A DESCRIPTIVE ANALYSIS OF BEGINNING SPECIALTY CROP FARMER TRAINING PROGRAMS IN MICHIGAN

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ABSTRACT

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Michigan's diverse agricultural landscape provides multiple perspectives when considering the need for beginning farmer training. One perspective is a $104 billion industrial agricultural industry, with an ageing and decreasing farming population, and consolidation of land (MDARD, 2019). Another perspective is a growing movement of smaller-scale, regenerative farms with an emphasis on direct marketing, minimizing external inputs and improving ecosystem services. In the middle is an emerging population of passionate and inexperienced growers that need training to get started, and farmer training organizations with their own challenges to meet farmers' needs. The purpose of this descriptive study was to survey Michigan's beginning specialty crop farmer training organizations in order to inform educators, policy makers, and beginning farmers. The research provides a description of existing training programs, the types of farmers participating in those programs, and current collaborations among the organizations. The results showed that Michigan has a diverse number of training options, but most operate independently of each other and lack resources to provide the best possible services. Recommendations include developing a state-wide systems approach to training and developing a central body or network that will aid in collaboration, resource allocation, and policy development. With this research as a foundation, it will be possible to complete a more comprehensive analysis, and to begin building a network that will provide future farmers to meet Michigan's agricultural challenges.

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KEY TO ABBREVIATIONS

BFRDG	-	Beginning Farmer Rancher Development Grant
CBO	-	Community Based Organization
CSA	-	Community Supported Agriculture
IRB	-	Institutional Review Board
MDARD	-	Michigan Department of Agriculture and Rural Development
MIFMA	-	Michigan Farmers Market Association
MSU	-	Michigan State University
NASS	-	National Agricultural Statistics Service
NGO	-	Non-Governmental Organization
NIFA	-	National Institute of Food and Agriculture
OTA	-	Organic Trade Association
USDA	-	United States Department of Agriculture

INTRODUCTION

Beginning farmer training organizations have a crucial role to play in the state of Michigan. It was notably said by Aldo Leopold that "there can be no doubt that a society rooted in the soil is more stable than one rooted in pavements." In this regard, Michigan depends on its soils to not only provide economic stability, but to connect its communities to the land. Michigan is fortunate to have diverse soil types and microclimates helping to propel it into the ranking of second in the nation in agricultural crop diversity (Michigan Farm Bureau, 2019). However, without farmers that know how to manage the land, the soil will still not produce. Without proper training and a continual supply of beginning farmers, the food system will be unable to continue in its current state.

The USDA defines beginning farmers as "those who have operated a farm or ranch for 10 years or less either as a sole operator or with others who have operated a farm for 10 years or less" (Ahearn & Newton, 2009). The high average age of farmers in Michigan, and the lack of beginning farmers to take their place, is a major concern (Miller & Cocciarelli, 2012; Shute, 2011). In a study conducted by Michigan State University researchers and the USDA National Agricultural Statistical Service, 1,500 Michigan Farmers were surveyed with questions concerning retirement and succession planning. Based on the survey participants, 40% of the operators of small farms ($10,000 to $100,000 in sales) in Michigan are over the age of 65 (Miller & Cocciarelli, 2012). These small farms make up almost 80% of Michigan's farming operations (USDA NASS, 2015). Looking at all sizes of farms, 35% of Michigan farmers are anticipating retiring in the next 10 years. Fifteen percent of the retiring farmers responded that they would probably sell their land for non-farm development or leave it idle. Ninety percent of the farmers surveyed were not interested in mentoring their farm's successor. This means that in

the next decade Michigan is projected to see a high percent of the current agriculture land move out of agriculture, and decades of knowledge and experience are going to be lost from our present-day farmers (Miller & Cocciarelli, 2012).

Both academic studies and federal reports indicate the landscape of farming is changing. From the 2012 to the 2017 census, Michigan has seen a nine percent drop in number of farms with an overall 18% decrease from 2007. In that same time farm size has grown, indicating consolidation. Based on other census data, 85% of all of Michigan vegetable sales now come from farms of 260 acres and larger (USDA NASS, 2017). Parallel to the consolidation of larger scale specialty crop farming are changing social trends that have increased the demand for small and local farms focusing on sustainable practices (Gillespie & Johnson, 2010). In 2018, national retail sales of organic fruits and vegetables topped $17.4 billion for the first time, an increase of 5.6% from the previous year (OTA, 2019). New farmers markets are providing direct market opportunities to reach new customers (MIFMA, 2017). Community supported agriculture (CSA) operations have also grown in popularity (Sharp, Imerman, & Peters, 2002), as well as farm-to-table dining (Boyce, 2013). However, there are questions about how this rise in small-holder farmer demand will be met as the cultural landscape of farming continues to change.

There is a need to grow a quantity of food to keep Michigan as a top producer, and there is also the need to grow food of high quality that strengthens Michigan in all other aspects of society. This means producing farmers with the ability to meet the demands for nutrient dense, locally produced specialty crops while providing the resiliency in the food system that can withstand disruptive factors such as climate change and market forces. Finding ways to recruit and train farmers to be successful in this complex system is a challenge. Through a comprehensive analysis of beginning farmer specialty crop training programs, the intent is to

provide a foundation for understanding our current system so we can effectively support Michigan's training programs to meet the changing needs of the future.

THEORETICAL FRAMEWORK

The scope of this research is exploratory and descriptive and is not meant to evaluate the effectiveness of current programs. Fraenkel, Wallen, and Hyun (2011) define descriptive research as describing existing conditions without an analysis of the relationship between variables. This framework is applied to the examination of farmer training organizations and to the participants that take part in the training. While discussing learning methods deployed by training organizations, we do so in the context of adult learning theory. Farmers have diverse learning styles and therefore they benefit from a variety of formats (Kilpatrick & Rosenblatt, 2007), while Johnson, Carter, and Kaufman (2008) have found that farmers preferred styles that incorporate linear, hands-on methods.

Resilience is defined as "the capacity of a system to absorb disturbance; to undergo change and still retain essentially the same functions, structure, and feedbacks" (Walker & Salt, 2012). This study uses resiliency theory's general principles; maintain diversity and redundancy, manage connectivity, encourage learning and experimentation, broaden participation, and promote polycentric governance systems (Biggs, Schluter, & Schoon, 2015), to promote a system of diverse training programs supporting a broad range of participants, and a collaborative structure that incorporates varying levels of governance that can adapt to changes in market trends.

A social network analysis is used to observe social relations among actors (Wasserman & Faust, 1994). This study uses social network theory to model collaboration between beginning farmer training organizations. Betweenness centrality measures the number of times an actor is within the shortest pathway between two other actors (Brandes, 2001). This measurement is used in the study to identify organizations that could be potential hubs for sharing resources.

Modularity classification is used to organize the actors into clusters based on the strengths of their connections (Blondel, Guillaume, & Lefebvre, 2008***).*** Granovetter (2008) postulates in *The Strength of Weak Ties* that while information may travel fast between subgroups with strong ties, it is the weak ties that bring in new information from external sources. Granovetter's theory gives additional credibility to the importance of a central actor able to use bridges or weak ties to connect subgroups throughout the network.

LITERATURE REVIEW

While Niewolny and Lillard (2010) argued that beginning farmer education is currently not well researched and poorly understood, there are at least some studies that have looked at the educational needs of beginning farmers. For example, a survey identifying the most important educational needs for beginning farmers, as perceived by Iowa's local and state extension professionals, ranked business analysis, management, and planning as the top three followed by weeds, pest, disease, and soil management (Trede & Whitaker, 1998). Research with a focus group of beginning farmers in Montana showed similar results identifying four major educational needs in the order of business management skills, legal knowledge, and communication skills, followed by skills associated with production (Bailey, 2013). Beginning farmers in Virginia also confirmed these needs when they reported their top four priorities in a 2014 study as 1) financial record keeping, 2) business planning, 3) nutrient management and soil health, and 4) weed, pest and disease management (Byrd, 2011).

Additional studies show these focus areas are not only desirable by beginning farmers but seasoned farmers as well. In 2008 Michigan State University Extension distributed surveys to 1,548 farmers of all experience levels to find out what educational areas needed more attention. The most commonly reported area was more education on farm management, especially using organic methods. Respondents also mentioned they would like to learn more about business, bookkeeping, and marketing skills, with sustainable farming practices being the next highest topic (Suvedi, Jeong, & Coombs, 2010). The results of the Michigan State University survey also aligns with what Nuthall (2010) found to be the eleven competencies prosperous farmers possess. These are: risk management, anticipation, planning, implementation, solutions, analysis, observation, negotiation, learning from experience, people skills, and understanding technology.

The greatest barriers for beginning farmers are finding capital, land acquisition, and farming knowledge. While there are some government and non-profit programs in place to help with these barriers; politics and bureaucracy have made these programs less effective than they could be (Reid, 2013).

The method by which knowledge is transferred is also important. Studies show different trades tend to have different methods of learning. Farmers have been shown to learn better using informal, linear, hands-on methods versus formal and abstract methods (Johnson, Carter, & Kaufman, 2008). These successful methods are usually modeled through working or interning on farms, participating in demonstrations, farm visits, and one-on-one teaching (MacAuley, 2014). Research has also shown that farmers learn better from practical knowledge presented by fellow farmers (Franz, Piercy, Donaldson, Westbrook, & Richard, 2010).

Several initiatives appearing in Michigan and around the country have been aided through the United States Department of Agriculture's (USDA) Beginning Farmer and Rancher Development Program (BFRDP), administered by National Institute of Food and Agriculture (NIFA) (Anderson, 2013; USDA NIFA, 2019). While the BFRDP was first created in the 2002 Farm Bill, it did not receive any funding until the 2008 Farm Bill. From that point through 2018, with the exception of 2013, the program has allocated roughly $20 million per year throughout the U.S. to beginning farmer initiatives that include education, training, and outreach. The 2014 Farm Bill also expanded the programs to include a priority on veterans and socially disadvantaged farmers, allocating five percent of its funding for each category (USDA, 2015). The 2018 Farm Bill provided an even higher amount of funding for the Beginning Farmer and Rancher Development Program and greater focus on the Outreach and Assistance to Socially Disadvantaged and Veteran Farmers and Ranchers Program. These programs combine to form

the Farming Opportunities Training and Outreach Program and have been allocated $435 million in mandatory funding through 2028. While there are numerous requirements for receiving a BFRDG, partnerships and collaborations are a high priority. The most recent request for proposals stated, “Strong partnerships among complementary organizations (e.g. NGOs, CBOs, and universities) with shared leadership are essential to most successful BFRDG projects” (USDA NIFA, 2019).

While national funding has increased, not all states have benefited equally from the grants. Compiled data from the USDA NIFA website showed states received a wide range of funding. Michigan is ranked nationally in the top of production for several agricultural categories, but from 2009 through 2017 only received six BFRDGs totaling a little over two-million dollars, around 1.1% of the total funds. Fifteen other states received an equal or greater number of grants. California and New York received the most grants, 20 and 17 respectfully, while Michigan’s neighbors, Wisconsin and Minnesota were next in line with 16 and 15 (USDA NIFA, 2019). BFRDGs are not the only funding supporting Michigan training organizations. NIFA provided another $800,000 in grant funds to Michigan organizations between 2009 and 2017.

The changing landscape of consumer demands presumably influences farm production and therefore the type of training farmers may need. Consumers today are more concerned with how food is produced and look to buy from farmers that express certain values or ethical standards, or sell food with properties such as local, fresh, or organic (Gillespie & Johnson, 2010; OTA, 2019). Organic farms in Michigan have grown from 421 to 646 between the 2012 and 2017 agricultural census. Average farm sales for those growers have increased from $127,086 to $272,553 over that same time. For organic growers farming one to nine acres there

2017 average sales equaled $81,508 (USDA NASS, 2017). Coinciding with the increase demand for organic and local are increased opportunities for direct market sales. According to Michigan Farmers Market Association, Michigan's farmers' markets have increased from 150 to 300 from 2006 to 2016 (MIFMA, 2017). Capitalizing on the current trends, many of the new farms and beginning farmer training programs are focusing on sustainability (Niewolny & Lillard, 2010).

While the demand and opportunities are increasing for sustainable farmers, the knowledge and skills necessary to run this type of operation are extremely challenging. Sustainable agriculture is defined as farming that is economically profitable, provides social benefits to the farm family and the community, and protects the environment (Feldman, 1998; Sullivan, 2003). The way Sullivan (2003) describes it, to be sustainable the beginning farmer must produce food in a way that helps the environment, usually without synthetic chemicals, while understanding community dynamics, and finding a way to run an economically sound business where the margin of profitability is narrow. Inputs such as labor are higher in these types of systems, but often the work can be done on less land and using more manual labor instead of expensive equipment. This type of farming is generally intensive rather than extensive, where more food can be produced on a smaller number of acres. The selling price of goods tends to be higher in a sustainable system, but the current market is smaller (Bowler, 2003).

Farmer training organizations are not only tasked with teaching farmers how to grow, but also teaching them how to be profitable. The 2017 agricultural census reported Michigan ranked 10th in the nation for sales of vegetables, melons, potatoes, and sweet potatoes totaling $535,068,000. While 3,089 farms sold these specialty crops, only 21.9% (675) of those farms accounted for 96% of the sales. The other 78.1% (2,414) of vegetable farms averaged only $9,050 in annual sales. Table 1 demonstrates this disparity (USDA NASS, 2017). Specialty crops

are defined as “fruits and vegetables, tree nuts, dried fruits and horticulture and nursery crops, including floriculture” (USDA AMS, 2019).

Table 1.
Farm Size in Relation to Sales

Acres Farmed	<$50k in Sales		> $50k in Sales		All Sales	
	% Farms	Avg Sales	% Farms	Avg Sales	Total Sales	% of All Sales
1-9 (748)	98.5%	$5,672	1.5%	$113,364	$5,427,000	1.0%
10-49 (1081)	90.8%	$9,199	9.2%	$97,354	$18,671,000	3.5%
50-69 (217)	82.9%	$11,422	17.1%	$181,243	$8,762,000	1.6%
70-99 (223)	77.1%	$9,977	22.9%	$166,529	$10,209,000	1.9%
100-139 (148)	68.2%	$10,802	31.8%	$180,000	$9,551,000	1.8%
140-179 (87)	59.8%	$11,250	40.2%	$323,543	$11,909,000	2.2%
180-219 (64)	71.9%	$13,674	28.1%	$535,667	$10,271,000	1.9%
220-259 (32)	50.0%	$7,563	50.0%	$349,500	$5,713,000	1.1%
260-499 (146)	47.3%	$18,275	52.7%	$475,831	$37,900,000	7.1%
500-999 (141)	29.1%	$20,268	70.9%	$722,290	$73,060,000	13.7%
1,000-1,999 (113)	12.4%	$22,643	87.6%	$1,343,505	$133,324,000	24.9%
2,000+ (89)	4.5%	$6,500	95.5%	$2,473,482	$210,272,000	39.3%
All Farms (3089)	78.1%	$9,050	21.9%	$760,329	$535,068,000	100.0%

PURPOSE AND OBJECTIVES

The purpose of this study was to identify and describe Michigan's beginning specialty crop farmer training programs as a basis for understanding how the programs meet current needs and whether the programs can meet the future needs of the state's beginning farmers.

Research Questions

1. What beginning specialty crop farmer training programs exist in Michigan and how are they being managed?
2. What are the types of participants in the beginning specialty crop farmer training programs?
3. Whether and how beginning specialty crop farmer training organizations are collaborating, and where is there potential for additional collaboration?

METHODS

To address the research questions, data from the literature, company and organizational data found on the organizations' websites, and personal communications were used with the goal of identifying as many Michigan organizations currently training beginning specialty crop farmers. In total 37 organizations were found as having a training program directed towards current or future specialty crop farmers. Organizations focusing solely on animal husbandry or minors were not a focus of this study. Separate programs under large organizations were classified as their own organization if they were managed separately. In an attempt to compile a comprehensive list, the identified farmer training organizations were emailed to numerous MSU extension agents and various farmer training organizations for edits and additions. The survey also included a question showing the current list and asking for additional organizations.

Data Collection and Response Rate

The survey was conducted using the Qualtrics online software and was tested using online tools assuring a readability level under 9th grade. IRB approval for the research was given in February 2017. The survey was then reviewed and critiqued by four MSU faculty. Pilot testing to determine length and relevance was done by farmer training organizations residing outside of Michigan or not included in the study. Validity and reliability were tested by having multiple people fill out the survey for the same program and comparing the results. The data collection was structured using the Dillman, Smyth, and Christian (2014) total design method. The surveys were sent to farmer training administrators' email addresses in March of 2017 using a census method. Follow up emails were used on a weekly basis for three weeks to encourage participation. On week three, personal phone calls were made to all remaining organizations and voice messages were left for those that did not answer.

Of the 35 organizations, 25 completed the survey in full, a rate of 71%. Five organizations partially completed the survey and five did not respond. Seven organizations completed the survey in the first week, for an early response rate of 20% (Table 2). Eleven more organizations completed the survey on week two after one follow up email, with the remaining seven needing three weeks and personal phone calls to complete the survey. Due to the relatively low N, it was not possible to account for non-response error. Survey data was analyzed using descriptive statistics in Microsoft Excel 2016.

Table 2.
Response Rate by Organization Type

Organization Type	Responses	Sent	Rate
Government	1	1	100%
Non-profit	15	18	83%
College/University	9	16	56%
Total	**25**	**35**	**71%**
Partial Responses	5	35	14%
Total	31	35	**86%**
Early Responses	7	35	20%

Instrumentation

The collection of the data and the analysis were broken into three parts. 1) Program specific data. 2) Participant specific data. 3) General organizational data including information on collaboration with other organizations. The program section of the survey consisted of 12 items covering descriptive information, program structure, training methods, and financial information. Seven questions were used to solicit participant demographics including age, gender, race, experience, and past and future participation in farming activities. The organization data was obtained from a combination of eight questions about the organization and the administrator responding to the survey, and five questions on collaboration. At the end of the

survey respondents were given the opportunity to make comments or clarify any answers on the survey.

Addresses of the programs were determined through internet searches. The addresses were then geocoded and illustrated using ArcMap 10.7.1 geographic information system (GIS) software. Organizations were categorized by type based on the survey data.

Collaboration between organizations was modeled using Gephi 0.9.2 open-source software and data from the survey. Though the small dataset, missing responses from key actors, and possible inaccuracies by certain organizations when filling out the survey, make this tool less useful than it could be, it is still valuable to visually observe how organizations listed their collaborators. The nodes represent the 24 organizations answering the survey plus two additional organizations who were mentioned multiple times as a collaborator by other organizations. These additional organizations (Center for Regional Food Systems, and Ingham County Land Bank) were not considered training programs in this research but were included because of their connections to training organizations. The Detroit Black Community Food Security Networks (D-Town Farm) and Tillers International were also added even though they only partially responded to the survey.

The lines between the nodes (edges) signify some type of collaboration happened between the two organizations. The definition of collaboration used is any resources shared between actors. The actions do not have to be reciprocal. The isolates represented by the blue color, did not indicate they were currently collaborating with any other farmer training organization.

The size of the nodes is based on their betweenness centrality, a measure that quantifies the number of times a node is within the shortest pathway between two other nodes. The colors

in the model are based on modularity classifications and help indicate where there are communities of collaboration. The isolates (blue) all have different modularity classifications but were colored the same to show their common characteristic of zero collaborations.

Description of Respondents

Of the 25 organizations with complete survey responses, 15 were non-profits, nine were universities or colleges, and one was a government organization (Table 2). Of the non-profits nine were community place-based organizations focusing within a city or smaller community. All but one of the university programs were associated with Michigan State University, though their distinct management, budget, and outcomes varied enough to consider them separate organizations. In the findings universities and colleges are consolidated into one category called universities. Non-profits managed a total of 31 training programs, Universities managed 16, and the government organization managed one.

It is also important to note the organizations that partially responded or did not respond when evaluating the accuracy of the findings. Unless noted, data from these programs was not used when calculating descriptive statistics. University programs represented three out of the five partial responses and four out of the five non-responses. The remaining two partial and one non-response were non-profits, two of which were based in Detroit.

Because of the variability in goals and outcomes of the programs, it was useful to analyze the findings after first assigning the programs into two categories. Programs were categorized based on a combination of the skills taught, contact hours, program cost, the average experience level of the participants listed by the administrator, and the percent of participants going directly from the program to work on a farm. Weights were assigned to the distribution of data in each field and then the programs were ranked based on the sum of those weights (Appendix 2). From

the rankings, programs were either classified as novice (16) or as engaged (32). Novice programs were characterized as being easily accessible to participants in terms of time and cost and useful to growers with elementary levels of experience. While engaged programs may still have an audience with very little experience, the assumption is that because the investment is higher for the engaged programs, the participants are more likely to continue the track to becoming farmers. Engaged programs were also more likely to have participants farming directly after completion of the program, as indicated on the survey by program administrators. Primarily due to the commitment level and depth of content, 14 out of the 16 university programs and the one government program were classified as engaged.

FINDINGS

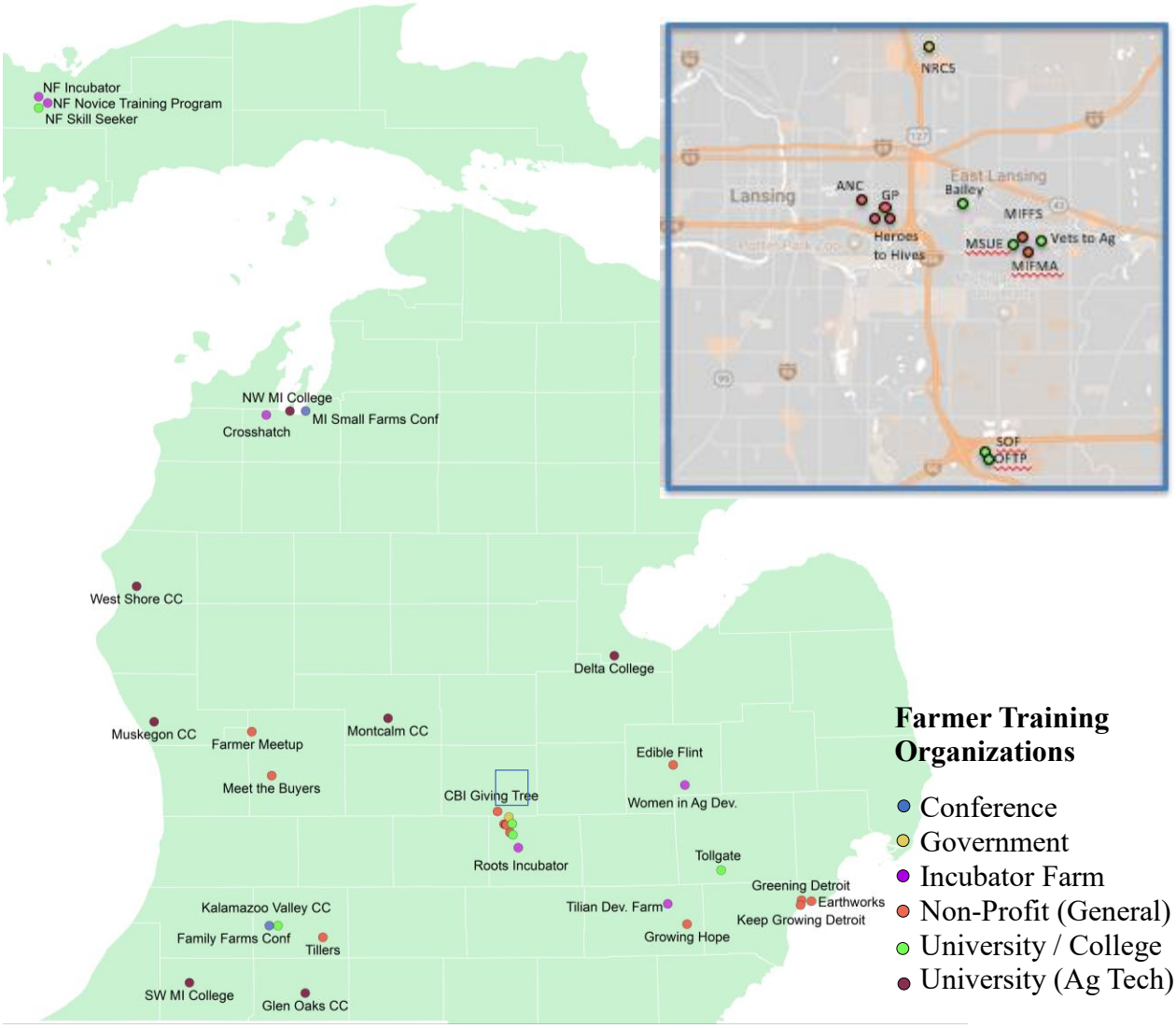
Program Characterization

From the 25 organizations, 48 separate programs were identified. While a few of the programs started in the late 1990s, the majority started after 2010. This is particularly true for university programs where 94% listed their initiation after 2010. Until 2010 novice and engaged programs were starting at about the same rate, eight and six programs, respectively. From 2010 to 2016 the number of engaged programs grew to outnumber novice programs 25 to eight.

The locations of the various organizations are positioned throughout the state, though a higher concentration of programs are centered around the greater Lansing area and close to Michigan State University (MSU) (Figure 1). MSU is the state's land grant university and its connections to agriculture and education make it a natural partner for many of the farmer training organizations. Several the urban non-profits are around the Detroit area and in Flint. The Michigan State University Agriculture Technology affiliate programs are spread throughout the state at community colleges; however, there is not much other information on the Agriculture Technology programs due to their low response rate in the survey. Several of the programs had just started at the time of the survey.

Figure 1.

Geographic Location of Training Organizations Identified and Asked to Participate in The Study



There are diverse pedagogical practices being used by the various programs. Thirty-three percent of the programs offer multi-week experiential or hands-on training. While this was the most popular practice among those surveyed, only 19% of novice programs use it versus 41% of programs classified as engaged. Programs that used this format averaged 380 contact hours, where programs that did not averaged 65. The second most popular training method was topic specific workshops. Twenty-nine percent of the programs use this method, though it was more

commonly practiced by non-profits and by novice programs than universities and engaged programs. Novice programs were also more likely to use single-day classroom experiences, 38% compared to three percent for engaged programs. Conference workshops were popular among non-profits, novice and engaged programs. Programs using conference workshops or topic specific workshops averaged 22 contact hours per program. Fifteen percent of the programs used some type of online format in their training.

University programs were much more likely to use multi-week classroom courses. Fifty-six percent of universities used this method compared to 13% of non-profits. However, only two out of nine university programs used this method as their only tool. The other programs coupled classroom time with experiential learning, mentorships, internships, multi-week online classes, and workshops. The least used methods of training were consulting and single-day online courses.

Eighty-three percent of the programs listed certified organic, organic methods or naturally grown as at least part of the methods they use to train. Forty-five percent of the programs listed conventional farming methods as part of their focus, though only four percent stated conventional as their only method. Fifty-five percent of the programs excluded conventional farming and listed organic methods or naturally grown as the best way to describe their program. Only a third of the 55% listed themselves as focused on certified organic methods. Twenty-five percent of the programs (12) listed urban agriculture as a farming method they employ.

Sixty-six percent of the programs taught more than 10 separate skills (Table 3). In the engaged programs more than 70% taught 12 of the same skills. Engaged programs averaged 12 skills per program, where novice averaged eight skills. Of the 16 skills listed in the survey, only

personnel management and tractor use were taught by less than 50% of the programs. Only two programs specialized in an individual skills. Business planning and marketing ranked in the lower third of percent taught by Michigan's programs, though they were still taught by 60% and 58% of the programs respectfully.

Table 3.
Percentage of Programs Teaching Skills

Skill	Engaged (32)		Novice (16)		Total (48)	
Production / growing	88%	(28)	81%	(13)	85%	(41)
Pest management	84%	(27)	81%	(13)	83%	(40)
Harvesting	84%	(27)	69%	(11)	79%	(38)
Disease management	84%	(27)	63%	(10)	77%	(37)
Soil management	88%	(28)	63%	(10)	79%	(38)
Irrigation	81%	(26)	44%	(7)	69%	(33)
Season extension	72%	(23)	56%	(9)	67%	(32)
Tool use	84%	(27)	31%	(5)	67%	(32)
Weed management	72%	(23)	63%	(10)	69%	(33)
Farm planning	75%	(24)	44%	(7)	65%	(31)
Business planning	69%	(22)	44%	(7)	60%	(29)
Fertility management	72%	(23)	38%	(6)	60%	(29)
Marketing	72%	(23)	31%	(5)	58%	(28)
Storage	63%	(20)	44%	(7)	56%	(27)
Personnel management	47%	(15)	13%	(2)	35%	(17)
Tractor use	44%	(14)	13%	(2)	33%	(16)

There was a considerable difference between the average contact hours for engaged programs (318 hours) versus the average number for novice programs (six hours) (Table 4). Programs in the lower range (1-20 hours) were mostly novice programs and tended to be run by non-profits. They consisted of workshops, meet-ups, and conferences, and were often offered multiple times a year. Programs in the middle range (60-100 hours) tended to be courses offered through universities. Contact hours in the upper range (>100 hours) were hands-on intensive training programs, apprenticeships, and farm incubators. All of the middle and upper range programs were engaged program.

Table 4.
Program Contact Hours

	Novice (16)	Engaged (28)	Total (44)
< 20 Hours	100% (16)	29% (8)	55% (24)
20-100 Hours		31% (9)	20% (9)
100-800 Hours		18% (5)	11% (5)
>800 Hours		21% (6)	14% (6)
Mean	6	318	205

Table 5.
Number of Participants Trained

	Novice (16)	Engaged (29)	Total
Total Participants Trained	800	938	1338
Mean Participants	53	18	30
Total Contact Hours	3,774	100,402	104,176

The number of participants trained also varied. Programs in the survey represented the range from single day conferences with 1,000 attendees to small cohorts of 16 being trained over the course of nine months totaling more than 1,000 contact hours per person. Many programs offered numerous stand-alone single day workshops bringing their “Total Participants” served (Average Participants Trained x Number of Times Offered) into the 400-600 range. While these

numbers may double count participants who attended multiple sessions or multiple programs, they do show the potential for reaching interested farmers. Taking out the two largest outliers (conferences totaling 400 and 1,000 participants), novice programs reported training almost one and a half times as many participants as engaged programs, but less than four percent of the total contact hours (Table 5). The average number of participants per training session was 30. Because of difference in the way some programs reported their number of participants in multiple sessions, the numbers only reflect one session per program. If reporting all 193 listed sessions, the total participants trained would increase from 1,338 to 5,295.

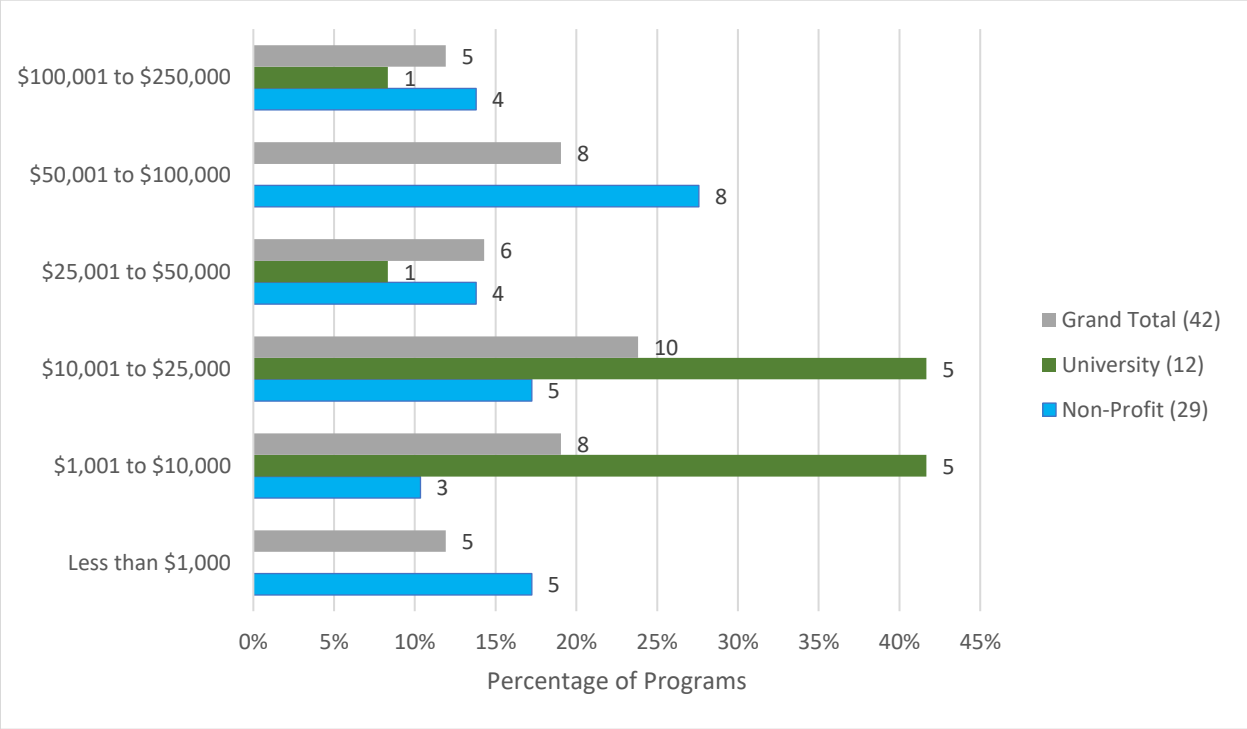
The cost per program also differed significantly across the state. Thirty-six percent of the programs that responded provided their training for free and an additional 15% of the programs paid participants for their time. Thirty percent of the programs ranged from $10-$140 and had the smallest average number of contact hours, 7.5 on average. The remaining 19% were the most expensive programs and ranged from $500 to $22,000 with a mean cost of $10,200. These programs had an average of 326 contact hours, second only to the programs that paid their participants (average contact hours 456). Universities made up all but one of the most expensive programs with most of them being for credit and collecting tuition. The most expensive non-profit is a farm incubator program and most or all of its costs have the potential to be offset by the participants' produce sales. All but two of the free programs and five out of seven of the programs that paid their participants were non-profits. Seventy-one percent of the programs in the $10-$140 range were also run by non-profits. All of the novice programs were in the $10-$140 range.

Of the 16 novice programs, only 12% had some type of formal recognition for completion of the program. Only 37% of the total programs formally recognized graduates of the

training. The percentage was slightly higher among engaged programs with 44% having some type of recognition.

The annual budget of programs ranged from less than $1,000 to between $100,000-$250,000 thousand. Both engaged and novice programs were represented in diverse budget ranges. Non-profits tended to have higher budgets than university programs holding 85% of the spots in the upper three budget classifications. Non-profits also represented all five of the less than $1,000 classifications (Figure 2).

Figure 2.
Percentage of University and Non-Profit Programs in a Budget Range



Of the 32 non-profit programs 14 stated that 50% or more of their funding came from government grants (Table 6). Ten of the programs were part of organizations that received BFRDG with six of the 10 programs depending on government grants for 90 to 100% of their

funding. The next two most common funding sources for non-profits came from donations (11 programs) and from program fees or tuition (12 programs). A higher percentage of novice programs (56%) depended on program fees and tuition compared to engaged (38%), while the engaged programs (31%) took in more donations than novice (12%). The rest of the funding sources were comparatively similar.

University programs were much less dependent on government grants with only 25% of those that answered using this type of funding. The most common funding source for universities was program fees or tuition. Eighty-three percent of the programs depended on fees or tuition with 63% being the average stated amount amongst those that used it. Only three percent of all the programs used funds from produce sales to support training programs, though this number was higher for university programs verses non-profits, 10% verses one percent respectfully.

Table 6.
Mean Percentage of Funding Listed by Programs

	Gov Grants	Non-Gov Grants	Prog Fees / Tuitions	Donations	Sales from produce	Direct Gov	Other	I do not know	choose not to answer
Non-Profits (32)	36%	13%	14%	14%	1%	4%	6%	0%	13%
University (16)	10%	0%	38%	7%	10%	0%	11%	25%	0%
Total	29%	9%	24%	15%	3%	3%	7%	9%	9%

Participants / Demographics

For participant demographics, program administrators completing the survey were asked to use a sliding bar to represent the average percentage of their program's participants in a category or range. Programs were often compared by the category or range identified as best representing the majority of their participants. Programs having equal percentages of participants in two categories would be counted in each category. Because programs can be counted more than once, the sum of reported percentages may be greater than 100.

Of the 39 programs that answered the survey question regarding age, 39% listed the largest number of their participants in the 36-50 age range (Table 7). Seventy-five percent of those programs were non-profits. University programs tended to train younger participants with the majority of their students in the 18-25 age range. Only two programs had either equal or greater numbers of their participants in the 51-65 age range, though in both programs this range represented only 25% of their population. Non-profits were pretty evenly split between their focus on 26-35 and 36-50 year olds with 44% and 48% of the programs selecting these age ranges as representing the majority of their students. Only one program taught participants who were 66 and older. This program had a focus on community gardening and training of garden leaders.

Analyzing age based on novice or engaged programs show engaged programs catering to a younger audience than novice programs. There are no engaged programs that have a majority of participants above the age of 51. Even in the 36-50-year-old range, there are 12 novice programs compared to four engaged programs with the majority of their students in this range.

Table 7.
Number of Programs Per Age Range That Most Represents Their Students

Type of Program*	Under 18		18 - 25		26 - 35		36 - 50		51 - 65		66 +	
Non-profit (27)	8%	(2)	24%	(6)	44%	(10)	48%	(12)	8%	(2)	7%	(1)
University (14)	0%	(0)	57%	(8)	29%	(4)	29%	(4)	0%	(0)	0%	(0)
Novice (14)	14%	(2)	14%	(2)	21%	(3)	64%	(9)	14%	(2)	7%	(1)
Engaged (27)	0%	(0)	44%	(12)	41%	(11)	26%	(7)	0%	(0)	0%	(0)
Total (41)	5%	(2)	34%	(14)	34%	(14)	39%	(16)	5%	(2)	0%	(0)

* The same program may be listed multiple times if their max percentage was equal in multiple age ranges.

Of the programs surveyed, 47% out of the 32 non-profits specified focusing on a specific population. Of those that focused on a specific population, 87% listed some type of socially disadvantaged or veteran farmers as their focus. Only one university program had this distinction. Low income or limited resources populations were the most common focus.

After removing the respondents that did not know the percentage of males and females in their program (seven programs) and those that chose not to answer (five programs), the average gender ratio of all the programs equaled a 47% to 53% split of males to females. Looking at non-profits and universities independently, it was found they had exactly inverse ratios of 42% to 57% with the non-profits teaching a higher percentage of females, and university programs teaching a higher percentage of males in their programs. Three non-profit programs listed women as a focus population whereas no university programs preference a gender. Seventeen of the programs had a higher percentage of females compared to 13 of males. Programs with "Garden" in their titles had some of the higher percentages of females, while programs focusing on veterans and the two Agriculture Technology programs listed their population as 80-100% male. While engaged programs reported 53% males to 47% females, novice programs had a much higher percentage of females, 60% compared to 40% males.

Of the 48 programs in this survey, 10% of the programs chose not to answer the percentage of various races or ethnicities within their participant population. Fifteen percent reported not knowing. A totaled of 36 programs answered the question in full. Table 8 shows how Michigan training programs compare with the state average. While many programs still have a high majority of white students, numerous programs were above the state average for minorities. Of the 10 programs (15%) that were equal or majority Black or African American, six focused on low-income or underserved populations. Of the programs that said they did not focus on a specific population, 90% had a majority of White participants with 57% being above the state demographic. The average percentage listed for the participants of these programs was 84% White, 11% Black or African-American, and 4% Hispanic or Latino and less than 1% other. Eighty-three percent of university programs reported above the state demographic for White participants with the average reported percentage being 89%. Non-profits showed more diversity with reporting with an average listed percentage of 54% White, 33% Black or African American, and 9% Hispanic or Latino, 2% Asian, 1% Multiracial, .5% Native American, .2% Middle Eastern or North African. Only one program, the Garden Project's Garden Leader Training, listed more than 10% Asian. The Garden Project has a focus on immigrant and refugees and reported 30% of their participants as Asian.

Table 8.
Percentage of Training Programs with Populations Greater Than State Averages

Race/ Ethnicity	MI Demographics	% Prog > MI Avg	Avg Reported %
White	75%	47% (17)	66%
Black	13%	50% (18)	24%
Hispanic	5%	39% (14)	6%
Multiple	3%	6% (2)	1%
Asian	3%	11% (4)	2%
Other	1%	6% (2)	0%
Native	1%	14% (5)	1%
Islander	0%	0% (0)	0%

Of the programs that listed their participants experience, non-profits and universities both listed their highest percentage of students as having little (less than one year) to no experience when they started their program (Table 9). Only 27% of the programs had any participants with more than 10 years' experience and were not considered beginning farmers. Twenty-one percent of the programs did not know or chose not to answer this question.

Table 9.
Average Percentage of Participant Experience

Program Type	No Exp	1 - 2 yrs	3 - 5 yrs	6 - 10 yrs	> 10 yrs
Non-Profit (25)	34%	29%	22%	8%	6%
University (12)	48%	28%	14%	6%	4%
Totals	38%	29%	20%	7%	5%

Program administrators completing the survey were asked to estimate what percentage of participants planned on farming on various scales after they completed their program (Table 10 and Table 11). Fourteen of the programs do not know and 4 chose not to answer. Of the

remaining 30, 83% of the programs thought the majority of their participants would go on to farm less than 10 acres of land. Programs on average thought a higher percentage of their participants would be farming on less than an acre of land (42%).

Table 10.
Number of Programs with the Majority of Participants in a Future Land Use Range (by acre)

Type of Program*	< 1		1 - 10		11 - 50		51 - 250		> 250	
Non-Profit (20)	40%	(8)	45%	(9)	20%	(4)	0%	(0)	0%	(0)
University (10)	30%	(3)	60%	(6)	10%	(1)	20%	(2)	10%	(1)
Total (30)	37%	(11)	50%	(15)	17%	(5)	7%	(2)	3%	(1)

Table 11.
Average Percentage of Participants in a Future Land Use Range

Non-Profit	48%	35%	13%	2%	0%
University	28%	43%	8%	10%	9%
Total	42%	38%	12%	4%	3%

* The same program may be counted multiple times if their max percentage was equal in multiple land use ranges.

In the survey administrators were asked what they believe their participants would do after completing their training. After removing responses saying they do not know (eight) or choose not to answer (three), 56% stated that almost half of their participants would go on to be an owner operator, or other positions on a farm. The other 44% of the programs thought most of their participants would use their training in a home or community gardening setting or would move directly into another type of training program.

Multiplying the number of participants given by each program times the reported percentage of "Future Participant Work" indicates how many owner operators, farm staff, interns, and community gardeners come out of Michigan programs each year (Table 12 and Appendix A). As done in the "participants training section," numbers are used from one session

per program to make sure the results are not inflated. Engaged programs expect to train 534 owner-operators each year, where novice programs are expected to train 236 owner operators per year. In contrast, novice programs expect to train 301 gardeners compared to 91 trained by engaged programs. It is necessary to point out that these totals also represent a small portion of non-beginning farmers and do not consider participants attending multiple programs.

Table 12.
What Participants Do Directly after Completing a Program

Program Name	Farm Owner Operator	Other position on a farm	Other BFTP	Home/Comm gardener	Will Not Use	Do Not Know	choose not to answer	Total Trained
Engaged Programs	534	145	58	91	1	72	38	938
Novice Programs	236	30	20	301	26	1286	0	1800
Totals	770	175	77	392	27	1357	38	2738

Collaboration

Every one of the 25 training organizations answering this survey said they were interested in collaborating with other organizations. Seventy-seven percent of those said they are actively collaborating with another farmer training organization already. The percentage of organizations collaborating was higher for non-profits (81%) compared to universities (67%). Non-profits also tended to collaborate in a greater number of ways. They averaged 3.0 different ways, where universities only averaged 1.1. The most common area of collaboration was curriculum, with 69% of the non-profits and 33% of universities listing this as an area in which they work with other organizations (Table 13).

Table 13.
Percentage of Organizations Sharing Resources or Services

	Non-Profit (16)	University (9)	Total (25)
Curriculum	69%(11)	33%(3)	56%(14)
Evaluation tools	50%(8)	11%(1)	36%(9)
Services	44%(7)	22%(2)	36%(9)
Tools or equipment	44%(7)	11%(1)	32%(8)
Funding	44%(7)	---	28%(7)
Farm or building space	31%(5)	22%(2)	28%(7)
Participant information	19%(3)	11%(1)	16%(4)
Staff	---	22%(2)	8%(2)
Promotion	6%(1)	---	4%(1)

The social network analysis model formed using Gephi 0.9.2 open-source software illustrates how organizations are connected through the resources they share (Figure 3 and Table 14). Running a modularity classification found six communities of collaboration, represented by the orange, red, purple, green, and yellow colors. Six individual organizations, colored blue, were also identified without any connections to other organizations. Three Detroit organizations, represented by the orange community, were connected to each other, but not to the other communities.

Michigan Food and Farming Systems (MIFFS) was determined to have the greatest betweenness centrality (106), followed by Michigan Organic Food and Farm Alliance (MOFFA), Allen Neighborhood Center (ANC), and MSU Student Organic Farm (SOF), each with betweenness centrality between 32 and 30. MIFFS also had the greatest number of connections (degrees) with nine.

Figure 3.
A Network Analysis of Collaboration Between Farmer Training Organizations

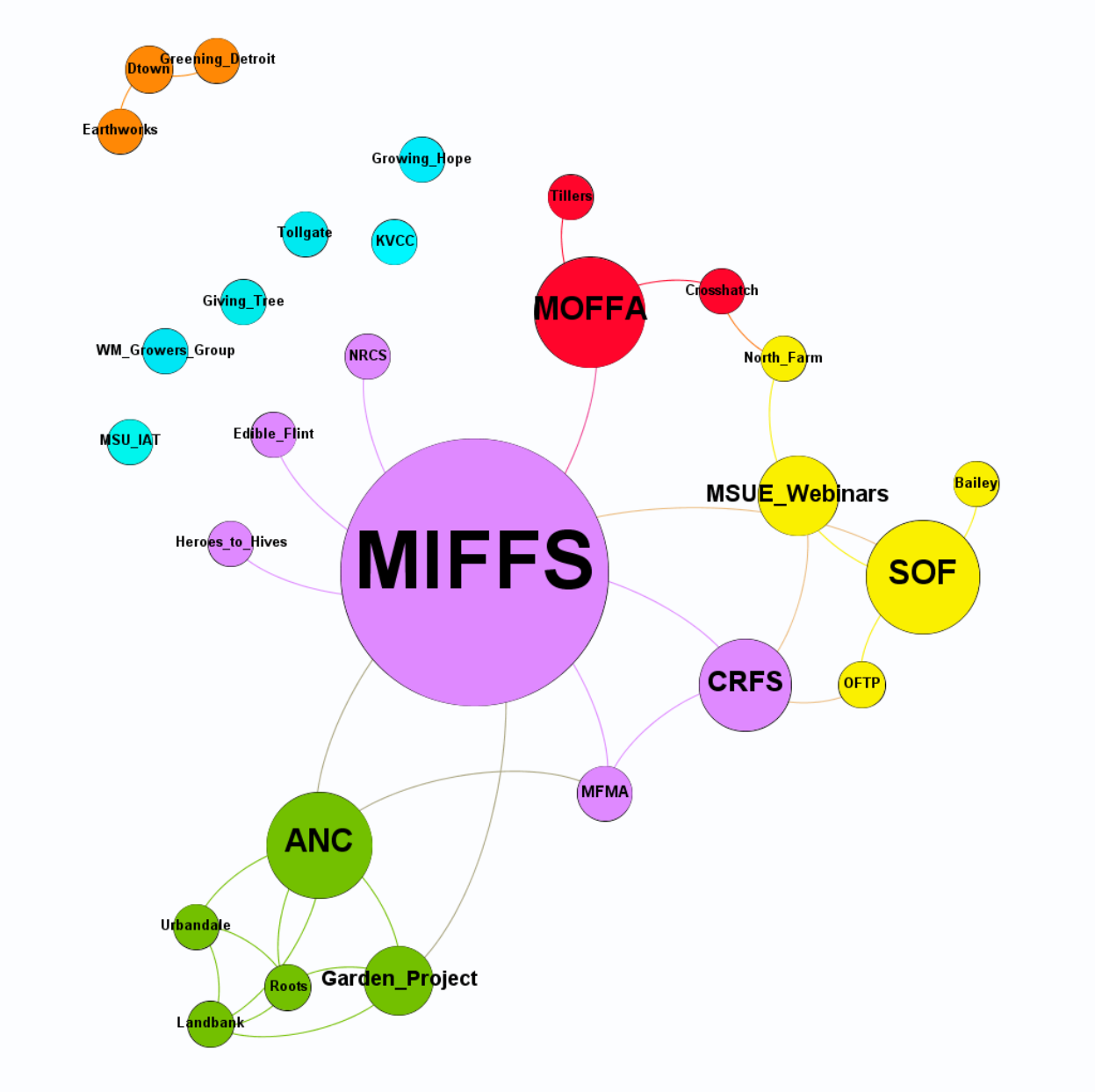


Table 14.
Network Analysis Data

Label	Betweeness Centrality	Modularity Class	Degree
Heroes to Hives	0.00	11	0
MSU IAT	0.00	10	0
Tollgate	0.00	9	0
KVCC	0.00	8	0
Growing Hope	0.00	7	0
WM Growers Group	0.00	5	0
Giving Tree	0.00	1	0
SOF	30.84	6	4
MSUE Webinars	13.93	6	3
North Farm	3.67	6	2
OFTP	0.67	6	2
Bailey	0.00	6	1
ANC	30.71	4	6
Garden Project	12.12	4	4
Roots	0.33	4	4
Landbank	0.33	4	4
Urbandale	0.00	4	3
Dtown	1.00	3	2
Earthworks	0.00	3	1
Greening Detroit	0.00	3	1
MIFFS	105.91	2	9
CRFS	19.76	2	4
MIFMA	4.59	2	3
NRCS	0.00	2	1
Edible Flint	0.00	2	1
MSUE General	0.00	2	1
MOFFA	31.74	0	3
Crosshatch	5.40	0	2
Tillers	0.00	0	1

CONCLUSIONS, DISCUSSION AND RECOMMENDATIONS

Programs

The results from this research show there are a diverse number of beginning specialty crop training programs located throughout Michigan. This diversity is demonstrated through the pedagogical practices, farming methods, participant numbers and commitment, as well as the financial management and geographic locations of the programs. While diversity of programs means there are more options for participants, financial and geographical constraints may limit some participants' choices.

Findings from the survey showed programs using a variety of formats in their training. The most practiced was multi-week experiential training, a format practiced by 33% of the organizations. While this teaching method has been found to be a good way for farmers to learn (Johnson, Carter, & Kaufman, 2008), the programs using this method had six times the number of contact hours than programs not using this method, possibly making it difficult for growers with limited time to participate. For participants with less time to commit, programs using topic specific workshops or conference workshops only averaged 22 contact hours and were the next two most popular formats. The online formats used by eight programs offer a way to overcome geographic constraints and reach a broader audience. Using conferences to train also had the added advantage of reaching large amounts of participants in a short time span. Two of the conference programs included in this study average a total of 1,400 participants each year.

The number of participants and contact hours in each program also varied over a large range. This range of options is important if programs across the state are going to attract participants with diverse schedules and commitment levels. Programs categorized as novice based on six separate criteria including contact hours, averaged only six contact hours, where

engaged programs averaged 318. Seven percent of the programs averaged more than 1,000 contact hours. While participants spent more time in these programs than any others, these programs only expected to have 34% of their participants become farm owner-operators.

Taking out the two largest outliers (conferences that totaled 1,400 participants), the overall number of participants trained by beginning farmer programs was 1,338. While there were twice as many engaged programs as there were novice, novice programs trained one and a half times more participants. Novice cohorts tended to be larger averaging 53 participants per program, but with less of a time commitment, averaging a little less than five hours per participant. This ratio of participants to time works well for programs teaching basic level topics and programs looking to attract new growers without the ability to commit to long intensive programs.

The analysis of costs of the beginning specialty crop farmer programs shows a wide variety of options for participants at all levels of commitment. This is important when attracting new growers and for farmers who cannot afford to start their career in debt. Eighty-three percent of the programs surveyed cost under $150 to participate, with 53% of those programs being free or paying their participants. These prices help take down one important barrier to entry for prospective farmers (Reid, 2013). Primarily only university programs require participants to pay over $150, though some of their tuitions reach $22,000.

While low prices are good for the farmer, they could pose a problem for the economic feasibility of the training organization. If the training organization cannot support its program through fees payed by its participants, administrators must look somewhere else for funding. This is usually in the form of grants, and donations. Eighty-one percent of non-profits that answered the funding question listed grants and donations at their top income generator for their

programs. While this shows that the greater society does see the need for the programs, directed grants and activities that appeal to donors significantly influence the flexibility of a program. Instead of working for their participants, the programs find themselves working for third parties that may not fully understand the needs of the program.

While there are numerous examples of differences between farmer training programs, there are also some similarities. The majority of the programs surveyed are relatively new. Ninety-four percent of the university programs and 71% of the total programs started after 2010. While statistical correlations were not done in this research, the start of the programs is consistent with the national interest in training new farmers as seen with the increase in federal funding written into the 2008 Farm Bill (USDA NIFA, 2019).

Another trend that may be affecting beginning farmer training programs is the increase of organic sales (OTA, 2019). Eighty-three percent of the programs listed using some type of organic methods in their training. The decision to teach organic methods is supported by census data showing organic farms in Michigan of one to nine acres averaging $81,000 in sales, versus the $7,000 in average sales of all Michigan farms of one to nine acres (USDA NASS, 2017). These statistics are particularly meaningful considering 87% of the programs listed 10 acres or less as the land size they expect the majority of their participants to farm. Conversely, only six percent of the programs listed conventional as their only method and all three of those programs were Agricultural Technology programs. It is possible the percentage of programs using conventional methods would be higher if six of the Agricultural Technology programs were not partial or non-responses in the survey.

Many of the programs also overlapped in the skills they taught. More than 80% of the engaged programs taught irrigation, soil management, disease management, harvesting, pest

management, tool use, and productions / growing. These skills were among numerous others that were taught together by a high percentage of the programs. The survey showed that 66% of the programs taught 10 or more skills with the more engaged programs teaching an average of 12 skills (Table 3). Organizations need to consider where their services are redundant and where shared curriculum would increase efficiency. While some redundancy is good to build resilience and better serve focused populations, too much may be at the detriment of efficiency of the system. As there are limited participants and limited resources to fund these programs, collaborations and participant sharing could give programs more content options in their training.

The survey also shows that non-production courses are some of the least taught subjects even though they are expressed as some of the highest needs for farmers (Bailey, 2013; Byrd, 2011; Trede & Whitaker, 1998). It is important to make sure the skills taught are appropriate for the success of the farmer. More courses covering management, business, marketing, environmental stewardship, and social networking could help farmers generate the economic and social capital necessary to thrive in the current system.

A look at the map of Michigan's beginning farmer training organizations (Figure 1) allows the reader to zoom out and imagine what a collaborative network of training organizations would look like on the state level. Currently there are groups of organizations located throughout the state. Urban areas have larger groupings with a number of those organizations focusing on urban agriculture. There are various farmer incubators located in different regions of the state, but they are not always formally connected with the training organizations geographically closest to them. The exception to this is the MSU North Farm where there are no other formal training programs within the vicinity of the incubator. Agricultural Technology programs are the most spread out geographically, but many of them are the lone training organization in the area.

Would these programs benefit from novice programs that could be feeders in to the Agricultural Technology training, or could the Agricultural Technology training be a feeder to some type of incubator?

Participants

Analyzing the demographics served by Michigan's training organizations, it is apparent that diversity is a priority among some organizations, but on the whole diversity can be increased. The survey asked organizations to report on the demographics of their participants by percentages in the categories of age, race, and gender. Due to the way these statistics are reported it is difficult to confidently express averages of non-weighted percentages, realizing the numbers can be skewed by outliers and programs with small populations. However, the numbers do tell us some interesting information.

There are a high number of programs that have a racial percentage above the state demographics. While 47% of the programs having greater than 75% White participants is not a strong indicator of diversity, the higher numbers of Black or African American, Hispanic, and Asian participants are a positive. These numbers could be representative of the geographic populations where the programs reside or because of a specific focus on a specific population. With 25% of the training programs using urban agricultural methods, it aids potential farmers that are interested in farming on smaller parcels of land, and therefore would likely have lower economic barriers to entry. This allows for some new populations to enter farming, where previously access to land prohibited them. Looking at the way administrators answered the questions on race / ethnicity, it is seen that 10% of the programs chose not to answer this question and another 15% reported not knowing. If diversity and representation of our population

is a priority, then programs must find ways to be intentional about race and ethnicity while at the same time being sensitive to rights and privacy of their participants.

Age may be the area where we see the most diversity in Michigan training programs. Again, due to the structure of the data it is hard to report exact numbers of the age ranges served; however, the data show a broad distribution of programs training participants from 18 to 50 years old. The broadness of the range indicates that people are coming to farming through a range of points in their adult lives. This means programs are needed that are tailored to help an enthusiastic youth ready enter a new field, as well as a seasoned adult leaving a successful career to start farming. While these various types of participants may be on a similar level of farming knowledge, their differences in technical abilities, confidence, management experience, physical ability, and life skills will dictate various ways to best provide training for these individuals. The diversity could also provide opportunities for peer-to-peer learning, mentoring, and structured teams that take advantage of the skills the participants bring to the table.

A survey question asking about the experience levels of participants shows the programs surveyed are mostly training beginning farmers. Non-profits listed around six percent of their participants as having greater than 10 years' experience, and universities four percent. Programs listed the average percentage of participants with no experience at 38%. This supports that a good portion of the programs in Michigan are serving beginning growers who are just entering the system or new farmers preparing to start their careers.

Eighty-three percent of the programs indicated the majority of their participants would be farming on less than 10 acres of land. The 2017 census data shows the total sales from farms under 10 acres make up only one percent of the total vegetable sales in the state. Ninety-eight-point-five percent of the farmers at that level have average sales of only $5,762 annually. Is this

where training programs should be focusing their training? From another perspective, the other 1.5% of farms' annual sales average is $113,364. Organic farms on one to nine acres also produce higher sales, averaging $81,000 (USDA NASS, 2017). Both statistics show though it is less common, it is possible to make a living at this scale. Sales numbers also do not take into account social benefits or the possibility of stacking enterprises, so farmers do not have to survive on only vegetable sales. A comprehensive training program needs to look at all of these points when developing their curriculum and make it clear to their participants the challenges and opportunities they have in front of them. Sixteen programs "Did not know" or "Choose not to answer" the number of acres on which their participants would most likely be growing. The disparity in sales between small and large size farms (Table 1) demonstrates the importance of a training program understanding its participants to give them a better chance of success.

All the organizations that filled out the survey indicated their program(s) have a role in training beginning farmers. Whether a program is at the beginning of an interested growers' path or leads directly to farming is pertinent to how it fits in the overall system. A survey question asking this information showed 56% of the programs said that 50% or more of their participants would become owner-operators or work on a farm directly after the program. The other 44% indicated that the majority of their participants would enter other training programs or would be using their training in home or community gardening.

Calculating expected number of owner-operators shows between 770 and 2,045 owner-operator farmers a year participating in beginning farmer training programs. The exact number is dependent on how programs with multiple sessions are counted. To put those numbers in prospective, the 2017 census reported a total of 3,089 vegetable farms in Michigan. Without additional research and more oversight on the part of the training organization, it is impossible to

know if graduates from Michigan's training programs are entering farming, dropping out of the system, or are already in the system.

Collaboration

Every organization in the survey indicated they would like to collaborate with other organizations. While several organizations are already sharing a few resources, similarities of formats, skills taught, methods, and funding show there is potential for additional collaboration. Several university programs have embedded connections with other programs in their institution and extension resources to connect with non-profits around the state. The findings show participant information and promotion are among the least shared resources. As all programs depend on having participants, setting up pathways for movement from one program to another and helping advertise all of Michigan's programs would benefit both the programs and the participants.

The social network model demonstrates how some organizations are left out of communities of collaboration and the importance of certain organization's roles in connecting others throughout the network. It also showed that a number of the modularity classifications appear to be similar to the geographic location of the organizations. Detroit organizations (in orange) connect with other Detroit organizations but not with others outside the city. The greater Lansing based non-profits (green) indicate collaboration between themselves and some with MIFFS and Michigan Farmers Market Association (MIFMA), also located in greater Lansing. There are a few exceptions. Michigan Organic Food and Farm Alliance (MOFFA), Tillers International, and Crosshatch all are located in different parts of the state, but collaborate with curriculum, funding and evaluation tools.

MIFFS has the largest betweenness centrality in the network. The organization is somewhat unique in that many of its programs operate in various parts of the state, making it easier to collaborate outside of the greater Lansing zone in which they are headquartered. An example of this is MIFFS' connection with Edible Flint. Due to its connectedness to various communities of collaboration, MIFFS is a good candidate to manage the information flow in the system. It connects actors that do not have direct links of their own.

Through conferences and events around the state, Michigan's specialty crop training organizations have numerous opportunities to informally connect. In those settings useful information may be shared back and forth without moving towards formal collaboration. The small number of official collaborators identified in this survey points toward the need of formalizing these relationships to make a more robust network. Actors attached to their communities, but not to the state-wide network could be missing out on benefits such as curriculum, funding, marketing, and participant sharing. National funding from NIFA grants, including Beginning Farmer Rancher Development Grants, is one example of funding that prioritizes partners and collaborations across a spectrum of organizations (USDA NIFA, 2019).

While 100% of those surveyed said they would like to collaborate, such collaboration may fall beyond the capacity of some organizations. Having a central organizing body that can assist in developing ties between others would be a valuable asset. Having a clearinghouse for resources such as curriculum, market needs, evaluations tools, and funding opportunities held by one entity, would free up time and energy in parts of an organization's programing so they can increase their connections to their participants. A better understanding of needs, greater evaluation, and more flexibility to adapt, are bound to increase the effectiveness of Michigan's beginning specialty crop farmer training programs. With programs reaching close to their

capacity, coupled with a strong understanding of the market and available participants, the amount and type of farmer training organizations can be found that keep Michigan's food system healthy.

Limitations

There are some limitations to this research that should be understood when using it for developing future research. As previously stated, there were numerous times respondents did not know or declined to answer the survey questions. The quality of the responses may be partly due to the length of the survey, the way the questions were worded, or because the respondent may not have the time or resources to fully answer the questions. Likely some of the numbers were estimated for similar reasons. Another concern is that the expertise of the person filling out the survey may not cover the full breath of an organization's programs. Constructing a survey to fit the wide range of programs doing various type of farmer training was difficult to accomplish. A question pertinent to an engaged program may not interest a novice program and vice versa. Due to the greater non-responses of university programs and programs from a similar geographic location, a full picture of Michigan's specialty crop training programs may be lacking. Additionally, there are other means by which farmers in Michigan may be acquiring their knowledge other than the beginning farmer training organizations surveyed herein that are outside of the state and operate online courses.

Recommendations for Additional Research

A descriptive analysis is exploratory and meant to serve as a basis for additional studies. A survey of Michigan beginning farmers would provide supplementary data and give validation to the findings in this study. Tracking farmers along their career could elucidate all of the means by which they acquire their knowledge, how often they use multiple beginning farmer training

organizations, and what they perceive as lacking in their training. Other studies could move beyond beginning farmer training and look at how we are training farmers in all parts of their career.

Qualitative studies of beginning farmer training organizations could build on the survey data to find more nuanced responses from organizations and a more targeted survey could be done. Many organizations may already be having participants evaluate their programs for their own internal use and looking at these evaluations across training organizations may provide additional insight as to their effectiveness and how farmers perceive how the training programs can be enhanced. Metrics could be developed to have some consistency among evaluations for training organizations.

Education and marketing on the consumer side could increase opportunities for beginning farmers as they integrate into communities. While farm-to-table restaurants, farmers' markets and CSAs have grown in popularity, gaining access to institutional purchasing could help in linking farmers and consumers in an additional setting. Research focusing on purchasers at institutions could make clear a best pathway for farmers to sell to these types of buyers.

APPENDIX

Table 15.
Rating System for Engaged and Novice Programs

Program Name (Engaged)	Total Weight	Advanced Skills		Contact Hours		Program Cost		No Experience		Work on a Farm	
		Skills	Weight	Hours	Weight	Cost	Weight	Percent	Weight	Percent	Weight
MSU N. Farm - Apprent. Farmer Prog	9	FP, Bus Prod	1	800	4	1300	2	0	1	75	1
CBI Giving Treee - Farm Staff	8	FP, Bus Prod	1	640	4	Paid	1	49	1	31	1
Lansing Roots - Incubator Farm	8	FP, Bus Prod	1	420	4	Paid	1	0	1	70	1
MSU - Organic Farmer Training Prog	7	FP, Bus Prod	1	1152	4	$8,900	2	50	-1	80	1
MSU IAT Viticulture certificate	7	FP, Bus Prod	1	63	2	17,000	2	0	1	100	1
MSUE Tollgate - Apprenticeship	6	FP, Bus Prod	1	800	4	Paid	1	100	-1	50	1
Urbandale - Urban farmer apprent prog	6	FP, Bus Prod	1	480	4	Paid	1	60	-1	45	1
MSU IAT - Ag Operations certificate	5	FP, Bus Prod	1	63	2	22,000	2	50	-1	90	1
MIFFS - Farm Devel. Centers	5	FP, Bus Prod	1	Varies	0	1500	2	0	1	100	1
MFMA - Farm-based Ed Prog	5	FP, Bus Prod	1	30	1	0	1	0	1	91	1
MSU IAT - Fruit & Veg Crop Mgnt	5	FP, Bus Prod	1	60	2	20,000	2	50	-1	40	1
MSU N. Farm - Novice Farmer Prog.	5	FP, Bus Prod	1		4	N/A	0	0	0	0	0
Bailey Greenhouse - Green Team	4	FP, Bus Prod	1	300	3	Paid	1	96	-1	19	0
KVCC - Course Agrifood depart.	4	FP, Bus Prod	1	90	2	600	1	0	0	0	0
Earthworks - Ag Training Prog	4	FP, Bus Prod	1	864	4	0	-1	92	-1	30	1
MIFFS - Multip Cultural Farmer Net.	4	FP, Bus Prod	1	60	2	0	-1	4	1	81	1
Greening Detroit - Urban Ag. Apprent.	4	FP, Bus Prod	1	700	4	0	-1	10	1	9	-1
MIFFS - Women In Ag Network	4	FP, Bus Prod	1	70	2	0	-1	5	1	66	1
MSU SOF - Farmer Field School	1	FP, Bus Prod	1	7.5	-1	$110	-1	20	1	94	1
MSU IAT - Landscape Mgnt Cert.	3	Bus, Prod	1	60	2	20,000	2	100	-1	0	-1
MSUE Tollgate - Part Time Apprent.	3	FP, Bus Prod	1		1	500	1	0	0	0	0
CBI Giving Tree - Voc. Training Clients	3	Prod	0	Varies	2	Paid	1	0	0	0	0

Table 15 (cont'd).

Program Name (Engaged)	Total Weight	Advanced Skills		Contact Hours		Program Cost		No Experience		Work on a Farm	
		Skills	Weight	Hours	Weight	Cost	Weight	Percent	Weight	Percent	Weight
MSUE - Heroes to Hives	2	Bus, Prod	1	60	2	0	-1	50	-1	70	1
MFMA - Hoophouses for Health Prog	1	Prod	0	0	0	0	-1	0	1	100	1
ANC - Hunter Park GardenHouse Intern.	1	FP, Bus Prod	1	250	3	0	-1	90	-1	10	-1
MIFFS - Meet The Buyers	1	Bus	1	4	-1	0	-1	0	1	95	1
MIFFS - MI Family Farms Conf	1	FP, Bus Prod	1	7	-1	$10-$40	-1	15	1	79	1
MFMA - MI Farmers Market Conf.	1	FP, Bus Prod	1	12	1	$100	-1	0	0	0	0
MIFFS On Farm Food Safety & Cons	3	Bus, Prod	1	15	1	0	-1	0	1	100	1
KVCC - Life Enrichment classes	0	Prod	0	16	1	140	-1	0	0	0	0
WM Growers - Monthly Gatherings	1	FP, Bus Prod	1	3	-1	0	-1	9	1	100	1
NRCS - Soil Health	0	Prod	0	2	-1	0	-1	0	1	100	1
				251.0		$3,839		27%		54%	

Table 15 (cont'd).

Program Name (Novice)	Total Weight	Advanced Skills		Contact Hours		Program Cost		No Experience		Work on a Farm	
		Skills	Weight	Hours	Weight	Cost	Weight	Percent	Weight	Percent	Weight
MOFFA - Organic Intensives	-1	FP, Bus, Prod	1	6	-1	75	-1	0	0	0	0
Growing Hope - Bldg Blocks for the	-1	Bus	1	4	-1	0	-1	50	-1	30	1
ANC - Frmer, Grdenin & Food Bus.	-1	FP, Bus, Prod	1	2	-1	12	-1	0	0	0	0
MSUE BF Webinar Series	-1	FP, Bus, Prod	1	2	-1	45	-1	60	-1	72	1
MSU N. Farm - Skill Seeker WS	-1	FP, Prod	1	5	-1	20	-1	0	1	25	-1
MIFFS - Vets in Ag Network	-1	FP, Prod	1	5	-1	0	-1	51	-1	47	1
Crosshatch - Workshops	-1	FP, Bus, Prod	1	4	-1	20	-1	0	0	0	0
Growing Hope - Grdn n Cooking	-2	Prod	0	2	-1	15	-1	17	1	0	-1
Grdn Prog - Garden Leaders Training	-2	Bus, Prod	0	11	-1	20	-1	33	1	4	-1
Crosshatch - Guilds	-2	Other	0	10	-1	0	-1	0	0	0	0
Crosshatch - NMSF Conference	-2	FP, Bus, Prod	1	6	-1	$75	-1	29	-1	0	0
Edible Flint - Garden starters	-2	Prod	0	16.5	1	$65	-1	50	-1	10	-1
Edible Flint - Garden workshop series	-4	Prod	0	7.5	-1	$10	-1	80	-1	5	-1
Growing Hope - Home Veg Grdn	-4	Prod	0	4	-1	0	-1	75	-1	0	-1
Growing Hope -Teen Mentor Intern	4	Prod	0	100	3	Paid	1	60	-1	40	1
ANC - Youth Grdnin & Nutrition	-2	Bus, Prod	1		0	0	-1	100	-1	0	-1
				12.3		$23.80		38%		15%	

Table 16.
Participants Per Program and The Way They Will Use Their Training

Program Name (Engaged)	Program Type	Farm Owner Operator	Intern on a farm	Paid position on a farm	Other BFTP	Home/Comm gardener	Will Not Use	Do Not Know	choose not to answer	Total Trained
MIFFS - MI Family Farms Conf	NP	240	76	0	40	44	0	0	0	400
MFMA - Farm-based Ed Prog	NP	91	0	0	0	9	0	0	0	100
MIFFS - Meet The Buyers	NP	82	5	8	5	0	0	0	0	100
MIFFS On Farm Food Safety & Cons	NP	27	2	2	0	0	0	0	0	30
MSU SOF - Farmer Field School	Univ	14	0	1	0	1	0	0	0	15
NRCS - Soil Health	Gov	14	1	1	0	0	0	0	0	15
WM Growers - Monthly Gatherings	NP	12	4	4	0	0	0	0	0	20
MIFFS - Women In Ag Network	NP	11	1	1	1	6	0	0	0	20
MIFFS - Farm Devel. Centers	NP	10	1	0	0	0	0	0	0	10
MSUE - Heroes to Hives	Univ	8	0	3	0	5	0	0	0	15
MIFFS - Multip Cultural Farmer Net.	NP	8	3	2	1	2	0	0	0	15
MSU - Organic Farmer Training Prog	Univ	7	1	5	2	2	0	0	0	16
Lansing Roots - Incubator Farm	NP	7	0	0	0	3	0	0	0	10
MSU N. Farm - Apprent. Farmer Prog	Univ	2	0	1	0	0	0	1	0	4
MSU IAT - Fruit & Veg Crop Mgnt	Univ	1	1	2	1	0	0	0	6	12
Urbandale - Urban farmer apprent prog	NP	1	0	0	1	0	0	0	0	3
Greening Detroit - Urban Ag. Apprent.	NP	0	0	0	0	5	0	0	0	5
Earthworks - Ag Training Prog	NP	0	2	1	1	6	0	0	0	9
MSU IAT - Ag Operations certificate	Univ	0	2	12	2	0	0	0	0	15
MSUE Tollgate - Apprenticeship	Univ	0	0	1	0	1	0	0	0	2
Bailey Greenhouse - Green Team	Univ	0	1	1	0	2	0	5	0	8
KVCC - Course Agrifood depart.	Univ	0	0	0	0	0	0	24	0	24
CBI Giving Treee - Farm Staff	NP	0	0	2	3	3	0	0	0	8
MFMA - Hoophouses for Health Prog	NP	0	0	0	0	0	0	0	0	0
ANC - Hunter Park GardenHouse Intern.	NP	0	0	1	1	4	0	0	0	5
MSU IAT - Landscape Mgnt Cert.	Univ	0	0	0	2	0	0	0	0	2
KVCC - Life Enrichment classes	Univ	0	0	0	0	0	0	30	0	30

Table 16 (cont'd).

Program Name (Engaged)	Program Type	Farm Owner Operator	Intern on a farm	Paid position on a farm	Other BFTP	Home/Comm gardener	Will Not Use	Do Not Know	choose not to answer	Total Trained
MFMA - MI Farmers Market Conf.	NP	0	0	0	0	0	0	12	0	12
MSU N. Farm - Novice Farmer Prog.	Univ	0	0	0	0	0	0	0	0	0
MSUE Tollgate - Part Time Apprent.	Univ	0	0	0	0	0	0	0	2	2
MSU IAT Viticulture certificate	Univ	0	1	0	0	0	0	0	0	1
CBI Giving Tree - Voc. Training Clients	NP	0	0	0	0	0	0	0	30	30
	Totals	534	99	47	58	91	1	72	38	938
Program Name (Novice)										
MSUE BF Webinar Series	Univ	165	5	0	0	66	0	0	0	236
MIFFS - Vets in Ag Network	NP	29	0	18	18	35	0	0	0	100
MSU N. Farm - Skill Seeker Workshops	Univ	27	0	0	0	70	11	0	0	108
Growing Hope - Bldg Blocks for the FE	NP	15	0	0	0	0	0	35	0	50
MOFFA - Organic Intensives	NP	0	0	0	0	0	0	100	0	100
Edible Flint - Garden starters	NP	0	2	2	2	26	0	0	0	30
Edible Flint - Garden workshop series	NP	0	0	0	0	5	0	0	0	5
ANC - Frmer, Grdenin & Food Bus. WS	NP	0	0	0	0	0	0	25	0	25
Growing Hope - Grdn n Cooking Class	NP	0	0	0	0	10	0	0	0	10
Grdn Prog - Garden Leaders Training	NP	0	1	1	0	38	0	0	0	40
Crosshatch - Guilds	NP	0	0	0	0	0	0	20	0	20
Growing Hope - Home Veg Grdn Prog	NP	0	0	0	0	25	0	0	0	25
Crosshatch - NMSF Conference	NP	0	0	0	0	0	0	1000	0	1000
Growing Hope -Teen Mentor Intern Prog	NP	0	2	1	0	4	0	0	0	6
Crosshatch - Workshops	NP	0	0	0	0	0	0	20	0	20
ANC - Youth Grdnin & Nutrition Prog	NP	0	0	0	0	23	3	0	0	25
	Totals	236	9	21	20	301	26	1286		1800
	Grand Totals	770	108	68	77	392	27	1357	38	2738

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