



2017 SURVEY OF SPECIALTY CROP GROWERS IN MICHIGAN AND OHIO

IOWA STATE UNIVERSITY

RUTGERS
School of Environmental
and Biological Sciences



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UNIVERSITY OF MICHIGAN



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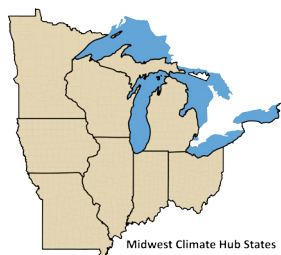
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Contents

Study Overview.....	7
Michigan and Ohio	7
Survey Design	9
Specialty Crop Farm Characteristics	10
Marketing Channels	15
Weather and Climate	20
Production and Conservation Practices	22
Grower Decision Making.....	25
Grower Characteristics.....	27
References.....	31
Appendix	33

List of Figures

Figure 1.	The geology and climate of the Great Lakes influence soil types, local weather variations and climatic conditions that Michigan and Ohio specialty crop growers factor into their management decisions.....	8
Figure 2.	Michigan and Ohio specialty crop farms producing for fresh markets and processing.....	10
Figure 3a.	Farmers market distribution in Ohio and the number of speciality crop growers who sell at those markets.....	17
Figure 3b.	Farmers market distribution in Michigan and the number of speciality crop growers who sell at those markets.	18

List of Tables

Table 1. Survey responses—Michigan and Ohio sampling frame	10
Table 2. Ohio and Michigan acres owned, rented in, rented out, and overall operated in 2016.....	10
Table 3. Ohio and Michigan farm size, by acres category	11
Table 4. Ohio and Michigan acres of fruits and vegetables grown for fresh market and/ or processing.....	11
Table 5. Ohio and Michigan growers by market channels used.....	11
Table 6. Ohio and Michigan growers by specialty crop type	11
Table 7. Ohio and Michigan vegetables produced for fresh market, by acres category	11
Table 8. Ohio and Michigan fruits produced for fresh market, by acres category.....	12
Table 9. Ohio and Michigan vegetables produced for processing, by acres category.....	12
Table 10. Ohio and Michigan fruit produced for processing, by acres category.....	12
Table 11. Ohio and Michigan number of crop types grown for sale	12
Table 12. Ohio and Michigan number of crop types grown for sale, by frequency category.....	13
Table 13. Ohio and Michigan percent of growers producing each crop type.....	13
Table 14. Ohio and Michigan mean number of types of livestock or livestock products raised for sale, livestock producers only	13
Table 15. Ohio and Michigan number of types of livestock or livestock products raised for sale	14
Table 16. Ohio and Michigan percent of livestock farmers producing each type of livestock or livestock products for sale.....	14
Table 17. Ohio and Michigan total gross revenue from farm operation, by revenue category.....	14
Table 18. Ohio and Michigan farm size categories corresponding to USDA ERS “Revised Farm Typology”	14
Table 19. Ohio and Michigan percent of 2016 gross revenue from various fresh market channels	16
Table 20. Ohio and Michigan number of years using various fresh market channels for local food systems.....	16
Table 21. Ohio and Michigan number of farmers’ markets at which specialty crop farmers sell... 17	17

Table 22. Ohio and Michigan vegetable and fruit sales to fresh markets within county	19
Table 23. Ohio and Michigan importance of “local food” markets to growers’ plans for their farm operation	19
Table 24. Ohio and Michigan engagement with local food groups and organizations	19
Table 25. Ohio and Michigan percent of growers receiving 2016 revenue from selected additional sources	19
Table 26. Ohio and Michigan grower level of concern about potential threats to their farm operations	20
Table 27. Ohio and Michigan percent of growers experiencing severe weather on land farmed in the past five years	20
Table 28. Ohio and Michigan perceived risks and capacity related to weather and climate change	21
Table 29. Ohio and Michigan use of selected production and conservation practices	22
Table 30. Width of buffer strips of grass, trees, or wild vegetation in fields next to streams or creeks	23
Table 31. Ohio and Michigan timing of selected agricultural practices	23
Table 32. Ohio and Michigan use of selected organic management practices	23
Table 33. Ohio and Michigan number of cover crops types used	23
Table 34. Ohio and Michigan types of cover crops generally used	24
Table 35. Ohio and Michigan growers ratings of influence of selected entities on farm operation decisions	25
Table 36. Ohio and Michigan grower interactions with agricultural organizations	25
Table 37. Ohio and Michigan grower rating of the importance of selected factors in farm operation decision making	26
Table 38. Ohio and Michigan years operating current farm, by years category	27
Table 40. Ohio and Michigan occupation status of specialty crop growers	27
Table 41. Ohio and Michigan occupation status of specialty crop growers’ spouses	27
Table 42. Ohio and Michigan farm workers by type	28
Table 43. Ohio and Michigan 2016 household income from farm, by percent category	28
Table 44. Ohio and Michigan proportion of total household income growers would like to make from the farm, by percent category	28

Table 45. Ohio and Michigan confidence that farm will provide hoped-for income five years from now.....	28
Table 46. Ohio and Michigan age, by year category	29
Table 47. Ohio and Michigan highest level of education	29
Table 48. Ohio and Michigan gender.....	29

Study Overview

Specialty crops are an important component of the economy in the upper Midwest, with the 2012 U.S. Census of Agriculture valuing them at \$4.7 billion. The states of Michigan and Ohio produce a diversity of annual and perennial specialty crops ranging from fruits, vegetables, greenhouse and nursery crops (see box insert for definition of specialty crops). Growing specialty crops in Michigan and Ohio in the past few years has been full of both promising opportunities and persistent challenges. Growers of specialty crops have benefited from increasing interest in “local food” from consumers and food businesses, and the continued emphasis from experts on the importance of a diet rich in fruits and vegetables. At the same time, weather events—including highly variable and extreme precipitation, temperatures, and concerns about human and environmental health have also increased social and market demands for food grown with minimal use of agricultural chemicals and exerted pressure on growers to continually evaluate and update their practices.

The research presented in this report was motivated by the intersection of all of these trends. Despite the large and growing economic and cultural importance of specialty crop production in the region, and the simultaneous increase in threats from climate change, very little research has been conducted on this group of farmers. During the winter and spring of 2017, a survey was conducted of specialty crops growers in Michigan and Ohio. The goal of this survey was to gather data on how growers are responding to new market opportunities and dealing with environmental and economic challenges. At the same time, the survey was designed to shed light on how growers’ decisions, practices and views in one area may be affected by developments or decisions in another. The result is a multi-faceted picture of the complex world of specialty crop growers in Michigan and Ohio summarized in three reports (Ohio—Sociology Technical Report 1053 | HE-2018-01, Michigan—Sociology Technical Report 1054 | HE-2018-02, and a combined Michigan-Ohio—Sociology Technical Report 1055 | HE-2018-03).

The term “specialty crop” is defined in law as “fruits and vegetables, tree nuts, dried fruits, and horticulture and nursery crops (including floriculture)” (7 U.S.C. 1621). Midwestern specialty crops include apples, asparagus, green beans, blueberries, cabbage, carrots, sweet and tart cherries, cranberries, cucumbers, Christmas trees, grapes, greenhouse crops, nursery crops, onions, peaches, plums, peas, bell peppers, potatoes, pumpkins, raspberries, strawberries, sweet corn, tomatoes, tree nuts, and watermelon.

This report combines Michigan and Ohio specialty crop grower survey data to provide a larger, regional look at the specialty crop industry in these states. First, survey methodology is briefly discussed and then the combined data on Michigan and Ohio specialty crop growers are presented in six sections: specialty crop farm characteristics; marketing channels; weather and climate; production and conservation practices; grower decision making; and grower characteristics.

Michigan and Ohio

Michigan (9.9 million people) and Ohio (11.7 million people) are highly populated upper Midwest states with Ohio rating 10th and Michigan 18th in terms of population density. Ohio’s population is fairly well distributed across the state among many small town and villages and large cities. The state also has an extensive highway network making it a day’s or less drive from Ohio to more than half of U.S. and Canada populations. Michigan’s population is unevenly distributed with much of its population located in the southern portion of the state proximate to the cities of Detroit, Grand Rapids, Lansing, Ann Arbor and Flint and Chicago, Illinois, the third most populous city in the U.S.

Agriculture is an important component of the both states' economies with USDA NASS 2012 Census data reporting Michigan annual agricultural sales of over \$8.68 billion; of which specialty crops are \$1.45 billion; and Ohio reporting annual sales of over \$10 billion of which specialty crops are almost \$600 million. Agricultural production in these Great Lakes states is strongly influenced by variability in local weather and regional climatic conditions. The climate and an abundance of water resources makes these two states well suited to growing a large variety of tree fruits and other annual and perennial fruits and vegetables. However, in recent years the upper Midwest has experienced an increase in annual precipitation and storm intensities, which affect soil moisture and specialty crop management and production decisions.



Figure 1. The geology and climate of the Great Lakes influence soil types, local weather variations and climatic conditions that Michigan and Ohio specialty crop growers factor into their management decisions. This map shows locations of farmer markets in Michigan and Ohio, see Marketing Channels section for more details.

Survey Design

The 2017 Survey of Specialty Crop Growers in Michigan and Ohio was conceived in 2014 by Dr. Ethan D. Schoolman, then a postdoctoral fellow at the University of Michigan (U-M), and funded by the Water Center at the U-M Graham Sustainability Institute. Dr. Thomas Princen and Dr. Margaret Kalcic were co-investigators on the original project proposal. Dr. Lois Wright Morton and Dr. J. Arbuckle, from Iowa State University, joined the project as collaborators in 2015, and assisted Dr. Schoolman in developing the survey questionnaire and sampling approach. To ensure a representative survey sample, robust response rate, and accurate processing of returned survey reports, the project partnered with the National Agricultural Statistics Service (NASS). NASS Great Lakes Regional Field Office staff members Kif Hurlbut and Marty Saffell were the project's main contacts. Rutgers University contributed additional funding to the project at a later date. The USDA-ARS Midwest Climate Hub provided funding for data analysis and preparation of the technical reports. Guang Han, a Ph.D. student in Sustainable Agriculture and Agricultural Education at Iowa State University joined the project in 2017 and led data analysis and tabulation for this report.

For the purposes of this project, “specialty crop farm operation” was defined as an operation which, according to the latest data available to NASS, was harvesting at least 1 acre of fruit and/or vegetable crops. Out of 8,383 farm operations in Michigan and Ohio that satisfied these criteria, 3,000 were selected for participation in the survey. Prior to sample selection, the survey population was stratified by farm size and type (primarily growing fruit crops, or primarily growing vegetable crops), to ensure that sub-groups within the survey sample would be representative of sub-groups within the overall population of farm operations. Survey respondents first received the questionnaire by mail in late January, 2017; respondents who did not return the first questionnaire were mailed the questionnaire a second time in mid-February. In late February and early March, respondents who did not return the second questionnaire were contacted several times by phone by survey enumerators and given the opportunity to complete the survey verbally. The data collection phase of the project was complete by the end of March, 2017. 1,401 valid survey reports (46.7 percent of the survey sample) were returned to the project, but of these, a significant number were from operators who were no longer actively farming or who were no longer growing specialty crops. 881 survey reports (29.3 percent of the survey sample) were both valid and usable, meaning that these reports were completed for operations that were currently growing specialty crops. Of these 881 usable reports, 698 were from growers producing for “fresh market”, defined as “vegetables and fruits that are sold raw, without being frozen, cooked, or subject to other forms of preservation prior to sale.”

Table 1. Survey responses—Michigan and Ohio sampling frame

Stratum	Full universe (N)	Sample (n)	Returned surveys	Response rate	Usable surveys
Fruit, Small (1-10 acres in fruit)	2,777	600	297	49.5%	145
Vegetable, Small (1-10 acres in vegetables)	2,939	600	293	48.8%	152
Fruit, Medium (10.1-75 acres in fruit)	990	575	273	47.5%	210
Vegetable, Medium (10.1-75 acres in vegetables)	916	575	276	48.0%	167
Fruit, Large (75+ acres in fruit)	381	325	135	41.5%	128
Vegetables, Large (75+ acres in vegetables)	380	325	127	39.1%	79
TOTAL	8,383	3,000	1,401	46.7%	881

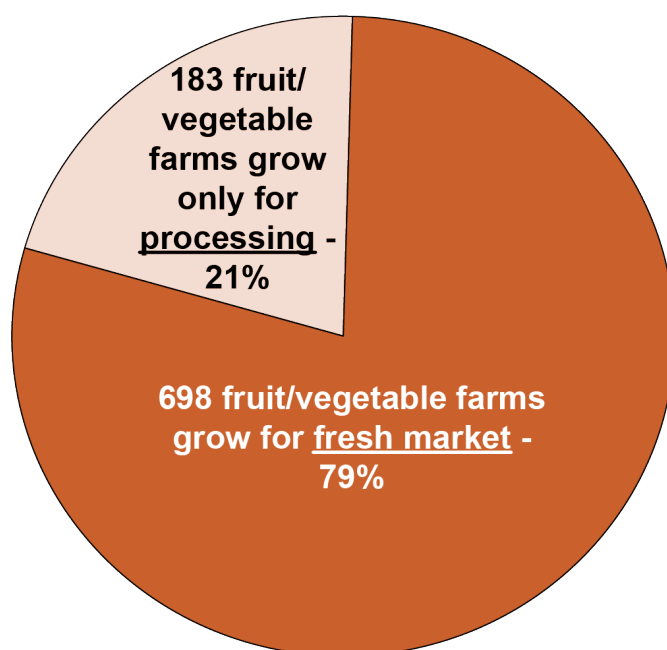


Figure 2. Michigan and Ohio specialty crop farms producing for fresh markets and processing.

Specialty Crop Farm Characteristics

This section provides basic descriptive information about the farms in our sample. Tables cover farm size, land tenure, and types of crops grown. Type of crops grown is presented by acreage category, diversity of crops, and other tabulations. Type and diversity of livestock raised are also presented.

Table 2. Ohio and Michigan acres owned, rented in, rented out, and overall operated in 2016 (n=881)

Category	Percent of growers	Mean	Median	Standard Deviation	Range
Owned land (n=838)	95.1%	185.0	76.5	500.5	1-12,000
Rented (n=327)	37.1%	282.2	50.0	787.4	1-8,400
Rented to others (n=138)	15.7%	100.2	40.0	250.0	1-2,500
All acres operated (n=881)	100%	265.1	75.0	738.8	1-11,500

Table 3. Ohio and Michigan farm size, by acres category (n=881)

Category	Percent
1-9 acres	11.1%
10-49 acres	27.2%
50-99 acres	18.2%
100-199 acres	17.6%
200-499 acres	14.3%
500-999 acres	6.0%
1,000-1,999 acres	3.1%
>2,000 acres	2.5%

Table 4. Ohio and Michigan acres of fruits and vegetables grown for fresh market and/or processing (n=881)

Market	Percent of growers	Mean	Median	Standard Deviation	Range
Fruit for fresh market (n=482)	54.7%	32.1	6.0	79.0	1-750
Vegetables for fresh market (n=474)	53.8%	41.7	7.0	152.1	1-1,974
Fruit for processing (n=286)	32.5%	70.2	30.0	116.7	1-1,092
Vegetables for processing (n=109)	12.4%	145.3	50.0	285.8	1-2,000

Table 5. Ohio and Michigan growers by market channels used (n=881)

Market	Percent
Fresh market only	57.4%
Processing only	20.8%
Both fresh market and processing	21.8%

Table 6. Ohio and Michigan growers by specialty crop type (n=881)

Crop type	Percent
Vegetables only	28.9%
Fruits only	39.3%
Both fruits and vegetables	31.8%

Table 7. Ohio and Michigan vegetables produced for fresh market, by acres category (n=474)

Category	Percent
1-9 acres	55.1%
10-49 acres	31.6%
50-99 acres	6.3%
100-199 acres	2.7%
200-499 acres	2.1%
500-999 acres	1.3%
1,000-1,999 acres	0.8%
>2,000 acres	0.0%

Table 8. Ohio and Michigan fruits produced for fresh market, by acres category (n=482)

Category	Percent
1-9 acres	53.9%
10-49 acres	31.3%
50-99 acres	5.8%
100-199 acres	5.6%
200-499 acres	2.5%
500-999 acres	0.8%
1,000-1,999 acres	0.0%
>2,000 acres	0.0%

Table 9. Ohio and Michigan vegetables produced for processing, by acres category (n=109)

Category	Percent
1-9 acres	24.8%
10-49 acres	22.9%
50-99 acres	15.6%
100-199 acres	18.3%
200-499 acres	11.0%
500-999 acres	5.5%
1,000-1,999 acres	0.9%
>2,000 acres	0.9%

Table 10. Ohio and Michigan fruit produced for processing, by acres category (n=286)

Category	Percent
1-9 acres	22.0%
10-49 acres	40.9%
50-99 acres	14.7%
100-199 acres	13.3%
200-499 acres	7.7%
500-999 acres	1.0%
1,000-1,999 acres	0.3%
>2,000 acres	0.0%

Table 11. Ohio and Michigan number of crop types grown for sale (n=881)

Mean	Median	Standard Deviation	Range
3.5	2.0	3.4	0-13

Table 12. Ohio and Michigan number of crop types grown for sale, by frequency category (n=881)

Category	Percent
No response	2.6%
1 type	42.7%
2-5 types	30.4%
6 or more types	24.3%

Table 13. Ohio and Michigan percent of growers producing each crop type (n=881)

Crop type	Percent
a. squash, pumpkin, cucumber, or melon	44.2%
b. apples, pears, or other tree-fruits	40.3%
c. tomatoes, peppers, or eggplant	37.7%
d. berries (any kind)	37.7%
e. sweet corn (not corn for grain)	27.7%
f. peas or snap beans	26.3%
g. stalk greens (asparagus, celery, rhubarb)	23.6%
h. carrots, table beets, other root crops	21.5%
i. chives, garlic, leeks, or onions	21.1%
j. potatoes (any kind)	20.8%
k. leafy greens (lettuce, spinach, kale, chard)	19.5%
l. corn for grain or silage	18.4%
m. soybeans	16.5%
n. grapes	16.3%
o. hay or other forage crops	15.4%
p. herbs	14.2%
q. flowers, ornamental shrubs/trees	14.2%
r. wheat, small grains, or oats	13.4%
s. other	11.1%
t. sugarbeets	1.8%

Table 14. Ohio and Michigan mean number of types of livestock or livestock products raised for sale, livestock producers only (n=127)

Mean	Median	Standard Deviation	Range
1.7	1.0	1.1	1-6

Table 15. Ohio and Michigan number of types of livestock or livestock products raised for sale (n=881)

Number of types	Percent
0	85.6%
1	8.5%
2	3.1%
3	1.9%
4	0.5%
5	0.2%
6	0.2%

Table 16. Ohio and Michigan percent of livestock farmers producing each type of livestock or livestock products for sale (n=127)

Livestock types	Percent
a. hens or pullets for eggs	76.4%
b. beef cattle	64.6%
c. sheep and/or goats	33.9%
d. hogs	30.7%
e. other	22.8%
f. broilers (chickens for meat)	18.9%
g. dairy cattle	14.2%
h. turkeys	9.4%

Table 17. Ohio and Michigan total gross revenue from farm operation, by revenue category (n=815)

Category	Percent
Less than \$10,000	20.0%
\$10,000 – \$49,999	22.6%
\$50,000 – \$149,999	21.1%
\$150,000 – \$349,999	13.4%
\$350,000 – \$999,999	13.1%
\$1,000,000 or more	9.8%

Table 18. Ohio and Michigan farm size categories corresponding to USDA ERS “Revised Farm Typology” (n=815)

Category	Percent
Small: Less than \$350,000	77.1%
Medium: \$350,000 – \$999,999	13.1%
Large: \$1,000,000 or more	9.8%

Note. Farm size categories adhere to the updated typology issued by USDA ERS (Hoppe and MacDonald 2013).

Marketing Channels

The contemporary “local food movement” has emerged as an important complement to the earlier, and continuing, push to grow and produce food in an environmentally responsible way. Definitions of “local food” vary widely, and experts disagree on the relationship between local food, public health, and sustainability. But however it is defined, the market for local food has grown by leaps and bounds for the past ten years. In 2015, according to USDA, approximately \$8.7 billion of food, from over 167,000 farm operations, was sold through direct marketing, a little more than half of which was due to sales of raw commodities. Michigan and Ohio have played important roles in the growth of the local food market: Michigan ranked 7th and Ohio 10th among states according to total direct-to-consumer sales, which in Michigan involved 4,742 and in Ohio 5,269 farm operations.

Aside from the 2015 USDA Local Food Marketing Practices Survey, little systematic survey data have been collected on how local food is marketed, how these channels for marketing for local food have evolved over time, and what farmers think about local food as a source of future revenue. The findings reported below begin to fill these gaps.

This section presents data on the different types of markets (e.g., farmers markets, wholesalers, produce auctions) that specialty crop growers use to sell their fresh vegetables and/or fruit. Statistics including percent of gross revenue from different market channels and years using them. Several questions focused on participation in “local food” markets and engagement with organizations that facilitate growers’ access to local markets.

Table 19. Ohio and Michigan percent of 2016 gross revenue from various fresh market channels (n=699)

Market channel	More than 50%	26% to 50%	10% to 25%	1% to 10%	0%
a. Sales through your own farm-stand or “pick your own” operation	28.0%	7.7%	8.0%	13.5%	42.8%
b. Wholesalers, distributors, brokers, or packing houses	23.7%	3.1%	4.0%	6.3%	62.8%
c. Farmers markets	14.3%	7.7%	7.3%	11.7%	58.9%
d. Produce auctions	3.3%	1.1%	2.4%	5.2%	88.0%
e. Selling to other farmers for resale at a farmer’s market or other “direct-to-consumer” outlet	1.6%	2.7%	3.6%	18.2%	74.0%
f. Selling directly to restaurants or caterers	1.0%	0.9%	2.1%	10.0%	86.0%
g. Food hub, growers cooperative, or small farms cooperative	1.0%	0.7%	0.7%	3.0%	94.6%
h. Small, independent grocery stores with one or a few locations	0.9%	2.1%	5.3%	13.0%	78.7%
i. Community Supported Agriculture (CSA)	0.9%	1.6%	2.1%	3.6%	91.8%
j. Selling directly to large retailers like Kroger or Meijer	0.9%	1.7%	1.3%	1.1%	95.0%
k. Value-added products made on farm or in community kitchens (jams, sauces, cider, etc.)	0.6%	1.7%	3.9%	7.4%	86.4%
l. Selling directly to institutions like schools or hospitals	0.1%	0.9%	0.7%	3.1%	95.1%

Table 20. Ohio and Michigan number of years using various fresh market channels for local food systems

Market channels	Mean years using	Standard Deviation
a. Sales through your own farm-stand or “pick-your-own” operation (n=333)	25.6	22.9
b. Farmers markets (n=246)	17.1	14.3
c. Selling to other farmers for resale at a farmer’s market or other “direct-to-consumer” outlet (n=136)	18.7	17.4
d. Small, independent grocery stores with one or a few locations (n=121)	20.8	21.9
e. Selling directly to restaurants or caterers (n=85)	11.5	10.6
f. Value-added products made on-farm or in community kitchens (jams, sauces, cider, etc.) (n=73)	19.7	21.1
g. Produce auctions averagely (n=73)	10.2	6.6
h. Community Supported Agriculture (CSA) (n=56)	8.3	7.0
i. Food hub, growers cooperative, or small farms cooperative (n=47)	16.1	17.0
j. Selling directly to institutions like schools or hospitals (n=26)	11.4	10.3

Table 21. Ohio and Michigan number of farmers' markets at which specialty crop farmers sell (n=881)

Number	Percent	(n)
No response	70.7%	623
1	15.7%	138
2	8.1%	71
3	2.7%	24
4	2.8%	25



Figure 3a. Farmers market distribution in Ohio and the number of specialty crop growers who sell at those markets.

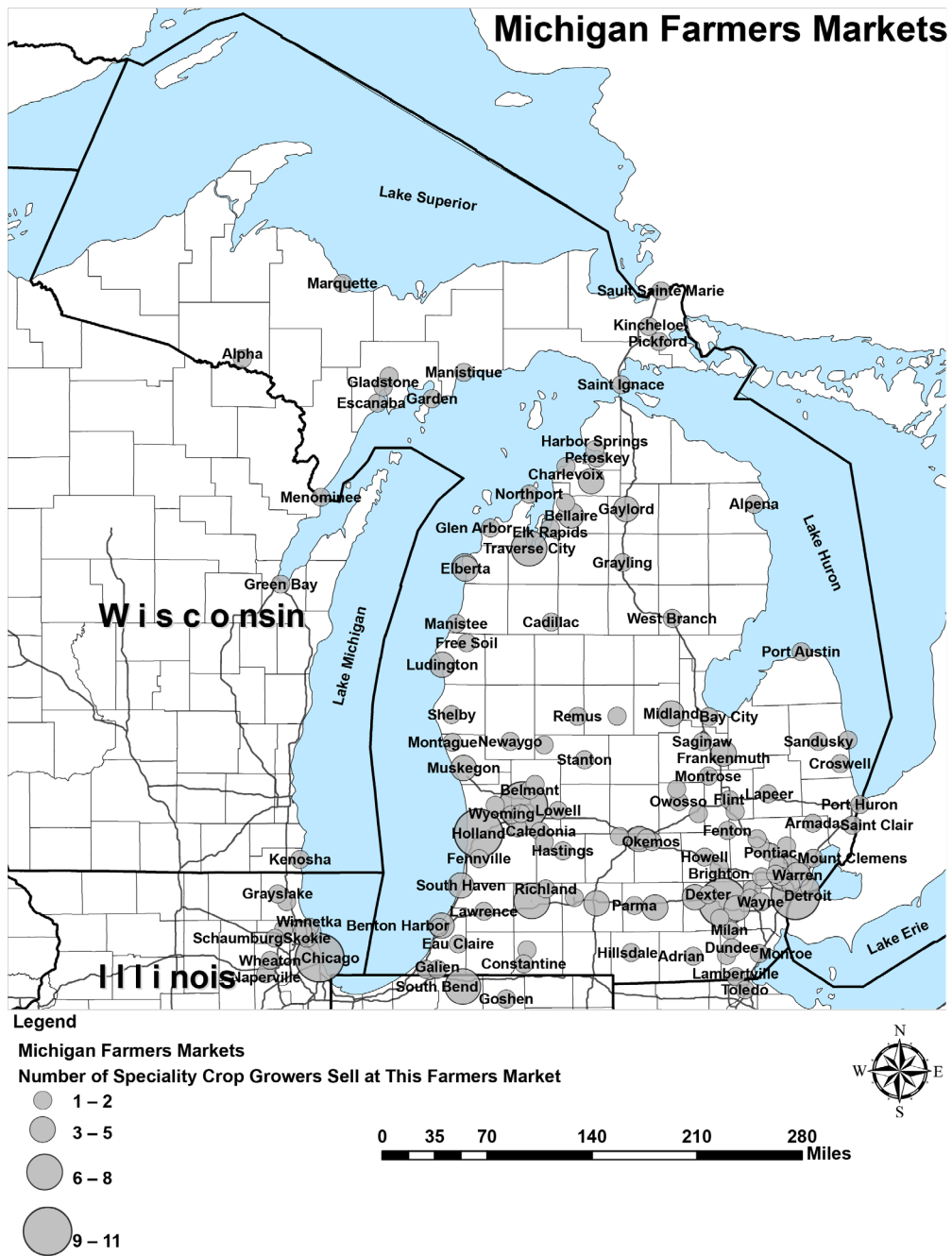


Figure 3b. Farmers market distribution in Michigan and the number of specialty crop growers who sell at those markets.

Table 22. Ohio and Michigan vegetable and fruit sales to fresh markets within county (n=699)

Percent growers selling to in-county fresh markets	Mean percent of growers' fresh produce sold within county	Standard Deviation
67.7%	68.2%	37.1%

Table 23. Ohio and Michigan importance of “local food” markets to growers’ plans for their farm operation (n=844)

Category	Percent
Not important	16.1%
Slightly important	13.3%
Important	23.9%
Very Important	46.7%

Table 24. Ohio and Michigan engagement with local food groups and organizations

Have you ever	Yes	No, but I would like to do this	No, and I am not interested in doing this
a. Donated produce from your farm to food pantries, soup kitchens, or similar organizations (including through gleaning)? (n=836)	51.7%	10.5%	37.8%
b. Worked with university agricultural extension to learn how to sell food locally? (n=812)	19.7%	22.5%	57.8%
c. Worked with nonprofit groups that help farmers to sell food locally? (n=811)	18.0%	19.7%	62.3%
d. Taken advantage of government programs designed to support farmers who sell food locally? (n=810)	17.2%	26.9%	55.9%

Table 25. Ohio and Michigan percent of growers receiving 2016 revenue from selected additional sources (n=881)

Source	Percent
Agri-tourism (outdoor activities, farm tours, and “pick-your-own” operations)	15.8%
Provide services or consulting to other farmers (planting or harvesting on contract, other custom work, seed sales, equipment rental, etc.)	9.4%
Rent out your property for non-farm uses (hunting, weddings, etc.)	6.7%

Weather and Climate

Michigan and Ohio produce a wide variety of high-value specialty crops. These crops are more profitable on a per-acre basis than many row crops; however, they also have higher production-related risks. They are generally more sensitive to weather stressors and require more intensive management compared to traditional row crops. Temperature and precipitation fluctuations are strongly influenced by Great Lake weather patterns and these directly impact the quality and quantity of specialty crop production and indirectly influence the timing of crucial farm decisions. Pest, weeds, and diseases management decisions are especially affected by weather variability and a changing climate (Kistner et al. 2017). With these issues in mind, one group of survey items asked growers to identify concerns that are influencing their farm operations, to relate recent experiences of extreme weather events, and to share views on how their operations will likely cope with climate change.

Table 26. Ohio and Michigan grower level of concern about potential threats to their farm operations

Potential threats	Not concerned	Slightly concerned	Concerned	Very concerned
a. Increased weed or insect pressure (n=820)	12.0%	22.3%	42.3%	23.4%
b. Fluctuations in spring temperatures (n=830)	15.2%	24.9%	31.6%	28.3%
c. Changes in health or timing of pollinators (n=810)	18.9%	21.9%	33.3%	25.9%
d. Higher incidence of crop disease (n=815)	14.4%	26.9%	38.2%	20.6%
e. Increased heat stress on crops (n=820)	20.2%	29.0%	34.6%	16.1%
f. More buyers requiring food safety audits, such as USDA-Harmonized Good Agricultural Practices (GAP), Good Handling Practices (GHP), etc. (n=816)	29.4%	22.8%	23.3%	24.5%
g. Unavailability of workers for my farm (n=822)	36.5%	17.0%	16.9%	29.6%
h. Longer dry periods and drought (n=824)	23.1%	29.9%	32.0%	15.0%
i. More frequent extreme rains (n=819)	30.4%	30.3%	27.5%	11.8%
j. Increased flooding (n=810)	67.9%	14.8%	11.0%	6.3%

Table 27. Ohio and Michigan percent of growers experiencing severe weather on land farmed in the past five years

Severe weather type	Percent
Significant drought (n=844)	45.0%
Saturated soils or ponding (n=835)	36.5%
Significant flooding (n=830)	16.4%

Table 28. Ohio and Michigan perceived risks and capacity related to weather and climate change

Risk and capacity type	Disagree	Uncertain	Agree
a. I have the knowledge and technical skills to deal with most weather-related threats to my farm operation (n=824)	9.7%	33.6%	56.7%
b. There's too much uncertainty about the impact of climate change to justify changing my farming practices/strategies (n=808)	16.1%	39.4%	44.6%
c. I have the financial resources to deal with most weather related threats to my farm operation (n=819)	24.7%	35.3%	40.0%
d. My farm operation will likely be harmed by climate change (n=814)	26.3%	50.5%	23.2%
e. Available best management practice technologies may not be enough to protect my farm from the impacts of climate change (n=803)	23.7%	50.4%	25.9%
f. Climate change is not a big issue because human ingenuity will enable us to adapt to changes (n=814)	31.2%	39.6%	29.2%
g. My farm operation will likely benefit from climate change (n=805)	40.0%	49.8%	10.2%

Production and Conservation Practices

Conservation practices encompass a wide range of strategies designed to protect soil from erosion and improve soil health, prevent off-farm loss of nutrients into nearby lakes and streams, reduce reliance on agricultural chemicals for pest and weed management, and balance productivity imperatives with natural resource conservation. Survey items in this section examine growers' historical uses of different conservation practices, applications of naturally- occurring and synthetic fertilizers, insecticides and herbicides, organic agriculture practices, and an in depth look at use of cover crops.

Table 29. Ohio and Michigan use of selected production and conservation practices (n=881)

Practice	Percent used	Mean years used	Standard Deviation
a. Nutrient management (testing soil, manure, or plant tissue to determine fertilizer rates) (n=581)	68.1%	24.1	16.1
b. Plant cover crops (n=442)	64.9%	24.5	20.9
c. Integrated pest management (managed use of pest-resistant varieties, scouting and considering pest thresholds before spraying) (n=490)	57.1%	22.2	13.4
d. Crop rotation (n=453)	53.8%	28.4	21.5
e. Drip irrigation (also called "trickle irrigation") (n=395)	45.9%	16.6	12.1
f. Maintain portions of crop fields as grass, trees or wild vegetation (n=382)	45.1%	26.5	22.8
g. Use manure, compost, bone meal, or other organic materials (n=334)	39.2%	17.9	17.2
h. Drain some or all fields with subsurface tile drains (n=329)	38.8%	30.8	24.3
i. Biological pest control (use beneficial insects and natural enemies to control pests and weeds) (n=237)	27.7%	19.6	14.6
j. Drain some or all fields with surface ditches (n=185)	22.0%	30.1	22.2
k. Use a greenhouse or hoop house to grow vegetable and/or fruit crops during cold-weather months (n=185)	21.1%	14.2	14.9
l. Reduced tillage (strip-till, ridge-till) (n=156)	18.4%	23.4	15.8
m. Precision agriculture with technology such as GPS, GNSS, and variable rate technology (n=121)	14.1%	10.9	7.7
n. Continuous no-till (no-till every year) (n=107)	12.8%	24.9	19.0
o. Intercropping (n=94)	10.9%	17.0	14.3

Table 30. Width of buffer strips of grass, trees, or wild vegetation in fields next to streams or creeks (n=796)

Distance	Percent
0-24 feet	15.1%
25-49 feet	16.2%
50-99 feet	8.0%
100 feet or more	12.9%
No streams or creeks next to fields	47.7%

Table 31. Ohio and Michigan timing of selected agricultural practices (n=881)

Practice	Percent using	Dec. thru Feb.	Mar. thru May	Jun. thru Aug.	Sep. thru Nov.
Apply synthetic fertilizer	68.2%	1.8%	58.9%	28.9%	13.6%
Apply manure, compost, or other organic materials	43.6%	11.8%	25.4%	9.4%	19.5%
Apply conventional insecticides, herbicides or fungicides	75.9%	1.1%	56.2%	69.8%	32.7%
Apply organic insecticides, herbicides or fungicides	32.2%	1.0%	20.3%	27.9%	13.5%
Apply ANY insecticides, herbicides or fungicides	88.1%	1.9%	64.2%	81.7%	39.4%
Sow cover crops	48.9%	1.8%	9.6%	12.8%	42.0%
Till fields	59.4%	2.5%	48.7%	20.7%	29.7%

Table 32. Ohio and Michigan use of selected organic management practices (n=881)

Practice	Percent using	Mean years used	Standard Deviation
a. Certified organic or transitioning to certified organic (n=53)	6.0%	9.9	7.9
b. Organic in practice, but not certified or transitioning to certified (n=129)	14.6%	12.2	10.4
c. "No-spray" (n=63)	7.2%	13.5	11.3

Table 33. Ohio and Michigan number of cover crops types used (n=881)

Number	Percent
0	34.8%
1	25.5%
2	14.5%
3	10.2%
4	5.4%
5	3.4%
6	3.1%
7	1.5%
8	1.1%
9+	0.3%

Note: On average, in 2016 each grower planted 1.7 cover crops (Standard Deviation=1.9).

Table 34. Ohio and Michigan types of cover crops generally used (n=881)

Type	Percent
a. Rye	48.9%
b. Clover	19.9%
c. Oats	19.1%
d. Radish	16.2%
e. Buckwheat	12.1%
f. Wheat	12.0%
g. Sudan-grass	9.0%
h. Other	8.2%
i. Peas	6.2%
j. Vetch	5.9%
k. Mustard	4.0%
l. Barley	3.9%

Grower Decision Making

From year to year, growers make major decisions about what to plant and how to farm. From month to month and even day to day, growers continually update their plans in the face of changing environmental circumstances and market conditions. In this section, data are presented on factors that growers reported influencing their decisions, including social networks and crop advisors, engagement with farming organizations, and personal attitudes and values about farming and the relationship between agriculture and the natural environment.

Table 35. Ohio and Michigan growers ratings of influence of selected entities on farm operation decisions

Entities	No influence	Some influence	Strong influence
a. University Extension (staff, online info, etc.) (n=813)	28.3%	43.2%	28.5%
b. Feedback from individual consumers, independent grocery stores, or other small buyers (n=798)	36.6%	36%	27.4%
c. Food safety third party auditors and consultants (n=791)	46.4%	32%	21.6%
d. Sales representatives for seeds, crop varieties, pesticides or fertilizers (n=802)	34.3%	45.4%	20.3%
e. Other farmers (n=810)	22.7%	57.4%	19.9%
f. Food wholesalers or distributors, grocery store chains, or other large buyers (n=779)	63.8%	21.7%	14.5%
g. Private crop or livestock consultant (n=764)	66.0%	19.6%	14.4%
h. Government agriculture or conservation agencies (n=796)	42.5%	44.8%	12.7%
i. Major farm organizations with a broad focus (Farm Bureau, Vegetable Growers, etc.) (n=793)	47.2%	40.6%	12.2%
j. Farm organizations focused on sustainable farming (n=778)	50.1%	39.6%	10.3%
k. Farm organizations focused on local food (n=777)	58.0%	33.8%	8.1%
l. Conservation or environmental groups (n=788)	58.6%	35.3%	6.1%
m. Landlord or management firm (n=749)	88.8%	8.7%	2.5%

Table 36. Ohio and Michigan grower interactions with agricultural organizations (n=881)

Interaction	Percent
a. I read their mailings, email updates, etc.	75.6%
b. I pay membership dues	54.9%
c. I attend at least one meeting a year	56.5%
d. I serve on committees or in leadership roles	19.9%

Table 37. Ohio and Michigan grower rating of the importance of selected factors in farm operation decision making

Decision factors	Not Important	Slightly Important	Important	Very Important
a. Think about the health of people who eat food grown on your farm (n=828)	3.1%	5.1%	32.5%	59.3%
b. Minimize soil erosion (n=824)	5.6%	11.5%	41.5%	41.4%
c. Minimize the use of pesticides and fungicides (n=831)	2.4%	14.9%	41.9%	40.8%
d. Maintain or increase soil organic matter (n=822)	4.4%	12.7%	42.2%	40.8%
e. Consider the health of streams on/near your land to be your responsibility (n=815)	7.6%	12.9%	40.4%	39.1%
f. Keep your fields clean (n=827)	3.1%	13.9%	44.5%	38.5%
g. Minimize nutrient runoff into waterways (n=818)	14.8%	11.4%	37.4%	36.4%
h. Have the highest profit per acre (n=821)	9.9%	20.6%	36.9%	32.6%
i. Manage for both profitability and minimization of environmental impact (n=818)	3.7%	14.3%	51.8%	30.2%
j. Use the latest seed and chemical technology (n=824)	20.1%	16.0%	35.0%	28.9%
k. Have the highest yields per acre (n=824)	9.2%	23.5%	38.6%	28.6%
l. Support other businesses in your community (n=833)	6.4%	17.4%	48.9%	27.4%
m. Use cover crops between harvest and planting (n=817)	25.9%	17.6%	31.0%	25.5%
n. Be active in your community (n=820)	11.7%	27.1%	36.8%	24.4%
o. Put long-term conservation of farm resources before short-term profits (n=816)	8.6%	23.4%	44.9%	23.2%
p. Have the most up-to-date equipment (n=827)	24.4%	38.3%	26.7%	10.5%
q. Maintain habitat for wildlife (n=823)	15.2%	27.1%	35.2%	22.5%
r. Work to get healthy food to people who cannot afford it (n=816)	14.5%	28.3%	38.7%	18.5%
s. Create opportunities for people to learn about farming (n=819)	13.1%	27.1%	42.0%	17.8%
t. Help friends and neighbors with farm tasks (n=826)	9.8%	30.3%	45.2%	14.8%
u. Be a leader in your community (n=817)	26.8%	30.1%	29.6%	13.5%
v. Minimize tillage (n=819)	23.0%	30.3%	33.7%	13.1%
w. Be active in farm organizations (n=813)	25.3%	35.4%	27.4%	11.8%
x. Create economic opportunities for other people in your community (n=817)	15.5%	34.0%	38.7%	11.8%
y. Avoid fall tillage (n=811)	36.1%	29.6%	23.7%	10.6%
z. Share equipment with friends and neighbors (n=822)	32.0%	31.6%	26.3%	10.1%

Grower Characteristics

In this section, basic socioeconomic characteristics of growers and farm operations are presented. These characteristics offer insights into grower experiences, years in operation, off-farm occupations that contribute to household income, and future aspirations for the farm to produce household income.

Table 38. Ohio and Michigan years operating current farm, by years category (n=830)

Category	Percent
1-5 years	6.6%
6-10 years	14.7%
11-15 years	12.8%
16-20 years	11.9%
21 years or more	54.0%

Note. Mean=24.6, Standard Deviation=14.7.

Table 39. Ohio and Michigan years operating any farm, by years category (n=718)

Category	Percent
1-5 years	4.6%
6-10 years	12.1%
11-15 years	9.3%
16-20 years	9.5%
21 years or more	64.5%

Note. Mean=28.8, Standard Deviation=16.0.

Table 40. Ohio and Michigan occupation status of specialty crop growers

Question	Yes	No	N/A
In addition to your farm occupation, do you have any off-farm occupations? (n=833)	40.6%	59.4%	-
Do you spend the majority (50 percent or more) of your worktime in off-farm occupations? (n=796)	27.8%	63.7%	8.5%

Table 41. Ohio and Michigan occupation status of specialty crop growers' spouses

Question	Yes	No
Does your spouse do farm work on your farm operation? (n=734)	68.9%	31.1%
Does your spouse spend the majority (50 percent or more) of his/her worktime in off-farm occupations? (n=715)	42.8%	57.2%

Table 42. Ohio and Michigan farm workers by type (n=881)

Type	Percent	Mean	Standard Deviation
Family members (n=664)	75.4%	3.1	2.2
Permanent employees (121 days or more per year) (n=273)	31.0%	5.9	11.6
Seasonal workers (120 days or less per year) (n=540)	61.3%	21.0	59.3
Migrant workers (seasonal workers who travel to do farm work) (n=213)	24.2%	35.7	86.2
Interns or volunteers (n=100)	11.4%	4.7	10.9

Note. The survey question about family members employed on-farm many not have been interpreted consistently by all respondents.

Table 43. Ohio and Michigan 2016 household income from farm, by percent category (n=807)

Category	Percent
None	7.8%
1% to 25%	32.2%
26% to 50%	16.5%
51% to 75%	7.9%
76% to 100%	35.6%

Note. Mean= 50.0%, Standard Deviation=38.8%.

Table 44. Ohio and Michigan proportion of total household income growers would like to make from the farm, by percent category (n=757)

Category	Percent
None	1.7%
1% to 25%	19.8%
26% to 50%	19.0%
51% to 75%	9.4%
76% to 100%	50.1%

Note. Mean=66.5%, Standard Deviation=34.7%.

Table 45. Ohio and Michigan confidence that farm will provide hoped-for income five years from now (n=830)

Category	Percent
Not confident	20.1%
Slightly confident	27.3%
Confident	35.8%
Very confident	16.7%

Table 46. Ohio and Michigan age, by year category (n=853)

Category	Percent
Under 25 years	0.6%
25 to 34 years	5.6%
35 to 44 years	8.9%
45 to 54 years	21.0%
55 to 64 years	33.4%
65 to 74 years	21.9%
75 years and over	8.6%

Note. Mean=57.8, Standard Deviation=12.8.

Table 47. Ohio and Michigan highest level of education (n=865)

Category	Percent
Less than a high school degree	9.7%
High school graduate/GED	33.5%
2-year college degree	18.2%
4-year college degree	24.5%
Graduate degree	14.1%

Table 48. Ohio and Michigan gender (n=881)

Gender	Percent
Male	85.1%
Female	12.8%
Not indicated	2.1%

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Appendix

Michigan and Ohio Specialty Crops Growers Study



Project Code: 479

1. In 2016, how many acres did this operation:

		Acres
a. Own?	+	901
b. Rent or Lease from others or use Rent-Free?	+	902
c. Rent to others	-	905
2. Calculate items 1a + 1b - 1c. Then the total acres operated in 2016 was	=	900

USDA defines **fresh market** produce as vegetables and fruits that are **sold raw**, without being frozen, cooked, or subject to other forms of preservation prior to sale.

Processed means produce that has been heated, cooked, canned, frozen, dried, mixed with preservatives, or subject to other forms of preservation prior to sale.

3. In 2016, on how many acres did you grow:

	Acres
a. Vegetables for fresh market	401
b. Fruit for fresh market	402

	Acres
c. Vegetables for processing	501
d. Fruit for processing	502

If you grow either vegetables or fruit **for fresh market**, please go to the next question on page 2.

If you do **not** grow for fresh market, but you **do** grow vegetables or fruit for **processing**, please skip directly to Question 8 on page 4.

If you do **not** grow vegetables or fruit **at all** on your farm operation, please **STOP HERE** and mail back this questionnaire using the enclosed envelope. Thank you for your help with this study.

Section A: Marketing Channels and Selling Food Locally

4. This question asks about how you sell the vegetables and/or fruit that you grow for fresh market.

During 2016, about how much of the total gross revenue for your farm operation came from the following sources? (Please estimate as best you can the percentage of your revenue from each source. Circle one number on each line.)

	None	Less than 10%	Between 10% – 25%	Between 26% – 50%	More than 50%	office use only
a. Wholesalers, distributors, brokers, or packing houses	1	2	3	4	5	410
b. Selling directly to large retailers like Kroger or Meijer	1	2	3	4	5	411
c. Produce auctions	1	2	3	4	5	412
d. Small, independent grocery stores with one or a few locations	1	2	3	4	5	413
e. Farmers markets	1	2	3	4	5	414
f. Community Supported Agriculture (CSA)	1	2	3	4	5	415
g. Sales through your own farmstand or “pick your own” operation	1	2	3	4	5	416
h. Food hub, growers cooperative, or small farms cooperative	1	2	3	4	5	417
i. Selling directly to restaurants or caterers	1	2	3	4	5	418
j. Selling directly to institutions like schools or hospitals	1	2	3	4	5	419
k. Selling to other farmers for resale at a farmers market or other “direct-to-consumer” outlet	1	2	3	4	5	420
l. Value-added products made on-farm or in community kitchens (jams, sauces, cider, etc.)	1	2	3	4	5	421

5. If any of your farm revenue in 2016 was generated by a source below, please check the box and provide the year it started. (Skip this question if none of your income comes from these sources.)

	This source has provided income for my farm since... [write year]
a. Produce auctions	430 <input type="checkbox"/> since _____
b. Small, independent grocery stores with one or a few locations	431 <input type="checkbox"/> since _____
c. Farmers markets	432 <input type="checkbox"/> since _____
d. Community Supported Agriculture (CSA)	433 <input type="checkbox"/> since _____
e. Sales through your own farmstand or “pick-your-own” operation	434 <input type="checkbox"/> since _____
f. Food hub, growers cooperative, or small farms cooperative	435 <input type="checkbox"/> since _____
g. Selling directly to restaurants or caterers	436 <input type="checkbox"/> since _____
h. Selling directly to institutions like schools or hospitals	437 <input type="checkbox"/> since _____
i. Selling to other farmers for resale at a farmers market or other “direct-to-consumer” outlet	438 <input type="checkbox"/> since _____
j. Value-added products made on-farm or in community kitchens (jams, sauces, cider, etc.)	439 <input type="checkbox"/> since _____

6. If you sell at farmers markets, please use the lines below to say where these farmers markets are located. (Skip this question if you do not sell at farmers markets.)

City or town where a farmers market I sell at is located:	State:	office use only
a.		910
b.		915
c.		920
d.		925

7. The following questions ask you to estimate how much of what you grow for fresh market is sold within a particular distance from your farm.

Please write in the approximate percent for each line, or check “I don’t know”:

	I don't know	office use only
a. Approximately _____ percent of the vegetables and fruit that I grow for fresh market are sold <u>in my county</u> .	450 <input type="checkbox"/>	451
b. Approximately _____ percent of the vegetables and fruit that I grow for fresh market are sold <u>within 100 miles of my farm</u> .	452 <input type="checkbox"/>	453
c. Approximately _____ percent of the vegetables and fruit that I grow for fresh market are sold <u>in my state OR within 275 miles of my farm</u> .	454 <input type="checkbox"/>	455

8. How important to your future plans for your farm operation is the market for “local food”?
(Please check one.)

Not important Slightly important Important Very important

office use only

460

9. Please check one box on each line to answer the following questions:

Have you ever ...	Yes	No, but I would like to do this	No, and I am <u>not</u> interested in doing this	office use only
a. Worked with nonprofit groups that help farmers to sell food locally?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	461
b. Worked with university agricultural extension to learn how to sell food locally?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	462
c. Taken advantage of government programs designed to support farmers who sell food locally?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	463
d. Donated produce from your farm to food pantries, soup kitchens, or similar organizations (including through gleaning)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	464

Section B: Growing Specialty Crops

10. On your farm, do you use any of the following practices for your vegetable and/or fruit crops? For each practice that you use, please check the box and write the year when you started using it. (If you do not use a practice, please leave that line blank.)

	Yes, I have used this practice since ... [write year]
a. Plant cover crops	<input type="checkbox"/> since _____ 200
b. Intercropping (plant two or more crops in the same rows at the same time)	<input type="checkbox"/> since _____ 201
c. Crop rotation	<input type="checkbox"/> since _____ 202
d. Reduced tillage (strip-till, ridge-till)	<input type="checkbox"/> since _____ 203
e. Continuous no-till (no-till every year)	<input type="checkbox"/> since _____ 204
f. Maintain portions of crop fields as grass, trees or wild vegetation	<input type="checkbox"/> since _____ 205
g. Use manure, compost, bone meal, or other organic materials, as a significant source of fertilizer	<input type="checkbox"/> since _____ 206
h. Nutrient management (testing soil, manure, or plant tissue to determine fertilizer rates)	<input type="checkbox"/> since _____ 207
i. Biological pest control (use beneficial insects and natural enemies to control pests and weeds)	<input type="checkbox"/> since _____ 208
j. Integrated pest management (managed use of pest-resistant varieties, scouting and considering pest thresholds before spraying)	<input type="checkbox"/> since _____ 209
k. Drip irrigation (also called "trickle irrigation")	<input type="checkbox"/> since _____ 210
l. Drain some or all fields with surface ditches	<input type="checkbox"/> since _____ 211
m. Drain some or all fields with subsurface tile drains	<input type="checkbox"/> since _____ 212
n. Precision agriculture with technology such as GPS, GNSS, and variable-rate technology	<input type="checkbox"/> since _____ 213
o. Use a greenhouse or hoophouse to grow vegetable and/or fruit crops during cold-weather months	<input type="checkbox"/> since _____ 214

11. What is the **minimum** width of the buffer strips of grass, trees, or wild vegetation next to streams or creeks on or next to your crop fields? (Please check one box for the minimum width of riparian buffer strips, or check the box for “no streams on my crop fields.”)

0–24 feet 25–49 feet 50–99 feet 100 feet or more

office use only

225

No streams or creeks run on or next to my crop fields

12. On your farm, do you carry out the following practices for your **vegetable and/or fruit crops**? If so, when? (Please check all the periods, in 3-month blocks, when you typically carry out a practice. If you do not use a practice, please check “not applicable.”)

I typically...	in... (please check all periods that apply)				
	December – February	March – May	June – August	September – November	Not applicable
a. Apply synthetic fertilizer	125 <input type="checkbox"/>	126 <input type="checkbox"/>	127 <input type="checkbox"/>	128 <input type="checkbox"/>	129 <input type="checkbox"/>
b. Apply manure, compost, or other organic materials	130 <input type="checkbox"/>	131 <input type="checkbox"/>	132 <input type="checkbox"/>	133 <input type="checkbox"/>	134 <input type="checkbox"/>
c. Apply conventional insecticides, herbicides or fungicides	135 <input type="checkbox"/>	136 <input type="checkbox"/>	137 <input type="checkbox"/>	138 <input type="checkbox"/>	139 <input type="checkbox"/>
d. Apply organic insecticides, herbicides or fungicides	140 <input type="checkbox"/>	141 <input type="checkbox"/>	142 <input type="checkbox"/>	143 <input type="checkbox"/>	144 <input type="checkbox"/>
e. Sow cover crops	145 <input type="checkbox"/>	146 <input type="checkbox"/>	147 <input type="checkbox"/>	148 <input type="checkbox"/>	149 <input type="checkbox"/>
f. Till fields	150 <input type="checkbox"/>	151 <input type="checkbox"/>	152 <input type="checkbox"/>	153 <input type="checkbox"/>	154 <input type="checkbox"/>

13. Do any of the following descriptions apply to your **vegetable and/or fruit crops**? If so, please check the appropriate box and write the year when it started to apply. (If a description does not apply to your vegetable or fruit crops, please leave that line blank.)

	Yes, since approximately... [write year]
a. Certified organic or transitioning to certified organic	230 <input type="checkbox"/> , since _____
b. Organic in practice, but not certified or transitioning to certified	231 <input type="checkbox"/> , since _____
c. “No-spray”	232 <input type="checkbox"/> , since _____

Section C: Other Information

14. How influential are the following groups and individuals when you make decisions about your farm operation? (Please circle one number on each line.)

	On my farming, this group has...			office use only
	No influence	Some influence	Strong influence	
a. Other farmers	1	2	3	240
b. Landlord or management firm	1	2	3	243
c. Private crop or livestock consultant	1	2	3	244
d. Sales representatives for seeds, crop varieties, pesticides or fertilizers	1	2	3	245
e. Food wholesalers or distributors, grocery store chains, or other large buyers	1	2	3	246
f. Feedback from individual consumers, independent grocery stores, or other small buyers	1	2	3	247
g. Major farm organizations with a broad focus (Farm Bureau, Vegetable Growers, etc.)	1	2	3	248
h. Farm organizations focused on local food	1	2	3	249
i. Farm organizations focused on sustainable farming	1	2	3	250
j. Government agriculture or conservation agencies	1	2	3	251
k. University Extension (staff, online info, etc.)	1	2	3	252
l. Conservation or environmental groups	1	2	3	253
m. Food safety third party auditors and consultants	1	2	3	254

15. How active are you with farm or agriculture organizations? (Please check as many boxes as apply.)

a. I read their mailings, email updates, etc.	<input type="checkbox"/>	260
b. I pay membership dues	<input type="checkbox"/>	261

c. I attend at least one meeting a year	<input type="checkbox"/>	262
d. I serve on committees or in leadership roles	<input type="checkbox"/>	263

16. How concerned are you about the following problems for your farm operation? (Please circle one number on each line.)

	Not concerned	Slightly concerned	Concerned	Very concerned	office use only
a. Increased flooding	1	2	3	4	270
b. Longer dry periods and drought	1	2	3	4	271
c. Increased weed or insect pressure	1	2	3	4	272
d. Changes in health or timing of pollinators	1	2	3	4	273
e. Higher incidence of crop disease	1	2	3	4	274
f. More frequent extreme rains	1	2	3	4	275
g. Fluctuations in spring temperatures	1	2	3	4	276
h. Increased heat stress on crops	1	2	3	4	277
i. Unavailability of workers for my farm	1	2	3	4	278
j. More buyers requiring food safety audits, such as USDA-Harmonized Good Agricultural Practices (GAP), Good Handling Practices (GHP), etc.	1	2	3	4	279

17. Over the past five years, have you...

	Yes	No	office use only
a. Experienced significant drought on the land you farm?	<input type="checkbox"/>	<input type="checkbox"/>	280
b. Had problems with saturated soils or ponding on any of the land you farm?	<input type="checkbox"/>	<input type="checkbox"/>	281
c. Experienced significant flooding on any of the land you farm?	<input type="checkbox"/>	<input type="checkbox"/>	282

18. Given recent changes in weather and climate in the Midwest, please provide your opinions on the following statements. (Please circle one number on each line.)

	Disagree	Uncertain	Agree	office use only
a. I have the knowledge and technical skills to deal with most weather-related threats to my farm operation	1	2	3	290
b. I have the financial resources to deal with most weather-related threats to my farm operation	1	2	3	291
c. My farm operation will likely benefit from climate change	1	2	3	292
d. There's too much uncertainty about the impact of climate change to justify changing my farming practices/strategies	1	2	3	293
e. My farm operation will likely be harmed by climate change	1	2	3	294
f. Available best management practice technologies may not be enough to protect my farm from the impacts of climate change	1	2	3	295
g. Climate change is not a big issue because human ingenuity will enable us to adapt to changes	1	2	3	296

19. Please think about how you make decisions about your farm operation, and rate the importance of the following items. (Please circle one number on each line.)

For your farm operation, how important is it for you to...	Not important	Slightly important	Important	Very important	<i>office use only</i>
a. Use the latest seed and chemical technology	1	2	3	4	301
b. Minimize nutrient runoff into waterways	1	2	3	4	302
c. Use cover crops between harvest and planting	1	2	3	4	303
d. Be active in your community	1	2	3	4	304
e. Think about the health of people who eat food grown on your farm	1	2	3	4	305
f. Have the most up-to-date equipment	1	2	3	4	306
g. Minimize soil erosion	1	2	3	4	307
h. Maintain habitat for wildlife	1	2	3	4	308
i. Keep your fields clean	1	2	3	4	309
j. Support other businesses in your community	1	2	3	4	310
k. Have the highest yields per acre	1	2	3	4	311
l. Maintain or increase soil organic matter	1	2	3	4	312
m. Avoid fall tillage	1	2	3	4	313
n. Be active in farm organizations	1	2	3	4	314
o. Work to get healthy food to people who cannot afford it	1	2	3	4	315
p. Have the highest profit per acre	1	2	3	4	316
q. Consider the health of streams on/near your land to be your responsibility	1	2	3	4	317
r. Minimize the use of pesticides and fungicides	1	2	3	4	318
s. Share equipment with friends and neighbors	1	2	3	4	319
t. Create opportunities for people to learn about farming	1	2	3	4	320
u. Put long-term conservation of farm resources before short-term profits	1	2	3	4	321
v. Create economic opportunities for other people in your community	1	2	3	4	322
w. Help friends and neighbors with farm tasks	1	2	3	4	323
x. Manage for both profitability and minimization of environmental impact	1	2	3	4	324
y. Be a leader in your community	1	2	3	4	325
z. Minimize tillage	1	2	3	4	326

Section D: Characteristics of your Farm Operation

601

20. What year did you become the operator of your current farm operation? Year: _____

602

21. What year did you become the operator of any farm operation? Year: _____

22. On your farm, what kinds of crops do you grow for sale? (Please check all that apply.)

a. chives, garlic, leeks, or onions	330	<input type="checkbox"/>	k. sweet corn (<u>not</u> corn for grain)	340	<input type="checkbox"/>
b. leafy greens (lettuce, spinach, kale, chard)...	331	<input type="checkbox"/>	l. berries (any kind)	341	<input type="checkbox"/>
c. stalk greens (asparagus, celery, rhubarb)	332	<input type="checkbox"/>	m. herbs	342	<input type="checkbox"/>
d. tomatoes, peppers, or eggplant	333	<input type="checkbox"/>	n. corn for grain or silage	343	<input type="checkbox"/>
e. squash, pumpkin, cucumber, or melon	334	<input type="checkbox"/>	o. wheat, small grains, or oats	344	<input type="checkbox"/>
f. potatoes (any kind)	335	<input type="checkbox"/>	p. soybeans	345	<input type="checkbox"/>
g. apples, pears, or other tree-fruits	336	<input type="checkbox"/>	q. sugarbeets	346	<input type="checkbox"/>
h. peas or snap beans	337	<input type="checkbox"/>	r. hay or other forage crops	347	<input type="checkbox"/>
i. carrots, table beets, other root crops	338	<input type="checkbox"/>	s. flowers, ornamental shrubs/trees	348	<input type="checkbox"/>
j. grapes	339	<input type="checkbox"/>	t. other	349	<input type="checkbox"/>

23. On your farm, do you raise any livestock or livestock products for sale? (Please check all that apply.)

a. dairy cattle	350	<input type="checkbox"/>	e. hens or pullets for eggs	354	<input type="checkbox"/>
b. beef cattle	351	<input type="checkbox"/>	f. broilers (chickens for meat)	355	<input type="checkbox"/>
c. hogs	352	<input type="checkbox"/>	g. turkeys	356	<input type="checkbox"/>
d. sheep and/or goats	353	<input type="checkbox"/>	h. other	357	<input type="checkbox"/>

24. If you plant cover crops, which cover crops do you generally use? (Please check all that apply.)

a. Rye	360	<input type="checkbox"/>	e. Clover	364	<input type="checkbox"/>	i. Oats	368	<input type="checkbox"/>
b. Barley	361	<input type="checkbox"/>	f. Wheat	365	<input type="checkbox"/>	j. Peas	369	<input type="checkbox"/>
c. Vetch	362	<input type="checkbox"/>	g. Sudan-grass	366	<input type="checkbox"/>	k. Mustard	370	<input type="checkbox"/>
d. Radish	363	<input type="checkbox"/>	h. Buckwheat	367	<input type="checkbox"/>	l. Other	371	<input type="checkbox"/>

25. During 2016, did you or your farm operation receive any revenue from any of the following sources? (Please check all that apply.)

a. Providing services or consulting to other farmers (planting or harvesting on contract, other custom work, seed sales, equipment rental, etc.)	380	<input type="checkbox"/>
b. Agri-tourism (outdoor activities, farm tours, and “pick-your-own” operations)	381	<input type="checkbox"/>
c. Leasing or renting out your property for non-farm uses (hunting, weddings, etc.)	382	<input type="checkbox"/>

26. Please answer the following questions about your work situation:

	Yes	No	Not applicable	office use only
a. In addition to your farm occupation, do you have any off-farm occupations?	<input type="checkbox"/>	<input type="checkbox"/>		603
b. Do you spend the majority (50 percent or more) of your worktime on off-farm occupations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	604

27. If you have a spouse, please answer the following questions about his/her work situation. If you do not have a spouse, please skip to Question 28.

	Yes	No	office use only
a. Does your spouse do farm work on your farm operation?	<input type="checkbox"/>	<input type="checkbox"/>	605
b. Does your spouse spend the majority (50 percent or more) of his/her worktime on off-farm occupations?	<input type="checkbox"/>	<input type="checkbox"/>	606

28. How many of the following types of workers were employed on your farm in 2016? (Please fill in the number of workers in each box.)

	How many worked on your farm in 2016?
a. Family members	610
b. Permanent employees (121 days or more per year)	611
c. Seasonal workers (120 days or less per year)	612
d. Migrant workers (seasonal workers who travel to do farm work)	613
e. Interns or volunteers	614

29. About how much of your total household income in 2016 came from your farm? (Please fill in the blank below.)

620

Approximately _____ percent of my household income in 2016 came from my farm.

30. Ideally, how much of your total household income would you like to come from your farm? (Please fill in the blank below.)

621

My goal is for _____ percent of my household income to come from my farm.

31. How confident are you that, five years from now, your farm will be able to provide you with the income that you are hoping for? (Please check one.)

Not confident Slightly confident Confident Very confident

office use only

622

623

32. What was your age on Jan. 1, 2017? _____ years

33. What is your highest level of education? (Please check one.)

Less than a high school degree ... 2-year college degree
 High school graduate/GED 4-year college degree
 Graduate degree

office use only

624

625

626

34. What is your gender? Male Female

35. Please check the box that best describes the total gross revenue from your farm operation in 2016.

Less than \$10,000 \$150,000 – \$349,999
 \$10,000 – \$49,999 \$350,000 – \$999,999
 \$50,000 – \$149,999 \$1,000,000 or more

office use only

627

Respondent Name: _____

9911	9910	MM	DD	YY
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This completes the survey. Thank you for your help.

Office Use Only																
Response	9901	Respondent	9902	Mode	9903	Enum.	9998	Eval.	9900	R.	9921	9985	Office Use for POID			
1-Comp		1-Op/Mgr		1-Mail									9989			
2-R		2-Sp		2-Tel									Optional Use			
3-Inac		3-Acct/Bkpr		3-Face-to-Face									9907	9908	9906	9916
4-Office Hold		4-Partner		6-e-mail												
5-R – Est		9-Oth		7-Fax												
6-Inac – Est				19-Other												
S/E Name																