. Half of the respondents grew their horticultural crops on 2 acres or less (the median in both years). However, we see a major difference in the total acreage reported in 2000 and 2015. Average horticulture farm size was smaller in 2015 compared to 2000. Even though the number of respondents reporting acreage in horticulture production increased by 51 percent from 2000 to 2015, the total acreage decreased by 12 percent, shown in *Table 2*.

Large-acreage farms, on average, are more diverse than small-acreage farms.

Farms of more than 10 acres produce, on average, more crops (seven) than smaller farms (five). This difference is statistically significant. The most common crops on large-acreage farms include melons (both muskmelons and watermelons), pumpkins, gourds, and sweet corn.

New horticulture producers are replacing retiring horticulture farmers in numbers, but not in acreage.

Our data shows beginning horticulture farmers far exceed the number who may be preparing for retirement (farming 31 years or more). This is in stark contrast to commodity crop producers in Iowa. The 2012 USDA Census of Agriculture showed there were nearly three times as many farmers in Iowa age 65 and older as those under 35 years of age⁴⁵, prompting concerns that there may not be enough beginning farmers to replace retiring ones in commodity agriculture. Evidence suggests that young people (aka "millennials") desire to connect more closely with their food, whether by knowing the farmer or growing their own⁴⁵. As a result, more young people may consider becoming farmers themselves and opt for horticultural production (as opposed to commodity production), because horticultural production may be more accessible, requiring fewer financial resources to get started. Horticultural production may appeal to beginners because they are producing food that can reach the dinner table quickly (as opposed to grains or meat).

Yet, beginning horticulture farmers are not replacing retiring growers in terms of total acreage, which helps explain the decline in total acreage from 2000 to 2015. In our survey, we saw a decrease in the number of horticulture farms with more than 10 acres (data in *Figure ii, Appendix B*).

This does not mean Iowa's beginning horticulture producers will not someday expand to replace large horticultural growers who quit or retire. Our data (shown in *Figure iii, Appendix B*) show that average sales and acreage tend to rise with

Table 2: Acres in horticulture production

Survey Year	2015	2000	Change
Total acres	6,186	7,055	-12%
Average	7.67	13.24	
Median	2.00	2.00	
Respondents	806	533	51%

years of experience, which seems to suggest that Iowa's current beginning horticulture farmers may expand their operations over time. However, we do not know if this trend is because farmers actually add acreage and sales with time, or if the figures showing growth increase as smaller growers quit farming over time.

Farm sales

Total horticulture sales of respondents doubled from nearly \$10 million to nearly \$20 million from 2010 to 2015. More than half of farmers reporting sales in both years saw a 10 percent sales increase during this time.

One of the questions in the 2015 survey asked respondents to share the value of their sales for both 2010 and 2015. Figure 5 shows that 404 respondents shared a sales value for 2010 and 707 reported sales for 2015. One of the reasons for this increase is because nearly 300 respondents were growing horticultural crops for five years or fewer in 2015, meaning they were not yet producing in 2010 and had no sales to report for that year.

Total sales reported for 2015 (\$19.1 million) nearly doubled from those reported for 2010 (\$9.78 million). Is the increase due to a rise in the number of respondents or a true widespread increase in sales? To help answer that question, Figure 5 shows the value of sales reported only by the 396 respondents who shared the value of their sales for both years. These 396 respondents experienced a 58 percent increase in sales, from \$9.76 million in 2010 to \$15.44 million in 2015.

Further exploration shows the increase in sales was widespread among the 396 respondents who shared sales data for both years. Over half (61 percent) of respondents experienced an increase in sales of 10

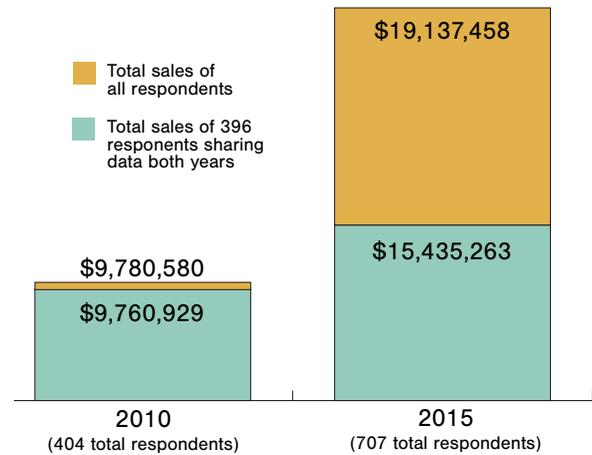


Figure 5: Total horticulture sales (n=715)

percent or more from 2010 to 2015 (data shown in Figure iv, Appendix B).

Total sales reported in 2000 were similar (\$19.7 million) to 2015 results, but when adjusted for inflation, they appear to be higher (\$27.1 million, see results in Table ii, Appendix B). These results should be viewed cautiously. The survey design regarding total sales changed significantly from 2000 to 2015. In 2015, we asked farmers to share the value of total horticultural sales, and had a high response rate (81 percent) to this question. In contrast, the 2000 survey did not ask this question. Rather, total sales were calculated using answers to several questions (total production sold, percent sold through each market, and average price per unit received at each market). In 2000, 344 farmers (61 percent) shared all the information necessary to make this calculation, leaving the analyst to impute values for the remaining 39 percent of respondents. Hence, the methods used to derive total sales in 2000 were quite different from those used in 2015, making the comparison of sales problematic at best.

French Family Farms

Cass County



Photo: ISU Extension and Outreach

If you ask Chris French what possessed him to start a post-retirement career as a tomato farmer, he'll give you three reasons: "I needed something to do, I thought we might be able to make some money, and the biggest incentive—I really couldn't find good quality, ground-grown tomatoes in the supermarket."

In 2010, Chris retired from 20 years raising corn, soybeans, and cattle. After months of research, Chris put up a 30x100-foot greenhouse and filled it with composted cattle manure. In went the tomato plants. Ten days later, the whole crop was dead. "Our first year was a complete disaster," he said.

Chris contacted Joe Hannan, commercial horticulture field specialist for Iowa State University Extension and Outreach. Joe identified one culprit—herbicide applied to forage eaten by the cattle, which then persisted in the animal's gut and subsequently in the manure—and Chris credits his expertise with the subsequent success of French Family Farms. From a second-year crop of 2,400 lbs. of marketable tomatoes, the operation swiftly expanded to a 2016 production level of one ton per week.

Chris currently markets and delivers the tomatoes to six grocery stores within a 60-mile radius of his southwest Iowa farm. For next season, Chris said he plans to maintain the current growing capacity of 10,000 square feet in three greenhouses, and he hopes to see an increase in production volume as he continues to refine his growing techniques.

"I think we've got most everything figured out now," he said. "But we learn something new every year."

Other data corroborate the suggestion that horticultural production is challenging in Iowa, as nearly one in three (31 percent) responding farmers in 2015 made less than \$1,000 in sales in 2015 (data presented in *Figure 5* in *Appendix B*). Moreover, all three Iowa Commercial Horticulture Surveys for Food Crops (1989, 2000, and 2015) have shown horticulture producers derive only a small percentage of their gross income from the sale of these specialty crops (shown in *Figure 6*). However, it appears that fewer and fewer horticulture producers receive significant income from horticultural sales. In 1989, 17 percent of respondents received 1 percent or less of their income from horticultural sales, which increased to 41 percent of respondents in 2015.

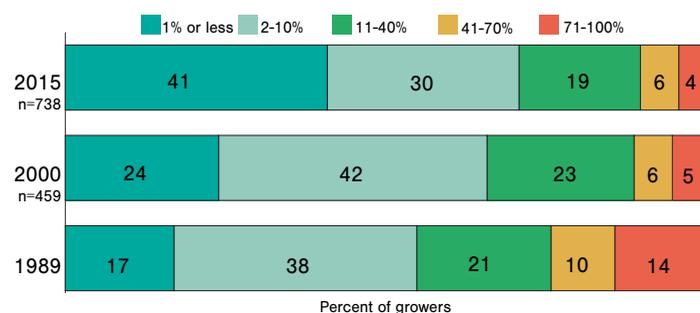


Figure 6: Portion of gross family income from sale of horticulture crops

These data indicate a large number of horticulture producers are growing and selling horticultural crops for supplemental income, rather than as a major source of income—a trend that has become more pronounced with time.

A deeper look at the data shows that grape and nut producers, and to a slightly lesser extent tree fruit producers, often receive 1 percent or less of

their income from the sale of horticultural crops. This may be because these crops take years to begin producing in significant amounts. These farmers may be investing in their crop now with the expectation that financial benefits will come later.

Our survey did not ask anything about profitability, because it is notoriously difficult to measure without resources and permission to view farm records. (Gross sales are not a proxy for profitability, but are one of the few financial indicators easily collected.) And while job creation, current economic activity, and estimated economic impacts may suggest horticulture farmers as a whole are contributing to the common financial good^{1,2,7,8}, individual horticulture farmers may not be financially benefitting from their farm businesses for several reasons.

First, small-scale farm management skills such as financial management often are underdeveloped among beginning farmers, due to lack of experience, background, or education. This may be especially true of beginning horticulture farmers in Iowa where programs (both public and private) that support new farmers often focus on commodity farmers. In addition, people who enter horticultural farming frequently have been formally educated in a different field or have a non-agricultural career background⁴⁶. This may have fueled their interest in contributing to creating a more environmentally sustainable and equitable food system, but it did not provide them with the farm management education necessary to succeed in horticulture.

Second, until recently public support mechanisms (including subsidies, federal crop insurance, tax incentives, private or public loans/guaranteed loans, capital investments, etc.) were not offered to small-scale horticulture farmers or were

Gustafson Farm Pumpkins

Boone
County

Jeremy and Kelly Gustafson got into the business of raising pumpkins five years ago to give their three children some entrepreneurial experience.

The kids, who are now 10, 8, and 5, are responsible for helping plant, weed, and harvest the pumpkins—“except the ones that are too big for them to pick up—that I have to do,” said Jeremy. They plant one to two acres of pumpkins a year on their farm near Boone, where their primary crops are corn, soybeans, and pigs.

Jeremy says the pumpkin sideline has grown steadily. “We’ve talked about adding a you-pick patch to the business and advertising it, so I guess if we do that, we’d better have some more pumpkins,” he said. Right now, sales are based only on word-of-mouth and drive-up traffic.

Jeremy said he learned what he needed to know about growing pumpkins from his fellow members in Practical Farmers of Iowa, a non-profit farmer research network based in Ames. “I got great ideas from the people who do horticulture for a living,” he said.

He and his family have been implementing cover crops for several years, and taking part in PFI’s cover crops research trials. Their farming practices also include strip tillage, side-dressed nitrogen fertilizer, and upland bird buffers.



Photo: Hannah Bates

difficult to access. Some of these programs are now becoming more available to small-scale horticulture producers. For example, the USDA has made significant efforts to increase access to its programs for beginning, small, minority, and socially disadvantaged farmers. These include the:

- USDA Farm Storage Facility Loan Program, which expanded to include storage facilities for fruits and vegetables in 2014;
- Whole-Farm Revenue Protection Pilot Program, launched in 2015, to allow diversified farmers to cover all crops under one policy (www.rma.usda.gov/policies/wfrp.html);
- Guaranteed Loan Program, designed to better fit small, beginning, and urban growers in 2016⁴⁷; and
- Beginning Farmer and Rancher Development Program, which supplies funding to organizations that provide education and technical assistance to beginning farmers and ranchers or develop curricula for beginning farmers and ranchers.

With time, we may see horticultural production in Iowa increase as public and private support mechanisms continue to grow.

The Economic Impact of Edible Horticultural Production

Economic impact analysis of the survey data shows that Iowa's horticulture industry in 2015 generated \$48.3 million in direct sales and an additional \$32.1 million in value-added commerce (including labor income, returns to farm owners and investors, and tax payments). Of this, 503 jobholders earned \$21.4 million in labor income, which is earned and spent locally.

Two key pieces of data can be used to determine the economic impact of edible horticulture production using results from the 2015 horticulture survey. Here is a description of the data, methods, and assumptions used to arrive at the economic impact figures reported:

- **Gross sales:** As mentioned earlier in the report, survey respondents were questioned about how many acres they had in horticulture production in 2015. Non-zero acre values were reported by 794 respondents. Excluding those reporting zero acres, average acres per respondent were 7.8, with a minimum of 0.1 acres and a maximum of 500. Among those indicating land in production, 740 reported gross sales totaling \$19.072 million. Using national data from the 2012 USDA Agricultural Census, we found that the weighted average national gross receipts per vegetable- and melon-producing farm (adjusting for

inflation) would be \$244,828 in 2015. The corresponding per-farm average for fruit, berry, and nut operations would be \$256,893. Iowa's producers averaged \$25,773 in gross sales per operation in this survey.

- **Labor costs:** Farmers were asked to report their total hired labor costs to help determine the extent of their contributions to Iowa's labor market. A total of 635 responding vegetable and melon producers reported total hired labor costs of \$1.56 million. In addition, 624 respondents growing fruits, berries, or nuts reported labor costs of \$.636 million. Together, these groups reported a total of \$2.196 million in hired labor costs. However, before estimates could be made, the survey data needed further refinement, which included the following assumptions:

- **Farmer labor:** The first assumption is the number of farmer-equivalents on an annualized labor basis used to ascribe to the model; dividing the national numbers by the Iowa average produced an estimate of 77.8 farm/farmer equivalents.

- **Farm-worker labor:** The second assumption is the number of farm-worker equivalents on an annualized basis used to enter into the model. Next, the labor income for the farm workers needed to be aligned with the modeling structure. In Iowa in 2015, according to the Quarterly Census of Employment and Wages from the Bureau of Labor Statistics, the average farm worker made \$14,661. Dividing \$2.196 million in total hired labor costs by \$14,661 converted those labor costs into 226.6 Iowa farm-worker equivalents.

For the model, gross sales and labor costs, including the number of jobs (farmers plus hired help), and payments to workers, are known or estimated. Other parts of the model derived from the existing coefficients in the input-output model used for the economic contribution analysis.

Understanding Economic Impact Terminology

Next, the survey results were used to estimate the economic contribution of fruit, berry, nut, melon, and vegetable production in Iowa. These estimates were made with input-output (I-O) models that are contemporary inter-industrial accountings of highly detailed industrial transactions in a study region. These models are coupled with estimates of household-level demands for goods and services in light of the availability of goods and services locally. They allow us to project what happens if industrial output, government spending, or household consumption levels change.

In this analysis, there is a two-step process employed to arrive at the statewide economic contribution of edible horticultural crops. The first estimate is for only the survey respondents; the second ratchets up those values to reflect the statewide economic contribution of this sector.

Step 1: The Economic Contribution of Respondents

As shown in Table 3, total sales of \$19.12 million were generated by 227.1 jobholders who earned a total of \$9.86 million in labor income. Those farms required \$2.97 million in inputs, which in turn supported 19.4 jobs earning \$937,104 in labor income. When the direct and indirect jobholders converted their labor incomes into household spending, they induced \$7.31 million in additional output, requiring 59.9 jobs making \$2.27 million in labor income. Summed, the survey respondents supported \$29.4 million in statewide output and \$19.56 million in value-added, of which \$13.1 million was labor income paid to 306.4 jobholders.

Step 2: The Statewide Economic Contribution of Edible Horticulture Crops

The farmers in this survey reported 6,186 acres of production^a. In 2012, there were 10,152 vegetable, potato, melon, fruit, nut, and berry acres, according to the Ag Census. Dividing the latter by the former suggests that multiplying the survey results by 1.64 will give reasonable statewide estimates.

Table 4 suggests Iowa’s edible horticulture producers generated \$31.4 million in direct sales in 2015, which required nearly 373 farm-level jobholders earning \$16.18 million in labor income. Those farmers required \$4.9 million in inputs, thus employing nearly 32 workers making \$1.54 million in labor income. When direct and indirect workers spent their paychecks, they induced 12.0 million in additional output, requiring 98.3 jobs making \$3.72 million in labor income. Summed, this sector of the agricultural economy produced \$48.3 million in output and \$32.1 million in value-added, of which \$21.44 million was labor income to 503 jobholders.

Another way to understand the value of this kind of agricultural production is to evaluate the multipliers implicit in Tables 3 and 4. The output (or ag sales) multiplier of 1.54 in Table 5 means that for every dollar of ag sales, those farmers support an additional \$.54 in output in the rest of the Iowa economy. A value-added multiplier of 1.41 means that for every dollar of value-added generated by farming, an additional \$.41 in value-added is

^a Properly conducted surveys can be used to make estimates for an entire population. Typically, survey results are analyzed in terms of the number of respondents by critical demographic or categorical criteria when making estimates for an entire population. In this analysis, however, there is uncertainty as to the actual number of fruit and vegetable farmers (the population). Using the overall response rate (about 29 percent) does not help us understand the relationship between respondents and non-respondents, let alone the size of the actual horticultural crop-producing population. As the overall economic contribution of this sector is derived from production, acreage data from the U.S. 2012 Ag Census were used to determine the inflation factor by which data in the previous table can be adjusted to reflect imputed statewide results.

Table 3: Edible horticulture products economic values for survey respondents

	Jobs	Labor Income	Value-Added	Output
Direct	227.1	\$9,857,866	13,872,403	\$19,116,583
Indirect	19.4	\$937,104	1,565,091	\$2,972,552
Induced	59.9	\$2,266,639	4,121,188	\$7,312,864
Total	306.4	\$13,061,609	\$19,558,682	\$29,401,864

Table 4: Edible horticulture products economic values for Iowa

	Jobs	Labor Income	Value-Added	Output
Direct	372.8	\$16,178,776	\$22,767,454	\$31,374,669
Indirect	31.9	\$1,537,980	\$2,568,635	\$4,878,567
Induced	98.3	\$3,720,018	\$6,763,713	\$12,001,241
Total	502.9	\$21,436,774	\$32,099,802	\$48,254,477

Table 5: Edible horticulture crops multiplier

	Total Multiplier	Multiplier per million dollars in direct sales
Outputs	1.54	\$1,538,008
Value-Added	1.41	\$1,023,112
Labor Income	1.32	\$683,251
Jobs	1.35	16

generated in Iowa. The labor income multiplier of 1.32 means that every dollar of labor income earned from farming (by the farmer and the farmers’ help) supports \$.32 in labor income in the remainder of Iowa’s economy. Finally, the jobs multiplier of 1.35 means that for every farmer and farm-labor job equivalent producing edible horticultural crops, another 35/100th of a job is supported elsewhere.

Total multipliers on a per-million dollar basis in farmer sales also are useful for understanding the contribution of this sector to the Iowa economy. Each million dollars in farmer sales supports \$1.54 million total sales in Iowa’s economy, \$1.02 million in value-added, \$683,251 in labor income, and 16 jobs. Owing to the potential difficulty in estimating annualized farmer and farm-labor equivalents, it might be preferable to use the per-million dollar in direct sales multipliers for projection in this sector as compared to the change in the number of farms.

Finally, the statewide values in Table 4 are fixed and linear in the short run. One can say, for example, that if local food production (or sales after adjusting for inflation) in Iowa grew by 5 percent by some future date, that sector would support an additional 502.9 X 5% = 25.1 jobs and \$21.44 million X 5% = \$1.07 million in labor income.

Understanding Economic Modeling

Several important pieces of data from an I-O analysis are reported in *Tables 3 and 4*. Direct values are those that describe the industry we are studying. The direct data for our analysis appear in the first row of *Table 3*. They represent the activity that occurs on the farm. Indirect values are a measure of the value of linkages that the direct firm has with the local economy, such as fuel providers, implement dealers, farm accountants, etc., to support the operation of that farm. Farmers require inputs and services, so their operations indirectly influence the local economy since inputs that can be purchased locally tend to be purchased locally. These data are in the second row of *Table 3*. The last piece of data reported refers to induced values. Induced values, sometimes called household values, accrue in a region when workers in the direct (the farms) and indirect (the suppliers/service providers) industries spend their earnings locally. When workers spend their paychecks, they spur an additional round of economic transactions as household goods and services are provided (row three of the table). When we sum all of these values together, we get a total accounting of transactions that are potentially attributable to the industry that we are measuring (the last row).

I-O analysis also provides several measures of economic activity. The first is industrial output. Industrial output normally

refers to the current value of gross production of the firm that we are assessing. Here we are using gross sales as the measure of output. The next value is value-added. Value-added is composed of all employee compensation as measured by labor income, to which are added normal returns to sole proprietors, returns to investors (dividends and rents), and indirect tax payments to governments (sales, use, property, and excise taxes). Value-added is the same thing as regional Gross Domestic Product (GDP), the preferred measure of the size of economic activity in a jurisdiction. The third measure is labor income. Labor income is composed of the wages, salaries, and the value of normal benefits that accrue to workers in the industry that we are measuring. It also includes returns to management for sole proprietors. When assessing the basic economic importance of an industrial activity to a region, it is generally preferable to pay particular attention to the value of labor income. Labor income, earned and (most likely) spent locally, is the portion of value-added that communities are best able to capture. The last measure is jobs. The modeling system counts the annualized value of jobs in industries, both full-time and part-time, not the number of full-time equivalences. As many people have more than one job, there are always more jobs in an economy than persons employed.

Crop Diversification

Iowa horticulture production is quite diversified; farmers are raising an average of five crops per farm. Crop diversity mitigates risk for farmers, both in terms of production and finances.

The 2015 Iowa Commercial Horticulture Survey for Food Crops offers additional insights into trends in Iowa's horticulture industry. The survey asked producers to report the area (in square feet or acres) and production in pounds for each crop they produced in 2015 using several different production tables, listed in *Table i* in *Appendix A*. Though 388 respondents (44 percent) partially filled out at least one table, over half (56 percent) skipped this section of the survey. This poor response rate poses interpretation challenges, though we can still draw several conclusions. On average, participating respondents produced five different crops in 2015, showing the diversity of horticultural farms. Crop diversity helps mitigate risk for the farmer, because when one crop performs poorly, another may perform well, increasing the chances the farm will have some source of income each year. Crop diversity also can help with cash flow, since each crop might sell during different times in the season, generating income throughout the year. Many farms struggle with cash flow, as they spend a substantial amount of money at the beginning of the season on inputs such as seeds and labor, depleting their operating funds early in the process.

The top 10 crops by number of farms producing them, shown in *Table 6*, changed little from 2000 to 2015, with eight crops appearing in the top 10 in both survey years: tomatoes, pumpkins, cucumbers, green beans, sweet peppers, dry onions, sweet corn, and cabbage. New to the list in 2015 were winter squash and grapes (both wine and table grapes), replacing potatoes and summer squash, which were in the top 10 in 2000.

Table 6: Top 10 crops (by number of farms producing)

	2015	2000
1	Tomatoes (116)	Sweet Corn (257)
2	Pumpkins, All (99)	Tomatoes (239)
3	Cucumbers (97)	Green Beans (202)
4	Green Beans (90)	Cucumbers (164)
5	Winter Squash (87)	Sweet Peppers (152)
6	Sweet Peppers (86)	Potatoes (150)
7	Onions, Dry (86)	Pumpkins, All (147)
8	Sweet Corn (82)	Cabbage (132)
9	Cabbage (74)	Summer Squash (128)
10	Grapes, All (72)	Onions, Dry (127)

In 2015, we see a few noteworthy changes in horticultural crop production. The biggest changes are in the percent of responding farmers growing grapes and melons. The percent of respondents who grew melons dropped by 27 percentage points (shown in *Table iii, Appendix B*), indicating there may have been a loss of farms growing melons or that farms dropped melons from their crop mix. The 2012 Census of Agriculture actually showed an increase in the number of melon producers in Iowa from 2002 (75 farms) to 2012 (100 farms), but a decrease in the number of acres (dropping from 251 acres in 2002 to 155 in 2012), meaning average melon acreage decreased. A 2004 report on melon production in Muscatine County documented the history of melon production in this part of Iowa. It explained that several factors have contributed to the decline, including high labor costs, volatile markets, loss of land due to development, and inability to compete with melon producers in other states and countries, such as Mexico⁴⁰.

In contrast, the number of respondents who grew grapes was 24 percentage points higher in 2015 than 2000 (shown in *Table iii, Appendix B*). This is primarily due to an increase in wine grape production. A 2014 report on the economic impact of Iowa wineries and wine grapes confirms this finding, showing a large jump in wine grape production in Iowa⁴⁸. It reported the number of wineries in Iowa increased from 74 in 2008 to 99 in 2012, with wine grape acreage increasing from 1,000 acres to 1,250 during that same period.

Sweet corn stands out in all years, as on average farmers planted 15 acres of land to this crop, far more than the next most plentiful crops: pumpkins and peas (grown on an average of five acres, shown in *Table iv, Appendix B*). Apples, aronia berries, and grapes also are grown (on average) on higher acreages (shown in *Table iii, Appendix B*). (Information about honey and maple syrup production is included in *Tables v and vi, Appendix B*.)

Production Practices

Irrigation

We asked respondents whether they irrigated; however, we did not ask them which crops they irrigated. We learned irrigation is not widely used among horticulture farmers in Iowa, although the fact that we had sufficient rainfall in 2015 may have affected the data (data are presented in *Figure vi, Appendix B*, along with supplemental *Figures vii and viii* related to irrigation).

Our data also show a higher percentage of those who indicated they grow vegetables used irrigation (50 percent) compared to those who grew fruit and nuts (37 percent) or berries (40 percent).

An especially high percentage of those growing cantaloupes (84 percent), herbs (81 percent), kale (79 percent), spinach (73 percent), lettuce (73 percent) and watermelon (72 percent) indicated they irrigate. While we do not know for certain if they were irrigating specific crops, data seem to suggest these crops may be widely irrigated. At the other end of the spectrum, a very low percentage of those

The Muscatine Melon

Muscatine
County



Melon production has been a small but notable part of Iowa agriculture for most of its history. A southeast Iowa truck farming region once called “the melon garden spot of the world” produced a wide variety of fruit and vegetable crops for more than 150 years. Several cultivars (“Muscatine melons”) even bear the name of the Iowa town where large quantities are grown. These melons have pronounced ridges, a deep orange color, and juicy, fragrant flesh.

As is the case with many Midwest vegetable farmers, the number of Iowa melon producers growing for wholesale has declined in numbers over the past few decades, as larger-scale production moved west, south, or outside the US entirely. However, the number of smaller-scale producers raising melons for direct market is on the rise statewide; the USDA Census of Agriculture recorded 100 Iowa farms raising 155 total acres of cantaloupe and muskmelon in 2012, as compared to 78 farms raising 217 acres in 2007.

“I would say in this area here around Muscatine, there were 30 melon growers 30 years ago,” said Vince Lawson, superintendent of the Muscatine Research and Demonstration Farm for the Iowa State University College of Agriculture. “Today, there may be five or six.”

Earl and Pam Krueger are among the few remaining growers in the area. “Our melon production has been on the decline due to the fact the growers in Muscatine have diminished drastically,” Pam said. The Kruegers currently raise 40 acres of melons (cantaloupe and watermelon) and 75 acres of sweet corn.

Lawson has been raising and researching melons at the Iowa State research farm for about 30 years. In that time, he says wholesale prices remained steady while production costs continued to rise. Wholesale markets have declined for local growers as chain grocery and department stores purchase fruit at a lower cost from large-scale producers out of state. As margins decrease, it becomes more difficult for farmers to pay the seasonal labor they need to help harvest the melons by hand.

Photo: Earl and Pam Krueger

On-Farm Processing and Marketing of Aronia Berries and Wine Grapes

Two crops—aronia berries and grapes—are sold primarily through wholesale markets, whereas all other crops are most often sold through direct-to-consumer markets (data shown in *Figure ix, Appendix B*). This is probably because fresh wine grapes and fresh aronia berries are of little immediate use to consumers, and usually are processed somehow prior to consumption.

Aronia berries, a so-called “superfood,” are high in antioxidants. While they can be eaten fresh, they are quite astringent, earning them the apt nickname “chokeberries.” Therefore, aronia berries often are converted into something sweet, such as jam or syrup. Our data suggest, however, that growers are not encountering consumers eager to buy fresh aronia berries to take home and make into something sweet. Only one-third (34 percent) was sold directly consumers, compared with 50 percent or more for all other crops. Rather, farmers are selling aronia primarily through wholesale outlets, which include contract processors and buyers (33 percent), brokers and wholesalers (18 percent), and food hubs/co-ops (7 percent), among others (see *Figure xi, Appendix B*).

Aronia berry producers may choose to leave the processing to others since, unlike many berry farmers, they are growing aronia berries on a large scale, with an average of over 2 acres. This quantity of berries is not easily processed in a home kitchen, suggesting that for a farmer to process his/her own aronia berries might require building a processing plant.

In contrast, red and white wine grapes are more commonly processed on-farm and had the highest sales of any processed product, with total reported sales of \$1.5 million (shown in *Table x, Appendix B*). In comparison, a report on the economic impact of Iowa wine grapes and wineries estimated that Iowa wineries made \$15.5 million in sales in 2012⁴⁸. One explanation for the difference between what our respondents reported and the economic impact study is that some wineries in the state may not be horticulture producers, but rather purchase grapes, other fruit, or fresh-pressed grape juice with which to make wine. The other reason is that only 13 unique respondents shared wine-sale information in *Table x, Appendix B* (11 shared both red and white wine production; one shared red only; one shared white only). This is likely lower than the total number of vineyards growing their own grapes.

Red wine makers purchased a much higher percentage of their fruit from out of state than did white wine makers. Our percentage for red wine is very similar to the “Economic Impact of Iowa Wine and Wine Grapes” report, which estimated that 40 percent of wine made in Iowa is made with grapes or other fruit from other states⁴⁸. Wineries often purchase higher tannin, less acidic red juice from New York, California, and Missouri for blending to produce a higher tannin, lower acid wine, which has a better mouth feel. In contrast, very few of Iowa’s white wines require blending with out-of-state wine juices⁵⁷.

Soldier Creek Winery

Webster
County



In 1919, Iowa was the sixth-largest grape-growing state in the US. A few short decades later, most farmstead grapes were gone—victims of an increase in row crops, herbicide drift, and a severe blizzard in 1940⁵⁸. Nearly a century later, Iowa’s grape and wine industries are once again thriving. More than 300 vineyards are supplying juice to 105 wineries.

One of the newer vineyards in central Iowa is Soldier Creek Winery, near Ft. Dodge. The family-run operation arose from the ashes of a catastrophic hog barn fire in 2002. For the next five years, farmer Bill Secor and his son Rob talked over options for diversifying. After Bill attended some grape-growing workshops offered by Iowa State University Extension and Outreach, and Rob took viticulture classes during his college years at Iowa State, they settled on grapes and wine as their next venture. In the spring of 2007, with the help of family, friends, and neighbors, 4,400 grapevines went into the ground on 6.5 acres—including the site of the barn fire.

As the vines grew, so did the family’s plans. They harvested their first grapes in 2012, and bottled their first wine—1,000 cases of it—in 2013. The operation has grown to encompass the entire Secor family, including his daughter Anne, 28, the vineyard’s wine-maker. “My plan was to be working at a winery. I just didn’t expect it would be our own,” she said.

Anne said 85% of the wine they produce is sold right out the winery’s doors to visitors. The remainder is sold by about 25 retailers in north central Iowa.

Soldier Creek, named for a nearby stream, added 1,500 plants to the vineyard in 2015. They will be at harvest capacity in 2017. The vineyard includes 10 varieties of cold-hardy French-American hybrid grapes—five white varieties and five red.

Anne added the family continues to consider adding other horticultural crops, including vegetable and orchard production. For now, Soldier Creek Winery keeps every member of the family busy. For more information, visit them on the web at soldiercreekwinery.com.

Cedar Valley Produce Auction

Howard
County



Customers come from up to 200 miles away to buy fresh flowers and vegetables from the thriving Cedar Valley Produce Auction in northeast Iowa. “Quality is driving it,” said Menno Zimmerman, who has managed the auction for the past two years. “Most of our farmers are making a living out of it, and they put their heart and soul into providing good quality products.”

The auction opened in 2003 near Elma, the endeavor of a group of about 20 Mennonite farmers. Many had moved to Iowa from the eastern U.S., where the produce auction model originated. The Cedar Valley Produce Auction is one of four now operating in Iowa.

Despite early warnings that the idea was a good one, but they would never make it, the auction has grown from a 2003 sales volume of \$200,000 to \$3.3 million in 2015. The producer group has expanded to more than 60 regular growers. Zimmerman said the largest increase in buyers has been among wholesalers. Many retailers, including grocery stores, come to the auction to purchase for resale. Other buyers include chefs, and those buying for home consumption or preserving.

“A lot of our farmers came from Pennsylvania, where land prices were higher,” Zimmerman said. “Iowa gives them an opportunity to have an income and raise a family. Most families have their children involved [in the farm operation].” Any grower can sell at the auction, not just Mennonites.

The auction operates on Monday, Wednesday and Friday each week from April through October. The site has grown to include an expansion to the original building and two additional structures, totaling 42,000 square feet today. Some buyers come all three days a week, from as far away as the Twin Cities and even Duluth, Minnesota. An average auction day brings in more than 100 buyers at all volume levels. The auction’s website claims it supplies farmers’ markets in three states.

Zimmerman expects the market to continue to grow for the foreseeable future. “The more volume we have, the more wholesale buyers we attract,” he said. He was a grower for the auction himself for six years before taking on the job as manager.

Chris Anderson is one of the auction’s longest-term wholesale buyers. “I might have missed the first auction they ever had,” he said, “but I have made most of them since.” Chris and his family operate Anderson Plants and Produce on the southwest edge of Mason City, Iowa, which sells directly to consumers. For the past 14 years, they have purchased their vegetables for resale only at the Cedar Valley Produce Auction.

Photo: Darin Enderton

growing wine grapes (17 percent) said they use irrigation. Iowa typically receives sufficient rainfall to support wine grape production. However, farmers may use irrigation during the first one or two years of a vine’s life and discontinue use once the vine is mature and producing.

While it might seem Iowa horticulture farmers’ lack of dependence on irrigation would give them an advantage over producers in more drought-ridden parts of the country, such as California, other barriers outweigh this benefit. Lack of industry infrastructure (e.g., transportation, storage facilities, aggregators, processors, etc.) and relative climate disadvantages are still too formidable and take too long to surmount to translate into an immediate benefit for Iowa horticulture farmers⁴⁹.

Aquaponics and Hydroponics

The relatively recent interest in alternative horticulture systems such as aquaponics prompted us to include questions about aquaponic and hydroponic systems in the 2015 survey. In aquaponic systems, plants grow in water in which fish also live, creating a symbiotic environment. In hydroponic systems, plants grow in water with

nutrients delivered as dissolvable fertilizers. In both systems, vegetables grow in a clean, closed environment, helping mitigate food safety risks while recycling nutrients. Twelve (1.5 percent) respondents indicated they use aquaponics and 23 (2.8 percent) use hydroponics, suggesting these have not yet been widely adopted in Iowa.

On average, respondents using aquaponics have grown horticultural crops for nine years, and farmers using hydroponics have grown horticulture crops for 13 years, similar to the average years all respondents have produced horticultural crops (13 years). This suggests that years of experience do not directly relate to whether or not a farmer uses one of the “ponics” systems. If the trend of many new horticulture farmers establishing new operations continues in the next decade as it has in the past 10 years, our data suggest we may not see much of an uptick in the use of “ponics” systems. However, an upcoming decision regarding whether hydroponic systems can be certified organic under the National Organic Program may influence whether farmers choose to implement hydroponic systems, especially given the rise in popularity of organic products⁵⁰.

CSA Farms

Community Supported Agriculture (CSA) farms had the highest average sales of any direct-to-consumer market. Community Supported Agriculture was first introduced in the United States in the 1980s. Since then, the number of CSA farms has steadily increased nationwide and, more recently, in Iowa, with the first CSA farms starting in 1995⁵³ (see *Figure xii, Appendix B*). Through a CSA, farm “shareholders” make a yearly financial investment in the farm, thus guaranteeing the farm’s costs are covered and helping the farmer manage cash flow by having income at the beginning of the season when expenses (such as seeds and labor) are highest. In return, shareholders regularly receive a portion of the farm’s production, often through a weekly CSA delivery either to their homes or to a common distribution point. CSA shareholders, or members, share in the farm’s risk, receiving more produce in years when yields are high and less when harvest is low^a. Some CSAs involve their members in shareholder events, such as on-farm potlucks, or labor sharing, where members pay part of their share by working on the farm.

Sixty-one (7 percent) respondents to our survey said they direct-marketed produce through a CSA in 2015. To put this in perspective, 83 CSA farms were listed in the Leopold Center for Sustainable Agriculture’s CSA directory in 2015, which includes all CSAs in Iowa⁵⁶. Assuming the LCSA directory accurately captured all of the CSA farms in the state, 73 percent of all CSA growers responded to our survey.

CSA growers are dependent on their CSA operations, as opposed to other marketing channels, for farm income. Nearly half (42 percent) of CSA growers received between 76 and 100 percent of their farm income from CSA shares (data presented in *Figure xiii, Appendix B*).

^a However, it is rare that CSA shareholders and farmers truly share risk, given that many CSA growers sell in multiple markets and sell any excess production there, rather than distributing it to members. There are actually few “pure” CSAs whose distribution of shares to members rests solely on production. Rather, most CSAs operate more like a subscription service.^{54, 55}

The CSA farms responding to our survey were, on average, quite different from other farms responding to the survey (summarized in *Table vii, Appendix B*).

- First, CSA growers have been raising horticultural crops for fewer years on average (9.4 years) than other growers have (12.9 years).
- Second, CSA growers raise significantly more types of crops than non-CSA growers do. On average, CSA farms grew 13 different crops, compared with five crops on non-CSA farms.
- Finally, CSA growers receive a much higher percentage of their gross household income (an average of 24.7 percent) from the sale of horticultural crops than non-CSA growers do (12.9 percent).

Together, these three differences help paint a picture of how CSA farming differs from other types of horticultural production. Because CSA farms grow most of the vegetables their shareholders will need for a large portion of the year, they grow a larger variety of crops than other farms. This requires a high level of skill, both in terms of knowing how to grow each crop, and pre-planning to meet shareholder needs on a week-by-week basis. CSA growers also are less likely than non-CSA growers to rely on off-farm income for their livelihood. On average, responding CSA farms had 78 members receiving summer shares. Growing this number of crops for this large number of shareholders and making weekly deliveries may require so much time that these growers simply do not have time for other enterprises, either on- or off-farm. CSA farming can be very demanding and requires farmers be “all in.” (For additional information on the cost of CSA shares in Iowa and the number of CSA shareholders, see *Table viii in Appendix B*.)

Good Eetens

Clay
County

Darla and Michael Eetens personify what many of us may imagine when we think of vegetable farmers: hard working, outdoorsy, and passionate about healthy soil and nutrition. Darla grew up on a nearby farm and has been gardening all her life. She raised five children, now aged 23 to 36, and fed them garden produce. Michael established GoodEetens Produce Farm in 2009 with an organically grown, all natural, U-pick strawberry patch. He and Darla married in 2010; the next year they combined their skills and dreams and expanded the operation to include a wide variety of vegetables, berries, bread, flowers, maple syrup, and honey.

The farm consists of 12 acres in the Everly area and another large garden patch near Boyden, of which four acres go toward producing vegetables and fruits. At any given time, two acres are under cultivation and the rest lies fallow. The couple emphasizes healthy eating and healthy living, and uses no chemicals on the gardens.

Michael enjoys improving the soil, planting cover crops after each harvest, and working to improve the farm’s potato and berry production. He also manages the hives and honey. Darla focuses on other vegetables, especially tomatoes, baked goods, and syrup.

Darla and Michael market all of their products directly to consumers, through three farmers markets (Spencer, Sheldon, and Everly) and a community supported agriculture (CSA) program. In 2016, 16 families subscribed to the GoodEetens CSA; Darla says they had enough interest to accept more applicants. But, she added, “Even if nobody would buy any of our stuff, I’d still grow a big garden!”

Visit GoodEetens on the web at goodeetens.weebly.com.

Photo: Good Eetens



Marketing

Direct-to-consumer markets dominate Iowa's horticulture markets, although this is slowly changing. While farmers markets are widely used, they yield relatively less in sales.

Most of Iowa's horticulture farmers rely on direct-to-consumer marketing to sell their products, although this method has declined since 2000. A continued reliance on direct-to-consumer marketing is not surprising, given that most are beginning horticulture farmers producing on two acres or fewer. For many of these farmers, scaling up may not be among their goals. For others, it may be their goal, but it's simply unobtainable right now.

Responding farmers use a combination of marketing outlets, with respondents using an average of two different types. Utilizing a variety of market types allows farmers to manage risk, because if one type of market falls through, another may pick up the slack. Selling through a variety of markets also helps ensure that farmers sell their entire crop, including "seconds"—products that may not be considered top quality because they are misshapen or slightly damaged by insects or weather.

Farmers markets and on-farm sales/stores were the markets most heavily used by respondents as shown in Figure 7. Hence, these respondents are relying heavily on local, direct-to-consumer markets, rather than selling to institutions, intermediate markets, or wholesale markets. Fifteen percent or less of the respondents used all other market types.

In fact, the majority of respondents (54 percent, shown in Figure 8) market their crops exclusively through direct-to-consumer outlets, which include Community Supported Agriculture (CSA) farms, farmers markets, on-farm sales or on-farm stores, online sales, pick your own, and roadside stands.

This was true for all types of crops. (A detailed breakdown of the average percent of each crop sold through each type of market is included in Table 8.)

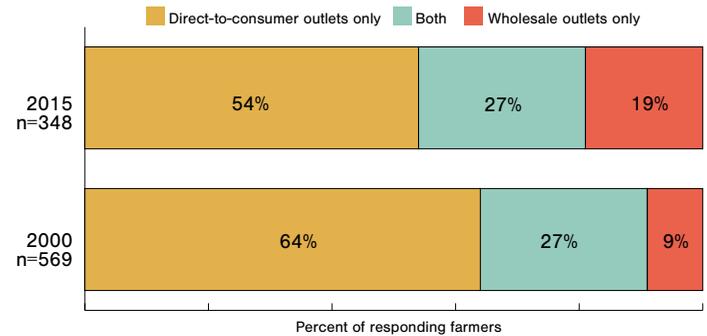


Figure 8: Marketing channels used for all crops 2015 vs. 2000

Direct-to-consumer sales are often the most easily achieved, especially for beginning or small growers. These types of markets generally allow the farmer to choose to whom, where, when, and at what price to sell. In contrast, wholesale markets often require standardized products and packaging as well as higher volumes, and offer lower prices. Therefore, it is not surprising the majority of our respondents are relying primarily on direct-to-consumer sales outlets, given that the majority are beginning horticulture farmers and most farms are small.

Despite evidence showing the majority of respondents continue to sell heavily through direct markets, our data also show that reliance on direct-to-consumer markets is shifting to more wholesale markets than in the past. Figure 8 shows that in 2015, 19 percent of respondents sold exclusively through wholesale outlets, which is more than double the 2000 percentage (9 percent). When wine grape producers are excluded, the trend remains, but the percent of farmers selling exclusively through wholesale outlets drops to 17 percent.

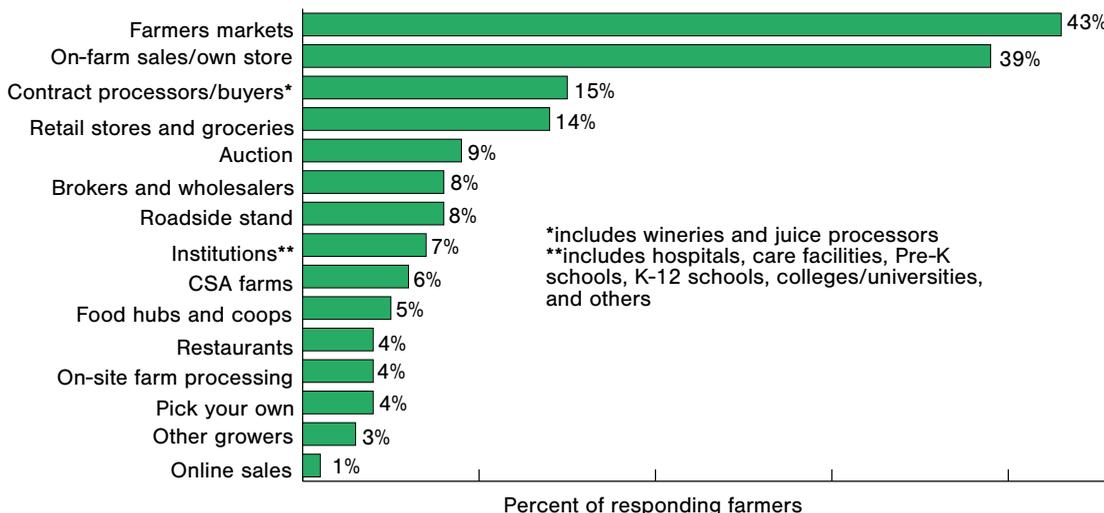


Figure 7: Markets used for horticultural products (n=357)

The data also show beginning horticulture producers (those growing horticultural crops for 10 years or fewer) are more likely to sell exclusively through wholesale markets (which includes auctions, brokers and wholesalers, contract processors and buyers including wineries, food hubs/co-ops, institutions, restaurants, retail stores and groceries)

A closer look: Farmers markets are widely used by farmers, but for most, sales supplement annual income

Farmers markets were by far the most commonly used market for survey respondents, but ranked low (eighth) in average sales value, with average farmers market sales of \$5,516 per farmer (shown in *Figure 9*). Although farmers markets often fetch top dollar for horticulture products, on average, farmers reported total annual sales through this market are quite low, meaning most farmers are not selling a lot of product at these markets. Farmers markets require a lot of time from farmers, often taking up a whole day of labor by the time the farmer loads a vehicle with product, drives to the market and sets up, serves customers, tears down, drives home, and unloads the vehicle.

Even so, most farmers are using a mix of markets. Hence, farmers market vendors often make additional sales through other market outlets as well. We see farmers market vendors have average total sales through all markets of nearly \$23,000, shown in *Table 7*, showing only about a quarter (average of \$5,516) of total sales occur at farmers markets, with remaining sales made through other markets.

Table 7: Farmers selling at farmers market vs. not selling at farmers markets

	Vendors	Non-Vendors
Average years growing*	17.7	11.4
Average number unique crops*	10	3
Average percent of gross income from sale horticulture products *	20%	12%
Average acres in 2015	10.8	7
Average sales in 2015	\$22,935	\$26,006

*Statistically significant difference, $\alpha = .001$



Photo: Hannah Fisher

Advertising

Nearly half (48 percent) of responding farmers did not actively advertise their business in 2015, relying instead on word-of-mouth. Not surprisingly, farmers who used no advertising in 2015 had the lowest median sales. These data could make a strong case that advertising works, because farmers who used more expensive forms of advertising (such as television and radio) had the highest median sales (shown in *Figure xiv, Appendix B*). However, it also may be true that farmers who are producing on a small scale (and who make up a large portion of our respondents) are able to sell all or most of their product via word-of-mouth, making advertising unnecessary and potentially problematic if demand exceeds supply. Perhaps only those farmers producing enough to supply people outside their personal network of friends and family need to advertise. Beginning horticulture farmers also were slightly less likely to use advertising (50 percent reported advertising) than more experienced farmers (55 percent). This may indicate their tight budgets made them unable to allocate funds to advertising, but the difference was not found to be statistically significant.

Farmers who used advertising also derived, on average, a greater percent of their gross income from the sale of horticultural crops than those who didn't advertise (shown in *Table ix, Appendix B*), which suggests they are treating horticultural production more as a business than a hobby.

Conversely, farmers who do not sell directly to consumers have no need to advertise. Farmers selling to contract processors or brokers/wholesalers were much less likely to advertise than other farmers, because they are likely selling only to these markets (shown in *Figure xv, Appendix B*).

It is not surprising that the types of advertising used by farmers in 2015 were quite different than those employed in 2000, shown in *Figure xvi, Appendix B*. A lower proportion used traditional advertising methods in 2015 than in 2000, with the most notable difference shown in newspaper/magazine advertising. Meanwhile, the use of websites increased, and social media outlets were used by nearly one in four (23 percent) farmers in 2015. The ubiquitous social media of the present day did not exist in 2000.

Finally, the percent of responding farmers who used no advertising appears to be higher in 2015 than 2000. It is hard to know whether this is an accurate interpretation, since the survey design changed slightly from 2000 to 2015. In 2015, "none" was included as a choice, and several farmers wrote in that they relied on word-of-mouth (which we chose to combine with none). In 2000, the survey did not include "none" as a choice, but, again, several respondents noted that they relied on word-of-mouth. We do not know how many farmers would have chosen "none" in 2000 had it been included as an answer choice.

than more experienced growers (shown in *Figure x, Appendix B*). A Pearson Chi-square test found this to be statistically significant at the alpha = .05 level for vegetables and for fruits and nuts, meaning that if the 2015 survey respondents are representative of the larger population of Iowa horticulture producers, we can be 95 percent confident that beginning farmers are wholesaling exclusively at a higher rate than more experienced growers.

At first glance, this finding is surprising, given the conventional wisdom that selling wholesale requires more skill, experience, and a higher volume of production—traits beginning horticulture producers are not likely to have. A closer look at the data shows beginning farmers are more likely to sell wholesale primarily because of the number of beginning horticulture producers who are growing wine grapes for a contract buyer or processor, which includes wineries. We also see a few farmers are selling green beans or pie pumpkins to contract buyers and processors. These may include farmers who began growing these vegetables for a cannery or frozen foods company.

The finding that newer, less experienced farmers are selling wholesale to high-volume buyers may also be a function of current trends in local food markets. The USDA released a report in 2015 claiming direct-to-consumer local food markets have become saturated, but that opportunities exist for growth in local food sales through wholesale markets such as institutions (schools, hospitals, etc.) and intermediary markets (grocers, restaurants, processors, and brokers, etc.)⁵¹.

Sales of Each Crop by Marketing Channel

As mentioned previously, farmers markets and on-farm sales/stores dominate Iowa’s horticultural markets. However, a few crops deviate from this marketing pattern.

On average, a high percentage of aronia berries (33.3 percent) and grapes (66.3 percent) are sold to contract processors and buyers; this is much higher than any other crops (as shown in *Table 8*). These are the only two crops for which farmers markets are not in the top two sales venues. More melons are sold at auctions (24.5 percent) than at any other

market, except farmers markets (38.9 percent); and auctions are a top market for high-tunnel produce. A high percentage, on average, of peas (20.4 percent), sweet potatoes (14.1 percent), and other potatoes (12.7 percent) are sold to or through CSA farms. Finally, roadside stands are one of the top markets for sweet corn.

Although the widespread closure of canneries cost Iowa many wholesale opportunities, new types are emerging. A 2014 Leopold Center for Sustainable Agriculture report documented 16 food hubs in Iowa (although some do not meet the USDA’s official definition of a food hub), along with another 15 businesses that act as centers of food hub-related activity¹⁸, for a total of 31. One commonly accepted definition of a food hub is the USDA’s: “a business or organization that actively manages the aggregation, distribution, and marketing of source-identified food products primarily from local and regional producers to strengthen their ability to satisfy wholesale, retail, and institutional demand⁵².” Iowa’s food hubs and related businesses include traditional food hubs, produce auctions, processors, and farms that aggregate or deliver products for other farmers. Most, if not all, of these food hubs and centers of food hub-related activity started after 2000. They offer a new wholesale market opportunity not available during the last horticulture survey.

The top four markets by dollar value of sales were wholesale-type markets: brokers and wholesalers (\$33,155), contract buyers and processors (\$25,544), retail stores and groceries (\$23,099), and auctions (\$14,101), shown in *Figure 9*. While wholesale markets were not widely used by growers, these markets purchase a large volume of product, resulting in high sales.

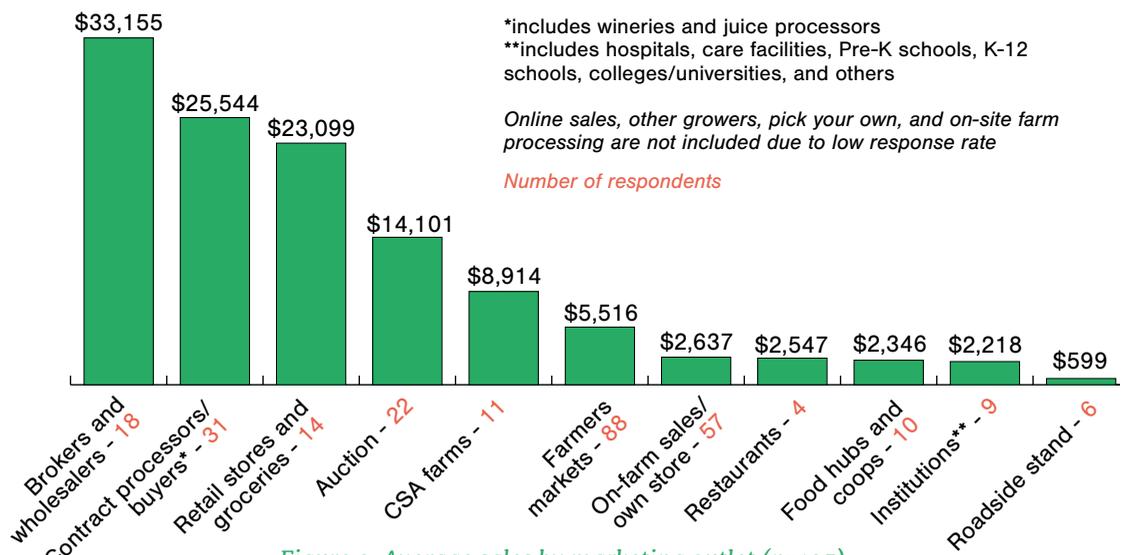


Figure 9: Average sales by marketing outlet (n=195)

Table 8: Average percent of each crop* by volume sold through marketing channel

	Apples (n=53)	Aronia Berries (n=27)	Grapes (n=46)	Honey (n=52) ***	Maple Syrup (n=8) ****	Melons (n=44)	Peas (n=35)	Sweet Corn (n=64)	Sweet Potatoes (n=17)	All Other Potatoes (n=45)	High Tunnel Produce (n=33)	All Berries (n=56)	All Fruits and Nuts (n=49)	All Vegetables (n=183)
Auction	0.5	0.4	0.0	1.7	0.0	24.5	2.1	10.3	5.8	4.3	33.4	3.9	4.1	10.2
Brokers and wholesalers	0.0	18.4	2.2	4.6	5.0	1.6	2.9	1.3	4.7	0.0	0.3	3.8	2.0	4.4
CSA farms	1.7	0.0	0.2	1.2	0.0	14.5	20.4	2.6	14.1	14.7	19.7	2.3	4.9	5.6
Contract processors and buyers**	0.6	33.3	63.3	3.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	9.1	17.6	4.3
Farmers markets	39.0	15.4	3.5	21.5	41.0	38.9	65.4	42.7	48.2	63.4	27.3	42.1	29.2	38.4
Food hubs and coops	0.9	7.4	0.0	1.2	0.0	0.0	0.0	0.0	0.0	6.5	1.5	0.0	0.0	3.1
All institutions ***	4.2	3.7	6.5	2.5	0.0	2.4	0.0	0.0	2.4	0.0	0.2	2.1	5.2	2.5
On-farm sales/own store	30.3	18.7	14.2	46.7	39.0	9.7	0.7	8.5	6.5	1.4	3.4	21.0	26.4	13.2
Online sales	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	2.9	1.1	1.5	0.05	0.2	0.8
On-site farm processing	1.5	0.7	6.0	0.0	13.0	0.0	0.7	0.0	0.0	0.2	0.0	2.9	3.3	0.6
Other growers	1.9	0.0	0.0	0.1	0.0	0.1	0.0	2.2	2.4	1.1	1.5	2.1	0.0	0.7
Pick your own	6.2	0.0	0.0	0.0	0.0	0.0	0.0	4.7	0.0	0.0	0.0	2.1	1.1	1.1
Restaurants	1.9	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.1	3.9	2.0	0.0	1.6
Retail stores and groceries	5.6	1.9	2.6	11.7	3.0	2.6	0.0	4.8	4.7	0.0	0.4	4.3	2.7	5.5
Roadside stand	3.9	0.0	0.0	3.5	0.0	3.6	2.9	16.3	0.0	1.7	0.6	2.4	1.7	6.3
Totals	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

* Hops not included due to low response rate.

 Highest %  Second highest %

** Includes wineries and juice makers.

*** Includes hospitals and care facilities, Pre-K schools, K-12 schools universities and colleges, and other institutions.

**** Though not technically horticultural crops, they were included in our survey, because they are specialty crops of interest to many.

Conclusions & Implications

Documented edible horticulture production in Iowa has experienced a number of highs and lows over the past two centuries. The industry was strongest in the late 19th and early 20th centuries when settlers of European descent tended huge crops of apples, grapes, potatoes, popcorn, and sweet corn. Abundant harvests of these crops necessitated parallel growth in Iowa's canning industry—until the entire Midwest, including Iowa, switched its focus to growing vast quantities of federally supported field corn and soybeans. This monumental change transformed both the land and processing industry.

The local food movement, with its focus on place-based, diverse food production, has helped breathe new life into Iowa's edible horticulture industry. The state of Iowa responded in kind by introducing initiatives in the past two decades to spur local food system development, such as the Local Food Task Force, the Iowa Food Policy Council, the Farm to School program, and the Iowa Local Food and Farm Plan. The Iowa's Farmers Market Nutrition Programs (both for Special Supplemental Nutrition Program for Women, Infants, and Children [WIC] clients and low-income seniors) have pumped more money into local food production than perhaps any other program: more than \$14 million from 2001 to 2015. However, data from the 2015 Iowa Commercial Horticulture Survey for Food Crops suggests there are still many challenges to overcome, and more opportunities to engage, before we achieve full-fledged horticultural renewal. Nearly 900 Iowa horticulture farmers helped us learn the following:

- The majority of Iowa horticulture farmers rely on direct-to-consumer markets to sell their products even as markets evolve and high-volume sales opportunities reappear. Direct-to-consumer markets accommodate varying quantities and qualities of Iowa-grown food products, have direct contact and build relationships with those who consume their produce, and allow farmers to access them on their own (more flexible) schedule and terms. However, direct-to-consumer sales amounts are relatively low, possibly because the audiences for these markets are saturated, meaning farmers using direct-to-consumer markets may be limited to producing the quantity of product these markets can absorb. For farmers wanting to scale up, wholesale markets may be their only choice. However, for some farmers entering wholesale markets may be challenging, as these types of markets are more likely to need a larger



Photo: Hannah Fisher

quantity of a high-quality, uniform product that is cleaned and packaged according to industrial standards.

- Farmers markets, one of many direct market options, are widely used by farmers, but yield relatively less in sales compared to intermediated markets (e.g., institutions, auctions, contract processors and buyers, wholesalers and brokers, etc.). Although farmers markets often yield top dollar for food products, on average, farmers' reported total annual sales through this market are quite low, meaning most farmers are not selling a lot of product at these markets. That said, most farmers market vendors are utilizing multiple market channels, indicating that farmers market sales may merely supplement their income.

· Data from 2015 show **an increasing number of farmers are selling exclusively to wholesale markets.** This may be due to growing availability of aggregated markets such as food hubs and produce auctions, in combination with an effort by large-scale buyers to buy more local food in response to consumer demand. Perhaps **some farmers realize pursuing efficiencies of scale by selling large quantities of product at low prices as opposed to small quantities at high prices is likely to generate more income**

due to the high transaction costs of direct-to-consumer sales. The average dollar value of sales to brokers and wholesalers also is higher than to direct markets such as farmers markets. Responding farmers reported average sales of more than \$33,000 to brokers and wholesalers and more than \$25,000 to contract buyers and processors, versus only \$5,500 in sales via farmers markets. **If policy makers, farm service providers, and horticulture industry advocates want to provide support that will reduce risk for farmers and large-volume buyers, they should spend more time and resources helping farmers and high-volume buyers develop sales relationships and make changes to accommodate each other's needs.**

· **The vast majority of responding farmers are beginning horticulture farmers with small acreages and low sales.** Beginning farmers may decide to start small either to avoid taking on too much risk, because they may have very limited capital to invest in a startup operation, or because little land is available to them. There also appears to be high turnover among growers, which is not surprising given the host of challenges they face. Chief among these are small acreages (the median is still 2 acres, but the average dropped significantly) and



meager sales. While total sales increased nearly 60 percent from 2010 to 2015, two in three producers in 2015 sold less than \$10,000 worth of horticultural products. Moreover, in 1989, 17 percent of respondents received 1 percent or less of their income from horticultural sales, which increased to 41 percent of respondents in 2015. These data strongly suggest **a large number of horticulture producers are growing and selling horticultural crops for supplemental income, rather than as a main source of income, and this trend has become more pronounced with time. Only a handful of horticulture farmers seem to be making close to a living wage from commercial fruit and/or vegetable production** (10 percent sold \$50,000 worth of product or more in 2015).

We should be careful not to confuse sales with profitability. This leads us to question why horticulture sales are so low. Is it lack of demand for local food? Anecdotally, we frequently hear demand for locally produced food exceeds supply. So is the problem a lack of business skills, capital, market development, infrastructure, adequate crop insurance, or policy support^a? It is probably a combination of all of these factors and more. How or even whether Iowa's policy-makers will act to create an environment in which horticulture producers can succeed is an open question.

^a Prior to 2014, farms could not plant fruits or vegetables on commodity base acres without jeopardizing their commodity payments, which discouraged farmers from diversifying into horticultural production. The 2014 Farm Bill changed this, allowing farmers to plant a certain percentage (depending on the type of Agricultural Risk Coverage they choose) of base acres to fruits and vegetables⁵⁹.

The 2011 Iowa Food and Farm Plan³² outlined these barriers and suggested ways to ameliorate them via policy and funding tools. Perhaps the 2011 plan could be reviewed and revised with the aim of providing more support to Iowa's beginning horticulture producers. **Furthermore, what additional set of policy tools can the state of Iowa provide in addition to those offered by the USDA, which include the USDA Farm Storage Facility Loan Program, the Whole-Farm Revenue Protection Pilot Program, and the Guaranteed Loan Program described earlier in this report? More than 20 states now have healthy food financing projects to help people of all income levels access local food; what can Iowa do to simultaneously provide healthful food to low-income Iowans and support local horticulture production? How can farm-serving public institutions such as the cooperative extension service and land grant universities provide assistance in collaboration with the private sector (i.e. investment firms and lending institutions)?**

• Economic impacts of the data show the edible horticulture industry is easily a multi-million dollar contributor to Iowa's agricultural economy. Gross product sales often are the first (and only) measure we tend to think of when considering impact. However, sales are only a fraction of all the economic activity an industry generates. Other kinds of economic activity needed to sustain edible horticulture production include costs associated with labor (for both the farmer/operator and hired labor); the provision



of inputs such as fuel, seed, and equipment; tax payments made to government; and farm services provided by accountants, financial planners, insurers, and attorneys. In addition, related activity occurs when the farm family, farm workers, and farm suppliers/service providers spend their earnings locally. The sum of all of these values together gives us a total cost accounting of transactions attributable to the horticulture industry in Iowa. In 2015, the Iowa edible horticulture industry generated more than \$48 million in economic activity, providing \$21 million in labor income to more than 500 jobholders. If the industry were to grow by 5 percent over the next few years, horticulture in Iowa would support an additional \$4 million of economic activity, including \$1.07 million in labor income and 25 jobs.

· **Analysis of the survey data also shows growth in some crops grown in Iowa, wine grapes are a prime example.** The Iowa wine industry reports the number of wineries in Iowa increased by about 30 percent from 2008 to 2012; and our data confirm the number of wine grape producers has increased. Wine grapes also have become the largest-grossing processed horticulture crop in Iowa, according to our survey, with total reported sales at \$1.5 million (although wineries in Iowa generate much more in sales than what we measured, according to the same report). Wineries purchase approximately 40 percent of their grapes or juice from out of state, which could suggest there is room for growth in grape production.

However, wineries may prefer to buy red grapes from out of state to create unique blends, mixing Iowa wine juice with higher tannins and lower acid juices from other states. Hence, opportunities to raise red grapes to sell to Iowa wineries may be limited.

· **The 2015 horticulture survey also revealed different crops rely on different marketing channels to reach consumers. As some markets increase, others decline; communicating this to growers could indicate which crops they might want to grow or phase out based on their marketing preferences.** For example, wine grape and aronia berry growers rely on contract processors to buy their products, so growers who would rather grow than market might choose to plant these crops. Growers selling honey might find grocery stores more receptive markets than CSA farms.

We hope this document, including survey data and analyses, is a useful tool for growers, consumers, policy makers, educators, and researchers to continue their work supporting and strengthening Iowa's horticultural food crop economy. Iowa producers encompass the full range of economic activity possible when growing horticultural food crops. Many growers derive their entire income from the production and sale of food crops, while even more farm part-time to supplement their income. The survey results should help guide interested parties to foster continued commercial opportunities for all producers to the extent they choose to participate in the industry.



Photos: Hannah Fisher

The Food Safety Modernization Act and Standards for Produce Safety

by Paul Ovrom, IDALS State Horticulturist

At the close of the printing of these survey results, the nation and its produce growers were taking first steps towards enacting and complying with the Food Safety Modernization Act or FSMA. This law had broad bi-partisan support in Congress and was enacted on January 4, 2011. FSMA – Title 21, Chapter 27, of the Code of Federal Regulations - is administered by the U.S. Food & Drug Administration (FDA). The act will be implemented over time with the primary goal of prevention of food borne illnesses including the reduction and elimination of outbreaks of illnesses and deaths associated with *Salmonella*, *E. coli*, *Listeria*, and other food borne diseases. This law promulgates the most sweeping reform of the FDA's food safety authority in more than 70 years. FSMA incorporates **seven "Foundational Rules."**

- * **1) Preventive Controls for Human Food:** Requires that food facilities have safety plans that set forth how they will identify and minimize hazards. Final rule issued: Sept. 10, 2015.
- * **2) Preventive Controls for Animal Food:** Establishes Current Good Manufacturing Practices and preventive controls for food for animals. Final rule issued: Sept. 10, 2015.
- * **3) Produce Safety:** In an effort to reduce and prevent foodborne illnesses associated with fresh produce that is typically consumed raw, the rule establishes regulatory science-based standards for the production, harvest, and handling of produce on domestic and foreign farms. Final rule issued:

Nov. 13, 2015. See below for more details.

- * **4) Foreign Supplier Verification Program:** Importers will be required to verify that food imported into the United States has been produced in a manner that provides the same level of public health protection as that required of U.S. food producers. Final rule issued: Nov. 13, 2015.
- * **5) Third Party Certification:** Establishes a program for the accreditation of third-party auditors to conduct food safety audits and issue certifications of foreign facilities producing food for humans or animals. Final rule issued: Nov. 13, 2015.
- * **6) Sanitary Transportation:** Requires those who transport food to use sanitary practices to ensure the safety of food. Final rule deadline: March 31, 2016.
- * **7) Intentional Adulteration:** Requires domestic and foreign facilities to address vulnerable processes in their operations to prevent acts intended to cause large-scale public harm. Final rule issued: May 27, 2016.

More on the FSMA Produce Safety Rule:

In the fall of 2016, the FDA reached out to the nation's state departments of agriculture and other pertinent entities to enter into contractual relationships to foster outreach, education, and compliance within state jurisdictions when it came to the FSMA Part 112 - Standards for Growing, Harvesting, Packing, and Holding of Produce for Human Consumption, also known as the Produce Safety Rule.

Through FDA funding, Iowa has brought together a Produce Safety Team made up of staff within the Iowa Department of Agriculture and Land Stewardship (IDALS) and Iowa State

University Extension and Outreach. Primary team contacts for Iowa's produce growers include Dr. Angela Shaw at ISU (angelaml@iastate.edu) and Paul Ovrom at IDALS (paul.ovrom@iowaagriculture.gov). The team's goals include fostering understanding and compliance of the Produce Safety Rule, developing an inventory of farms that fall within compliance of the rule, and assist growers with assessments and training to reduce and eliminate foodborne illnesses associated with the production, harvest, and handling of fresh produce that is typically consumed raw.

Farms* that fall under the **full compliance** of FSMA's Produce Safety Rule must meet certain set requirements on water quality; biological soil amendments; domesticated and wild animals; worker training and health and hygiene; equipment, tools and buildings; and, requirements pertaining to sprouts if this crop is grown, harvested, or handled. Because of the complexities involved, producers that fall under full compliance are encouraged to contact the Iowa Produce Safety Team to learn about training opportunities in the months and years to come. More information on full compliance can be found below.

Many Iowa produce farms* that are affected by the FDA's Food Safety Modernization Act's (FSMA) Produce Safety Rule will either be **exempt** or fall under the FDA's **modified requirements** portion of the Rule. However, all produce growers are encouraged to assess whether undertaking the requirements for full compliance may be beneficial for their farm operations (information on full compliance can be found below under "(C) Full Compliance"). It is also important to remember that all produce farms, exempt or otherwise, must take appropriate measures to minimize the risk of

serious adverse health consequences from use of, or exposure to, covered produce and to provide reasonable assurance that the produce is not adulterated as detailed in section 402 of the Food, Drug, and Cosmetic Act. The complete Produce Safety Rule can be found at the FDA's website:

<http://www.gpo.gov/fdsys/pkg/FR-2015-11-27/pdf/2015-28159.pdf>.

A) Exempt Status: The Produce Safety Rule provides for four exemptions. These include farms that 1) grow, harvest, pack or hold **only** agricultural commodities that are not typically consumed raw including food grains**, 2) grow, harvest, pack or hold produce that is **only** used for personal or on-farm consumption, 3) sell produce (grown or acquired for re-selling) with an average annual value during the previous three-year period of \$25,000 or less. The rule also provides a fourth (4) exemption for produce that receives commercial processing (for example, distilling and commercial canning) that adequately reduces the presence of microorganisms of public health significance. Farms that sell covered produce that will undergo such treatments (for example, wine grapes, canning tomatoes, and green beans) must a) disclose in documents accompanying the produce that the food is "not processed to adequately reduce the presence of microorganisms of public health significance," and b) obtain an annual written assurance from the customer (buyer) that they have established and are following procedures, identified in the written assurance, that adequately reduce the presence of microorganisms of public health significance – or obtain from the customer (buyer) that a business entity in the distribution chain subsequent to the customer will do likewise (§ Part 112.2).

While the Produce Safety Rule does not apply to exempt farms (§ Part 112.2), records should be kept to show proof of which exemptions apply.

B) Modified requirements are applicable to “**qualified exempt**” farms. These are farms that average over the last three years less than \$500,000 in sales of all food and sell more than half of what is grown directly to “**qualified end users**” (§ 112.5). **It is important to note that the rule distinguishes between food and produce.**

“Food” is defined by the Federal Food, Drug, and Cosmetic Act to mean “articles used for food or drink for man or other animals [and]...articles used for components of any such article” (US Code: Title 21, Subchapter II – Definitions). Please note the reference to “food” in the modified requirements description.

A **qualified end user** is the consumer of the food (an individual, not a business), or a restaurant, or a retail food establishment, that is located either in the same State or same Indian reservation as the farm that produced the food, or not more than 275 miles from the farm. Wholesale food hubs, food distributors (i.e., the produce is purchased by the hub or distributor) and grocery store warehouses are not considered qualified end users.

C) Full Compliance: If you believe your farm does not fall within A) or B) above - that is, your farm on a three year rolling average has equal to or greater than \$500,000 in annual **food** sales, or **food** sales are less than \$500,000 (and greater than \$25,000) and the majority of your sales are not to qualified end-users: produce typically consumed raw that is grown, harvested, packed or held on your farm may fall under the “fully covered” portion of this Rule. Visit <http://www.fda.gov/Food/GuidanceRegulation/FSMA/ucm334114.htm> for more information.

Some farm examples can help “visualize” exempt status, qualified exempt status, and full compliance:

- A farm sells \$19,000 in produce averaged over a 3 year period at a local market and through a CSA.
 - This farm is under the \$25,000 threshold and is thus exempt from the Produce Safety Rule (see “A” above).
- A farm sells \$30,000 in food averaged over a 3 year period at a local farmers market and through a CSA. The farm grows \$23,000 worth of produce and purchases \$5,000 in produce and \$5,000 other value-added food for re-sale along with produce grown.
 - This farm would fall under the modified requirements (see “B” above): it sells on average over \$25,000 in produce (note this is regardless of whether the produce is grown on the farm or is a mix of purchased and farm-grown produce) so it is not exempt; most if not all of the **food** (produce plus value added) is sold to qualified end users.
- A farm sells \$35,600 in produce, and also sells \$650,000 in other food products, including sauerkraut and jam (3-year rolling average).
 - Because this produce farm sells more than \$500,000 in food, it falls under full compliance: Any produce sold from this farm that is typically consumed raw would fall under full compliance requirements (see “C” above).

- A farm sells \$475,000 in produce (3-year rolling average) with these details: \$200,000 sold to a wholesaler out-of-state/more than 275 miles, \$200,000 to a local restaurant, and \$75,000 to a local grocery store. The farm does not grow, harvest, pack or hold any other food.
 - Because the farm sells the majority of the food to “qualified end users” and sales are under the \$500,000 threshold, the farm would be qualified exempt (see “B” above).
- A farm sells all of their \$27,000 in produce annually to a distributor located more than 275 miles away and not in the same state where the produce was grown. The farm grows potatoes, pumpkins, sweet corn, winter squash, and has 1 acre of raspberries and strawberries.
 - This farm sells more than \$25,000 in produce so the farm would **not** fall under exempt status (“A” above); the produce grown that is typically consumed raw – the raspberries and strawberries – **falls under full compliance** (“C” above) since it is **not** sold to qualified end users (“B” above).

The remainder of this discussion applies only to producers that fall under the modified requirements (see “B” above) of the Produce Safety Rule. Producers that fall under the Modified Requirements portion of the Produce Safety Rule must comply with some Produce Safety Rule measures: primarily 1) labeling and

2) records (see “Additional” for further requirements).

1. Modified Requirements – Labeling (§ Part 112.6)

For produce requiring a food packaging label (for example, many grocery stores require labeling)

- The label must “prominently and conspicuously” include on the food packaging label the name and the complete business address of the farm where the produce was grown including the street address or P.O. Box, city, state, and zip code.
- For produce purchased for resale to “qualified end users” the label must also include both the farm and resellers complete business addresses.

Compliance timeline: If the packaging label is required, then the compliance date by which the proper label is required is January 1, 2020.

For produce that does not require a food packaging label (examples would include sales at a farmers’ market and to some restaurants)

- The name and complete business address of the farm including the street address or P.O. Box, city, state, and zip code where the produce was grown must be “prominently and conspicuously” displayed on a, poster, sign, placard, or documents delivered contemporaneously with the produce in the normal course of business. In the case of Internet sales, this could include an electronic notice.
- For produce purchased for resale to “qualified end users” you must also declare on a label, poster, sign, placard, or other documents the name and complete business address of any other farms or businesses from which you purchased produce for resale.

Compliance timeline: As opposed to the specific compliance timeline above for packaging labels, farms with produce that does not require a food packaging label have until their general compliance date to comply with these traceability requirements. Those general compliance dates vary by size of operation as follows:

- Farms grossing no more than \$250,000 in produce sales annually (based on a rolling three-year average) are considered very small businesses, and the general compliance date for very small businesses is four years from the effective date of the rule (so, four years from January 26, 2016): **January 26, 2020**
- Farms grossing no more than \$500,000 in produce sales annually (based on a rolling three-year average) are considered small businesses, and the general compliance date for small businesses is three years from the effective date of the rule (so, three years from January 26, 2016): **January 26, 2019**

2. Modified Requirements – Records (§ Part 112.7)

A qualified exempt farm must keep adequate records necessary to demonstrate that the farm satisfies the criteria for the qualified exemption including:

- Records that show the farm is below the sales threshold.
- Selling more to qualified end users than not.
- That the purchaser is a qualified end user.

Compliance timeline: FDA expects farms that will be claiming the qualified exemption to begin keeping these records as of the effective date of the rule – 60 days after publication – or, starting January 26, 2016.

The farm must also keep a written record that reflects an annual review and verification of the farm’s continued eligibility for the qualified exemption.

Compliance timeline: Farms do not have to begin keeping this record until one year from the farm’s general compliance date: January 26, 2020 for very small businesses, and January 26, 2019 small businesses.

Records that document status and annual verification do not have to be submitted to FDA, but they must be retained and made available upon request.

These records are subject to the same general requirements for all records kept under the Produce Rule: they must be detailed, accurate, legible, dated and signed or initialed by the person performing the documented activity; they can be stored offsite as long as they can be retrieved within 24 hours of request for official review; they can be written or electronic; they must be original or true copies; they can be based on existing records.

Sales receipts retained to document the \$500,000 threshold for qualified exempt farms do not need to be initialed, but they should be retained long enough to document the qualified exempt status for the applicable year, based on the rolling three-year average.

For recordkeeping, collect invoices where practicable from qualified end-users that help document that the buyer of your produce is indeed a qualified end user.

Additional

Farms falling under the Modified Requirements **must also comply with FDA compliance/enforcement and, when applicable, withdrawal and reinstatement of a qualified exemption. For more details, visit <http://sustainableagriculture.net/blog/produced>**

[e-rule-analysis-part-1/](#) and scroll down to the “Modified Requirements” section.

GAP Certification: Many producers are GAP (Good Agricultural Practices) certified or undertaking training to achieve that goal. Producers are encouraged to undergo GAP training; the general guidelines provided through GAP training can be adapted and/or incorporated into any production system. GAP training through level 3 provides producers with essentially all of the tools and knowledge needed for full compliance under the Produce Safety Rule. More information on GAP training can be found at <http://www.safeproduce.cals.iastate.edu/>.

Contacts

ISU: Dr. Angela Shaw - angelaml@iastate.edu

ISU: Joe Hannan - jmhannan@iastate.edu

ISU: Dr. Sandy Andrews - smaranda@iastate.edu

IDALS: Paul Ovrom – paul.ovrom@iowaagriculture.gov

FDA: <http://www.fda.gov/Food/GuidanceRegulation/FSMA/ucm334114.htm>

*FDA defines a farm as either 1) a primary farm: an operation under one management in one general, but not necessarily contiguous, location and devoted to the growing of crops, the harvesting of crops, the raising of animals, or any combination of these activities; or 2) a secondary farm: an operation not located on a primary production farm that is also devoted to farming activities, like harvesting, packing and/or holding raw agricultural commodities (RACs) and where the primary production farm(s) that grows, harvests, and/or raises the majority of those RACs must own or jointly own a majority interest in the secondary activities farm. For more information see the FDA link under the “Contacts” section.

**Rarely consumed raw produce commodities include asparagus; black beans, great Northern beans, kidney beans, lima beans, navy beans, and pinto beans; garden beets (roots and tops) and sugar beets; cashews; sour cherries; chickpeas; cocoa beans; coffee beans; collards; sweet corn; cranberries; dates; dill (seeds and weed); eggplants; figs; horseradish; hazelnuts; lentils; okra; peanuts; pecans; peppermint; potatoes; pumpkins; winter squash; sweet potatoes; and water chestnuts. Also food grains, including barley, dent- or flint-corn, sorghum, oats, rice, rye, wheat, amaranth, quinoa, buckwheat, and oilseeds (e.g. cotton seed, flax seed, rapeseed, soybean, and sunflower seed).

Does your farm grow, harvest, pack or hold produce?

Sections 112.1 and 112.3(c)
We define "produce" in section 112.3(c).



Your farm is NOT covered by this rule.

YES

Does your farm on average (in the previous three years) have \$25k or less in annual produce sales?

Section 112.4(a)



Your farm is NOT covered by this rule.

NO

Is your produce one of the commodities that FDA has identified as rarely consumed raw?

Section 112.2(a)(1)

If you grow, harvest, pack or hold more than one produce commodity, you must ask this question separately for each one to determine whether that particular produce commodity is covered by this rule.



This product is NOT covered by this rule.

NO

Is your produce for personal/on-farm consumption?

Section 112.2(a)(2)



This produce is NOT covered by this rule.

NO

Is your produce intended for commercial processing that adequately reduces pathogens (for example, commercial processing with a "kill step")?

Section 112.2(b)



This produce is eligible for exemption from the rule,

provided you make certain statements in documents accompanying the produce, obtain certain written assurances, and keep certain documentation, as per Sections 112.2(b)(2) through (b)(6).

NO

Does your farm on average (in the previous three years) as per Section 112.5:

have < \$500k annual food sales,

AND

a majority of the food (by value) sold directly to "qualified end-users"?

Section 112.3(c)

"Qualified End-User" as defined in Section 112.3(c) means:

- the consumer of the food OR
- a restaurant or retail food establishment that is located—
 - (i) in the same State or the same Indian reservation as the farm that produced the food; OR
 - (ii) not more than 275 miles from such farm.

(The term "consumer" does not include a business.)



Your farm is eligible for a qualified exemption from this rule,

which means that you must comply with certain modified requirements and keep certain documentation, as per Sections 112.6 and 112.7.



You are covered by this rule

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Notes

Iowa Commercial Horticulture Food Crop Survey Results

2015 data compiled for release spring of 2017



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