2019 Annual Report of Accomplishments and Results

Michigan
Michigan State University

I. Report Overview

The NIFA reviewer will refer to the executive summary submitted in your Plan of Work. Use this space to provide updates to your state or institutions as needed.

1. Executive Summary (Optional)

Key areas for MSU Extension:

MSU Extension's Response to COVID-19

During unprecedented disruptions to daily life due to the novel coronavirus global pandemic, MSU Extension remains committed to serving Michigan residents. MSU Extension has created a suite of online resources and programming, available on demand through its new Remote Learning and Resources online space (https://www.canr.msu.edu/rlr/index). MSU Extension is modifying and transitioning traditional in-person programming to a digital space to continue to ensure individuals, families, farmers, business owners, and communities get the information they need when they need it.

The Remote Learning and Resources online space is a one-stop-shop for MSU Extension's digital offerings and educational materials related to the current circumstances. Among the resources featured on the site are:

- A listing of all MSU Extension virtual events — from family yoga sessions to lunch-and-learns for equine enthusiasts
- A collection of free educational resources for parents and caregivers to keep children engaged in learning throughout the school break
- Online learning opportunities for adults who may want to continue their own lifelong learning
- A series of resources to help individuals stay healthy and active during social distancing
- A variety of educational articles related to topics such as dealing with family stress, talking to children about novel coronavirus and managing finances

Through the Food Processing and Innovation Center (FPIC), MSU Extension has also partnered with a local Lansing area healthcare provider to develop a process to use FPIC facilities to decontaminate N95 respirator masks. Having this process allows local hospitals and healthcare workers to reuse these masks, giving hospitals an added advantage in protecting themselves from the novel coronavirus.

MSU Extension's Farm Stress Response

MSU Extension continues to addess farm stress, due to an increase in Michigan farmers dying by suicide. The Centers for Disease Control and Prevention has reported that farmers and farm workers attempt and complete suicide at a higher rate than other professions. To help respond to the needs of Michigan farmers and their families, MSU Extension developed two important farm stress management workshops: "Weathering the Storm in Agriculture: How to Cultivate a Productive Mindset", which shows farmers how to identify signs and symptoms of stress and teaches stress management techniques, and "Communicating with Farmers Under Stress", which is designed for those who work with agricultural producers and farm families to help them learn more about managing stress and communicating with those in need. MSU Extension has also delivered several training to national partners, including American Farm Bureau Federation, the National Farmers Union, and the Farm Credit Council, with the goal of extending farm stress educational materials and giving them the ability to connect those in need with resources.

MSU Extension Delayed Planting Resources

Throughout Michigan and the Midwest, the prolonged wet weather and flooding in spring 2019 put farmers in a difficult financial position. Unprecedented rainfall forced farms to delay planting and greatly adjust management practices. In the worst cases, some fields were not planted at all. MSU Extension's statewide network of agricultural educators were quick to respond to this situation by tracking growing conditions, working individually with farmers, hosting crop update sessions and writing educational articles detailing how farmers could adjust to inhospitable conditions, make difficult choices and apply for crop damage assistance.

MILES – Michigan Intertribal Land Grant Extension System

In 2019, Bay Mills Community College and Michigan State University began a partnership to better serve tribal nations and communities. The Michigan Inter-Tribal Land Grant Extension System (MILES) is led by Bay Mills Community College, in collaboration with MSU Extension. The goals of this partnership include enhancing agriculture production and marketing, developing leadership skills in both youth and adults, conserving natural resources, thriving economic development programs, and creating stronger families through health and nutrition. Over the course of four years, they will expand the existing project team of five outreach and evaluation specialists to include professionals from all four Michigan land-grant institutions by including MSU, Bay Mills Community College, Saginaw Chippewa Tribal College in Mt. Pleasant and Keweenaw Bay Ojibwa

Community College in Baraga. Through these outreach and engagement efforts, MILES will strengthen tribal communities by supporting tribal sovereignty and connecting communities with the educational resources they want and need to solve community-identified problems.

DPFLI – Detroit Partnership for Food, Learning and Innovation

Detroit's challenges are different than those in rural food production areas—contaminated soils, small areas and lack of agricultural education among them. The Detroit Partnership for Food, Learning and Innovation is Michigan State University's first urban food research center, developing solutions to economic and nutritional challenges unique in urban environments. This research and Extension center grew from years of discussions with Detroit leaders and residents. This facility and the MSU Extension staff housed there will help educate people about growing healthy, nutritious food, and provide a location for a wide range of programming that will benefit the local community.

Key areas for MSU AgBioResearch:

MSU looks to lead way on PFAS research

Michigan State University researchers are looking to answer questions surrounding the little-known per- and polyfluoroalkyl substances known as PFAS. Contamination numbers in Michigan outpace those of any other state, and MSU is on the front lines of solving the growing problem. MSU scientists are working on building PFAS knowledge and finding ways to minimize the environmental and health impacts of these "forever-chemicals." With further funding and research, MSU hopes to become a clearinghouse for PFAS research and the leading source of PFAS information in the nation.

- MSU Extension has a PFAS contamination response website (canr.msu.edu/pfas), and other researchers are examining how humans are exposed to PFAS and how that exposure can be limited.
- MSU researchers want to examine just how detrimental PFAS can be to human health. According to the Environmental Protection Agency, human ingestion of PFAS through drinking water or food can cause reproductive, developmental, liver, kidney and immunological effects. Increased cholesterol levels among exposed populations have been the most consistent findings in studies.

Helping growers manage spotted wing drosophila

First detected on the West Coast of the U.S. in 2008 and Michigan in 2010, spotted wing drosophila (SWD) is an invasive fly that damages a wide range of crops. SWD have now been reported in more than 30 states. Berries and cherries are especially affected, and some states have experienced near entire crop losses. SWD poses a significant threat to Michigan's cherry industry, which is valued at more than $70 million per year and a crucial part of the state's agricultural economy.

- Project GREEEN has invested heavily in SWD research, funding projects that are investigating SWD biology, attractants and management. Additional support has been provided by commodity groups.
- Leveraging Project GREEEN funding, MSU researchers received a $250,000 grant from the U.S. Department of Agriculture's Specialty Crop Research Initiative to study sustainable management strategies for SWD.
- Following U.S. detection in 2008, SWD caused more than $500 million in annual crop losses in the following two years.

Chronic wasting disease threatens Michigan deer hunting, wildlife conservation efforts

More than 600,000 Michiganders take to the woods in pursuit of white-tailed deer each year. For many, the hunt represents more than a chance to secure fresh food. In many instances, the opening day of deer hunting season is treated like a holiday.

An activity rife with nostalgia in the Great Lakes State, deer hunting is often a multigenerational pastime where stories of chasing trophy bucks are ingrained in community folklore. But this heritage and its future are threatened by a fast-spreading, highly contagious condition called chronic wasting disease (CWD).

Caused by an abnormal form of cellular protein called a prion, CWD affects deer, elk and moose. It is among a class of conditions known as transmittable spongiform encephalopathies, meaning that it's an infectious and degenerative neurological disorder. One of the most well-known examples of this type of disorder is mad cow disease.

Animals with CWD may have no discernible symptoms for years. However, in advanced stages they may show odd behavior, emaciation, listlessness and loss of bodily functions. All CWD cases eventually result in death.

https://www.canr.msu.edu/news/chronic-wasting-disease-threatens-michigan-deer-hunting-wildlife-conservation-efforts

New MSU research center focusing on natural resources

In 2018, the Muck Soil Research Farm in Laingsburg, Michigan, which housed vegetable research for Michigan State University and closed in 2012, was being considered for sale.

Around the same time, Jen Owen, an associate professor in the MSU Department of Fisheries and Wildlife, was looking for housing for her research field crew and learned of the property while meeting with Doug Buhler, MSU AgBioResearch director, and other leadership.

Owen took the roughly 13-mile drive to Laingsburg to check out the buildings and began to explore the rest of the property. Her mind began to race. While the land proved challenging for farming, Owen saw it as an ideal spot for natural resources and ecological restoration research.

"The expansive wetlands and surrounding habitat contain an abundance of plant and animal life," Owen said. "More than that, it contained a unique opportunity for the MSU community to further both our natural resources research, academic programs and outreach efforts. When I came back to campus, I asked for the whole property."

Some may view the overgrown wetlands, stocked with invasive plant species, as something not worth the investment. Owen sees it differently. She said this location presents an opportunity to conduct long-term ecological wetland restoration research and share knowledge with many stakeholders.

https://www.canr.msu.edu/news/new-msu-research-center-focusing-on-natural-resources

MSU to enter partnership with educational institution in India

Leaders from the College of Agriculture and Natural Resources and MSU AgBioResearch signed a letter of intent to partner with Somaiya Vidya Vihar, a nonprofit educational trust that manages several educational institutions across India.

Leaders from Michigan State University's College of Agriculture and Natural Resources (CANR) and MSU AgBioResearch signed a letter of intent Friday, Nov. 8 to partner with Somaiya Vidya Vihar (SVV), a nonprofit educational trust that manages several educational institutions across India.

Founded in 1959 by Padma Bhushan K. J. Somaiya, a successful Indian businessman in the sugar industry, SVV has become a large educational provider in the areas of science, technology, engineering, social sciences and commerce.

Today, SVV is operated by Somaiya's grandson, Samir Somaiya, and employs more than 1,500 faculty members in 34 colleges and institutes in India, providing education to more than 39,000 students.

The letter of intent outlines several potential collaboration opportunities around sustainable development. Topics include soil health, probiotics and microbial solutions, ecofriendly packaging from agricultural waste, big data and precision agriculture, healthy food choices, bioenergy and renewable energy.

https://www.canr.msu.edu/news/msu-to-enter-partnership-with-educational-institution-in-india

Michigan State University poll shows emerging food trends are more widely embraced by younger generations

Americans under 40 are more receptive to trying new food products, such as plant-based and cell-cultured meats, meal kits and insect protein, than those 40 and older.

The most recent Michigan State University (MSU) Food Literacy and Engagement Poll, conducted in September, reveals that Americans under 40 are more receptive to trying new food products, such as plant-based meats and insect protein, than those 40 and older.

"The food landscape is changing rapidly" said Sheril Kirshenbaum, co-director of the poll. "Willingness to adopt new alternatives to traditional agricultural products varies tremendously across age groups, and public acceptance of these emerging technologies will determine winners and losers in the international marketplace."

The poll surveyed more than 2,100 Americans on a variety of emerging food technologies and options, including:

- Plant based meats.
- Cell-cultured meats
- Protein powder made from insects, such as crickets.
- Meal kits.
- Genetically modified organisms (GMOs).

https://www.canr.msu.edu/news/michigan-state-university-poll-shows-emerging-food-trends-are-more-widely-embraced-by-younger-generations

Merit and Scientific Peer Review Processes

The NIFA reviewer will refer to your Plan of Work. Use this space to provide updates as needed or activities that you would like to bring to NIFA's attention.

Process	Updates
1. The Merit Review Process	no changes
2. The Scientific Peer Review Process	no changes

II. Stakeholder Input

The NIFA reviewer will refer to your Plan of Work. Use this space to provide updates as needed or activities that you would like to bring to NIFA's attention.

Stakeholder Input Aspects	Updates
1. Actions taken to seek stakeholder input that encouraged their participation with a brief explanation	no changes
2. Methods to identify individuals and groups and brief explanation.	no changes
3. Methods for collecting stakeholder input and brief explanation.	no changes
4. A Statement of how the input will be considered and brief explanation of what you learned from your stakeholders.	no changes

III. Planned Program Table of Contents

V. Planned Program Activities and Accomplishments

Please provide information for activities that represent the best work of your institution(s). See Section V of the Guidance for information on what to include in the qualitative outcomes or impact statements. Add additional rows to convey additional accomplishments. You may expand each row as needed.

No.	Title or Activity Description	Outcome/Impact Statement	Planned Program Name/No.
1.	**Farm Stress response**	**Creating Resilient Farms by Managing Stress** The rewards of farm life can be great, but so can the heavy demands — which include everything from equipment failures to unpredictable growing seasons. These challenges can lead to stress, mental health issues and even suicide. The Centers for Disease Control and Prevention reports that farmers and farm workers attempt and complete suicide at a higher rate than other professions. Uniquely positioned at the intersection of agricultural knowledge and mental health expertise, MSU Extension is helping farmers, their families and industry professionals alike navigate these stresses. In response, MSU Extension created two important farm stress management workshops: "Weathering the Storm in Agriculture: How to Cultivate a Productive Mindset" shows farmers how to identify signs and symptoms of stress in themselves and their families, and teaches stress management techniques they can use in their everyday lives.	Human Health, Environment, Family, Youth, Society and Community

		"Communicating with Farmers Under Stress" is a workshop that teaches agricultural industry workers how to recognize and respond to signs of mental distress with the farm families they encounter in their work. In January 2019, MSU Extension hosted a national Farm Stress Management Summit, which was attended by 99 participants from 23 different states. In late 2019, MSU Extension trained folks from American Farm Bureau Federation, the National Farmers Union, and the Farm Credit Council with the goal of extending farm stress educational materials and creating new customized materials in online courses that will better prepare their employees to recognize the signs and symptoms of stress, and give them the ability to connect those in need with resources. In August 2019, MSU Extension launched a free webinar series - "Bury Seeds, Not Stress" - which covered a variety of topics, from the mental health stigma facing men to how to incorporate stress-reducing techniques into your day. Sessions were open to farmers, family members, industry workers — anyone who wants to learn more about how to manage the stresses of farming life and support our agriculture professionals. ● In 2019, MSU Extension provided 27 farm stress management workshops, reaching 757 farmers and agriculture industry professionals. ● 91% of participants report that these farm stress trainings helped them learn to recognize signs of depression, suicide and mental illness. **Relevant links and resources:**	

		Resilient Minds: Managing Stress on the Farm - Managing Farm Stress Resilient Farms: Financial and Management Guides - Managing Farm Stress Bury Seeds, Not Stress webinar series	
2.	**4-H college enrollment**	**Michigan 4-H Prepares Youth for College Success** The economic returns of a better-educated and more skilled workforce are widely recognized, bringing national attention to the need to equip youth with the requisite skills to succeed in college. The economic returns of a better-educated and more skilled workforce are widely recognized, bringing national attention to the need to equip youth with the requisite skills to succeed in college. Research shows that young people who enroll in college on time - within 6 months of graduating from high school - are more likely to graduate on time, making on-time college enrollment an important focus in the successful pursuit of higher education. MSU Extension's 4-H Youth Development program is helping to secure a more prosperous future for Michigan by preparing the next generation of college graduates. Through diverse programs serving more than 200,000 young people, Michigan 4-H helps youth develop important life and leadership skills, increase college aspirations and improve college readiness. Through data obtained through the National National Student Clearinghouse, a national enrollment and degree-attainment verification system, as well as comparison data from the Michigan Department of Education, we find that:	Human Health, Environment, Family, Youth, Society and Community

		• In 2019, 63% of Michigan's 4-H alumni enroll in college on time, while only 53% of Michigan youth overall enrolled on time. • In fall 2019, 4-H alumni enrolled in college on time at a higher rate than other Michigan youth in 84% of Michigan counties. • As of 2019, 41% of Michigan 4-H alumni (versus 35% of Michigan youth overall) have earned a bachelor's degree 6 years after high school. **Relevant links and resources:** Michigan 4-H Alumni College Access Project Michigan 4-H alum enroll in college at higher rate than their peers	
3	**Delayed planting season resources**	**Delayed Planting Resources Help Farmers Mitigate Weather Issues** Throughout Michigan and the Midwest, the prolonged wet weather and flooding in spring 2019 put farmers in a difficult financial position. Unprecedented rainfall forced farms to delay planting and greatly adjust management practices. In the worst cases, some fields were not planted at all. MSU Extension's statewide network of agricultural educators were quick to respond to this situation by tracking growing conditions, working individually with farmers, hosting crop update sessions and writing educational articles detailing how farmers could adjust to inhospitable conditions, make difficult choices and apply for crop damage assistance. Because this issue has the potential to greatly affect farm income,	Plant Sciences

		educational efforts included programming dedicated to assisting farmers under stressful conditions. ● Delayed planting educational materials were viewed online nearly 25,000 times between June and August 2019 ● More than 600 participants attended in-person informational sessions discussing strategies for handling delayed planted acreage between June and August 2019. ● Weekly virtual breakfast meetings were amended to discuss delayed planting strategies. Nearly 600 participants attended the live webinars between April and July 2019. Others viewed the webinars on YouTube more than 1,000 times and Facebook posts reached almost 5,000 people. **Relevant links and resources:** Delayed Planting Resources - Agriculture	
4.	**FPIC – Food Processing Innovation Center**	**FPIC – Food Processing Innovation Center** The Michigan State University Food Processing and Innovation Center (FPIC) is Michigan's leading independent commercial food development, processing, packaging and research facility. Businesses big and small rent the state-of-the-art facility featuring the latest in processing and packaging technology to meet their needs and take their business to the next level. Create and commercialize new food and drink product lines for the marketplace in an industry compliant and cutting-edge facility located in Okemos, Michigan. The FPIC services both existing food businesses and larger scale startups in Michigan, Great Lakes region and beyond. The FPIC	Food and Non-Food Quality, Nutrition, Engineering and Processing

		has seen 110 production days, 9 clients, 31 products and 2 research projects since its launch in 2018. In response to the 2019-2020 novel coronavirus pandemic, MSU Extension and FPIC partnered with a local Lansing area healthcare provider to develop a process to use FPIC facilities to decontaminate N95 respirator masks. Having this process allows local hospitals and healthcare workers to reuse these masks, giving hospitals an added advantage in protecting themselves from the novel coronavirus. MSU Extension recruited help from other parts of the university, such as the MSU Health Sciences and the College of Engineering, which tested the sanitized masks to make sure they maintained their integrity. **Relevant links and resources:** Food Processing and Innovation Center About - Food Processing and Innovation Center Innovation and Growth - Alumni & Friends MSU Extension Develops Decontamination Method to Reuse N95 Masks	
5.	**Initiative driving support of Michigan's animal agriculture industries**	**MSU and animal agriculture commodity organizations partner to address industry's most pressing challenges.** Tackling both short- and long-term priorities linked to the sustainability of Michigan's animal agriculture industry is the objective of a relatively new initiative that brings together Michigan State University, the Michigan	Animal Production and Protection

		Department of Agriculture and Rural Development, and animal agriculture industry organizations. From managing antibiotic resistance and curbing infectious diseases to improving animal welfare and boosting environmental stewardship, the Michigan Alliance for Animal Agriculture (M-AAA) focuses on pooling resources for the advancement of the industry. Agricultural leaders recognized that deploying the expertise of MSU's outreach and research capacity would give producers access to the latest information that directly addresses their needs. **Relevant links and resources:** https://www.canr.msu.edu/news/initiative-driving-support-of-michigan-s-animal-agriculture-industries	
6.	**MSU water scientist chairing international task force examining wastewater for community infection of novel coronavirus**	**Joan Rose, the Homer Nowlin Chair in Water Research at MSU, is leading the International Water Association Covid-19 Task Force's efforts to enhance water supply safety.** Michigan State University (MSU) water expert Joan Rose is leading efforts to collaborate with scientists worldwide to monitor for the presence of the novel coronavirus in sewage.	Soil, Water and Natural Resources

		The most common symptoms of the virus are cough, fever and fatigue. In more severe cases, these early indicators can be associated with shortness of breath and chest pain. But a study conducted in Wuhan, China, published in The American Journal of Gastroenterology reveals that in about 30% of cases, the first sign of infection is gastrointestinal distress — particularly diarrhea. In some instances, there are no respiratory symptoms at all. Shortly after the outbreak began in early January, Rose — the Homer Nowlin Chair in Water Research at MSU and one of the world's foremost experts on drinking water and wastewater treatment — contacted colleagues in China and neighboring Asian countries where the virus was spreading. She said it became clear, based on those conversations, that water quality and sanitation were topics of great concern. **Relevant links and resources:** https://www.canr.msu.edu/news/msu-water-scientist-chairing-international-task-force-examining-wastewater-for-community-infection-of-novel-coronavirus	
7.	**MSU leads study exploring the viability of using indoor farming to grow leafy greens**	**A multi-university team of horticulturists, engineers and agricultural economists led by MSU has received a four-year, $2.7 million grant from the USDA to study indoor production of leafy greens.** A multi-university team of horticulturists, engineers and agricultural economists led by Michigan State University (MSU) has received a four-	Economics, Marketing and Policy

		year, $2.7 million grant from the U.S. Department of Agriculture (USDA) to study indoor production of leafy greens. Erik Runkle, a professor in the MSU Department of Horticulture, was awarded the grant by the USDA National Institute of Food and Agriculture's Specialty Crop Research Initiative. Industry partners have matched funding, bringing the project total to $5.4 million. Leafy greens include commonly consumed vegetables such as lettuce and kale. Production challenges outdoors have led to interest in growing these specialty crops hydroponically in controlled environments, however there is little information on whether this is economically viable. Capital and operating costs can be significant for startups, especially as it relates to light-emitting diodes (LEDs) and cooling systems. "Indoor farming, which is also known as vertical farming, using LEDs has a lot of advantages," Runkle said. "It takes much less space, there is more efficient use of water and nutrients, production is year-round, and there are virtually no pesticides. But there is little science-based information about best growing practices, and very little economic data around indoor farming." **Relevant links and resources:** https://www.canr.msu.edu/news/msu-leads-study-exploring-the-viability-of-using-indoor-farming-to-grow-leafy-greens	
8.	**Discovering ways to build hardier, healthier plants**	**The MSU Plant Resilience Institute is working to understand how plants cope with growing pressures from a changing climate.**	Plant Sciences

		Plants have always battled various pressures, from diseases and insects to adverse environmental conditions. But increasing occurrences of more extreme weather events and a growing world population are resulting in the need to develop even hardier crops for the global food system. Researchers in the Michigan State University Plant Resilience Institute (PRI) are studying how these intensifying environmental impacts hinder plants' ability to adapt, and how those impacts might be mediated or averted. Gregg Howe, a University Distinguished Professor in the Department of Biochemistry and Molecular Biology, was part of the research team that started the process to form the PRI in 2015. "We wrote a proposal and started to lay the groundwork as a nice fit to our plant science and agriculture roots," he said. "The idea was to use this as seed funding to get projects off the ground and to make ourselves more competitive for external funding opportunities in the area of plant resilience. We saw this as a way to make MSU's strength in plant research even stronger." **Relevant links and resources:** https://www.canr.msu.edu/news/discovering-ways-to-build-hardier-healthier-plants	

9.	**Tools help farmers make real-time decisions, manage crops, reduce environmental impacts**	Farmers operate at the intersection of the land, the water and the atmosphere. They often need quick and easy access to weather information to make important real-time calls, from knowing when to plant to determining when to harvest. "This is what farmers tell us: 'We're really busy people, we've got a lot on our plates and we've got a lot of decisions to make,'" said Jeff Andresen, Michigan State University professor in the Department of Geography, Environment, and Spatial Sciences. "They really need to have somebody give them an informed decision about what's going to happen with the weather." Andresen is the director of Enviroweather, an MSU-developed digital tool that provides current weather information that farmers can use as a base for their decisions. Ninety-six weather stations in the state monitor local weather conditions. "Each weather station is essentially a little microcomputer that is hooked up to a number of sensors that take observations automatically," Andresen said. "We monitor conditions like maximum and minimum air and soil temperature, wind speed and precipitation – there are all sorts of things that you can measure." The stations, which meet research standards, send data to a server on the MSU campus that also receives information from the National Weather Service (part of the National Oceanic and Atmospheric Administration, NOAA). An interactive webpage displays the data through a map and charts that farmers can access at home and in the field.	Soil, Water and Natural Resources

		Relevant links and resources: https://www.canr.msu.edu/news/tools-help-farmers-make-real-time-decisions-manage-crops-reduce-environmental-impacts **Learn more about weather stations:** https://youtu.be/4K8LqRrrLYQ	
10.	**MSU looks to lead way on PFAS research**	Michigan State University researchers are looking to answer questions surrounding the little-known per- and polyfluoroalkyl substances known as PFAS. Michigan State University researchers are looking to answer questions surrounding the little-known per- and polyfluoroalkyl substances known as PFAS. Contamination numbers in Michigan outpace those of any other state, and MSU is on the front lines of solving the growing problem. MSU scientists are working on building PFAS knowledge and finding ways to minimize the environmental and health impacts of these "forever-chemicals." With further funding and research, MSU hopes to become a clearinghouse for PFAS research and the leading source of PFAS information in the nation. ● MSU Extension has a PFAS contamination response website (canr.msu.edu/pfas), and other researchers are examining how humans are exposed to PFAS and how that exposure can be limited.	Soil, Water and Natural Resources

		• MSU researchers want to examine just how detrimental PFAS can be to human health. According to the Environmental Protection Agency, human ingestion of PFAS through drinking water or food can cause reproductive, developmental, liver, kidney and immunological effects. Increased cholesterol levels among exposed populations have been the most consistent findings in studies. **Relevant links and resources:** https://www.canr.msu.edu/pfas/ Perfluorinated Chemicals: What they are and what you should know about them	
11.	**First Impressions Tourism (FIT) assessment program**	First Impressions Tourism (FIT) assessment program is a comprehensive community assessment conducted by unannounced visitors in a host community positioned to leave development based on their unique results. FIT involves developing community leadership, assessing the host community, sharing the results in a community forum and providing suggestions to drive community action. Overall, FIT helps communities learn about their strengths and weaknesses through the eyes of first-time visitors evaluating their community in an asset-based manner on multiple tourism-related community metrics. The overriding goal of the program is to support community economic development by facilitating the growth of local and regional tourism economy. Marine City, MI successfully applied to be a First Impressions Tourism (FIT) recipient community in 2018. As a recipient, Marine City received a team of five outside visitors throughout the year who each assessed the community on various tourism factors. The results of the assessment were shared in a community forum during February 2019, which drew in nearly	Economics, Marketing and Policy

		60 participants from Marine City/St. Clair County. After receiving their results, the Marine City Community Leadership Team (CLT) was provided with a summary report. This consisted of a collection of presentation slides showcasing data extracted from nearly 80 pages of unedited visitor feedback, and a supplemental tourism report summarizing short-term rental and social media recommendations. As with nearly all communities that complete FIT, Marine City made improvements based on visitor feedback almost immediately after the 2019 forum, using FIT data to validate several pre-FIT projects in need of community and political support to move forward.As part of the FIT program, MSU Extension Tourism Educators follow up with all communities to assess impacts and actions, typically within a year of completing the program. They followed up with the Marine City CLT in January 2020 with qualitative questions designed to assess everything from growth in leadership and external funding to a range of infrastructure and community improvements. As a direct result of engaging in the FIT program, Marine City was able to make the following changes. ● Launched an Economic Development Board ● Chamber of Commerce expanded hours and moved locations ● Unveiled eight public art mosaics in the downtown ● Downtown business owners made donations to support lighting for the Marine City Lighthouse area. ● Approved an ADA accessible kayak launch for at a city riverfront park	

		• Funded a Downtown "Business Loop" marketing effort with signage. • Received $4,000 dollars from the St. Clair County Economic Development Alliance (EDA) and $2,000 dollars from Prosperity Region 6 partnership with MSUE for project implementation. • Future projects include: City and Chamber website updates and city street upgrades. **Relevant links and resources:** https://www.canr.msu.edu/tourism_first_impressions/index https://www.canr.msu.edu/news/marine-city-welcomes-first-time-visitor-perspectives-to-strengthen-community-collaboration-and-spawn-new-ideas-for-tourism https://www.canr.msu.edu/tourism_first_impressions/uploads/files/2019-FIT%20Report%20Marine%20City%20-New%20FINAL%20DRAFT.pdf	
12.	**MSU Extension Beef Quality Assurance program**	Starting January 1, 2019, Cargill Inc. and Tyson Foods require producers to be certified in the Beef Quality Assurance (BQA) program in order for them to buy cattle. Other packers have also announced their intentions for similar requirements. Cargill and Tyson make up a major part of the finished beef cattle harvest capacity in the United States. Since January 1, 2019, reports from Michigan auction yards indicate that producers that are not certified are receiving heavy discounts as compared to cattle being sold by certified producers. Consequently, Michigan producers are finding important economic value to the Michigan State University Extension Beef Quality Assurance certification program. Michigan State University Extension Educators and Specialists conducted 16 Beef Quality Assurance (BQA) certification programs in 2019 for 620	Animal Production and Protection

		beef producers mostly from the state of Michigan. Certified producers will continue to have full market access in private bids and through auction yards. Each certification session consisted of a two-hour presentation using PowerPoint and followed with a 15-question test. Producers needed to obtain 80% correct to achieve certification. Certified producers receive a unique certification number and certificate. Their certification credentials were passed onto sale barns if they so desire. Producers failing the test on their first attempt were offered another short presentation and allowed to retake the test. Across Michigan, 2,067 beef producers obtained certification in 2019, with in-person meetings and on-line certification. Michigan State University Extension efforts resulted in 620 producers receiving certification through in-person meetings in 2019, totaling 1377 over the past two years. An additional 1447 producers received their certification online at bqa.org in 2019. **Relevant links and resources:** Beef quality assurance: Michigan producer questions and answers BQA transportation certification training	