

FY 2020 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 FY 2020 Plan of Work located in the Institutional Profile. Use this space to provide updates if needed.

1. Executive Summary (Optional)

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, as well as online resources for schools
- 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. This process allows local hospitals and healthcare workers to

reuse these masks, giving hospitals an added advantage in protecting themselves from the novel coronavirus and saving them valuable resources in a time of crisis.

Early in the pandemic, more than 500 stakeholders from across Michigan took part in 21 informal virtual listening sessions to discuss the challenges related to COVID-19 and ideas for MSU Extension's Child and Youth team moving forward. The community had a variety of requests for MSU Extension, including a need for virtual programming, hands-on learning, home-learning kits for youth, outdoor activities for families, mental health and coping resources for youth, and specific programming for minoritized populations. Other lessons learned included providing resources in multiple modes as Internet access continues to be a struggle for some participants.

To better support local schools and homeschool families, an informal Qualtrics survey was distributed through 4-H Online and social media in September 2020 to ascertain the needs of educators. In total, 845 educators, representing 198 school districts in 65 counties, as well as 111 homeschool families representing 327 children in 48 counties responded. Results revealed a need for a variety of content to support education including educational kits, curriculum units, and virtual field trips.

As a result of the COVID-19 pandemic, many individuals are dealing with financial hardships due to a sudden loss of income. From student loans and credit card debt to worries about losing a home or car, managing debt and expenses is often a major stress point in households. MSU Extension offered eight Cash Crunch webinars focused on helping 42 individuals navigate these stresses and learn techniques to manage finances. Webinar topics included taking stock of family and community resources, setting spending priorities, developing plans to pay creditors, and avoiding scams.

MSU AgBioResearch's Response to COVID-19

The College of Agriculture and Natural Resources along with MSU AgBioResearch also responded providing [resources](#) to ensure students and faculty were able to continue learning and conducting research in safe and healthy ways. Leadership sent out regular communications to help keep them informed. The popular [field days](#) showcasing the latest research findings successfully pivoted to online formats with high response.

MSU AgBioResearch has been able to continue much of our work due to the dedication of our faculty and staff along with strong support from MSU senior leadership. Our research centers have been open and have rapidly implemented necessary procedures to maintain the health and safety of our research staff and students working at on-campus and off-campus farms, as well as our animals and plants. We were able to establish a process to quickly review and approve research and related travel. Researchers were granted priority to projects that have

immediate impact on production, especially those related to animal health, welfare and reproduction; critical plant pests like spotted wing drosophila; plant disease such as corn tar spot; plant breeding programs; as well as long-term research in both agriculture and natural resources.

MSU Extension's Farm Stress Response

MSU Extension continues to address farm stress, due to an increased number of 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 three 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, "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, and "Mending the Stress Fence", which helps farmers learn how to respond to stress. MSU Extension has also delivered several trainings 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.

MILES – Michigan Inter-Tribal 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, improving economic development programs, and creating stronger families through health and nutrition. Over the course of four years, MILES 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 lots, 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 to 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.

II. Merit and Scientific Peer Review Processes

The NIFA reviewer will refer to your 2020 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 ONLY
1. The <u>Merit Review Process</u>	No changes
2. The <u>Scientific Peer Review Process</u>	No changes

III. Stakeholder Input

The NIFA reviewer will refer to your 2020 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 ONLY
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

IV. Critical Issues Table of Contents

No.	Critical Issues in order of appearance in Table V. Activities and Accomplishments
1.	Human Health, Environment, Family, Youth, Society and Community
2.	Soil, Water and Natural Resources
3.	Plant Sciences
4.	Economics, Marketing and Policy
5.	Animal Production and Protection
6.	Food and Non-Food Quality, Nutrition, Engineering and Processing

V. Activities and Accomplishments

Please provide information for activities that represent the best work of your institution(s). In your outcome or impact statement, please include the following elements (in any order): 1) the issue and its significance (e.g. who cares and why); 2) a brief description of key activities undertaken to achieve the goals and objectives; 3) changes in knowledge, behavior, or condition resulting from the project or program’s activities; 4) who benefited and how. Please weave supporting data into the narrative.

No.	Project or Program Title	Outcome/Impact Statement	Critical Issue Name or No.
1.	Michigan State University Extension provides learning experiences to Michigan youth through Virtual Fairs	<p>State Fair: In 2020, Michigan State University Extension partnered with the Michigan State Fair to create the Michigan State Fair 4-H & Youth Virtual Showcase. This first-of-its-kind showcase provided a virtual platform for youth across Michigan to exhibit their work in a variety of project areas from the safety of their homes. Michigan youth aged 5-19 were encouraged to participate; 4-H membership was not required.</p> <ul style="list-style-type: none"> • 2,065 entries were submitted across the state from 428 youth • 63 counties had youth participating in the event, twice as many counties as in previous Michigan State Fair events 	1 Human Health, Environment, Family, Youth, Society and Community

		<ul style="list-style-type: none">• In addition, those who participated in the state fair earned a total of \$50,000 in scholarships <p>"I have always dreamed of competing at the Michigan State Fair, but due to distance, that was not possible. The positive in this whole experience is that I had the ability to compete virtually at more shows than I could have ever imagined. Thank you so much for making this possible!" - 4-H member from Menominee County</p> <p>County Fairs:</p> <p>When the COVID-19 pandemic led to the cancellation of many Michigan fairs, Michigan State University Extension and Michigan 4-H teamed up with local community partners to provide an online platform that supported the 4-H experience and continued longtime traditions. These 4-H virtual learning showcases and auctions provided a space for youth to demonstrate their mastery of skills developed in 4-H, receive feedback on their efforts, and market and sell their 4-H projects.</p> <ul style="list-style-type: none">• 7,294 entries were submitted• 2,699 youth participated• 58 counties offered a 4-H virtual showcase and/or auction for youth• 17 of the 58 counties that conducted virtual showcases also helped youth participate in virtual auctions. Nearly 3,800 buyers invested \$1.4 million in Michigan 4-H youth livestock and still projects. <p>Relevant links:</p> <p>Virtual Learning Showcase and Auctions County-Level MSU Extension</p> <p>Michigan State Fair will be virtual summer 2020</p> <p>Awards and Entries for 2020 Michigan State Fair</p>	
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<p>2.</p>	<p>Michigan State University provides evidenced-based learning to an expanded audience through Virtual Field Days</p>	<p>Field Day events, normally hosted at the various MSU AgBioResearch Centers across Michigan, were offered online due to COVID-19. Working together, MSU Extension and AgBioResearch created 16 Virtual Field Days with up to 200 attendees each, and 3,000+ views of the posted recordings. More than a dozen partners — ranging from individual farms to conservation districts to commodity organizations — helped bring this opportunity to people across the country and around the world. There were attendees from Canada, Great Britain, Argentina and South Africa. Topics included manure management, viticulture, vegetable trials, field crops, turfgrass, livestock, sustainable forest harvesting, and more.</p> <p>Corn Field Day: The Virtual Corn Field Day addressed topics of concern to corn crop and pest management through a blend of pre-recorded presentations, live presentations, and panel discussions. This Field Day focused on two main topics: tar spot disease in corn and the causes and implications of uneven corn development within fields.</p> <ul style="list-style-type: none"> • 96 participants attended the live webinar • Approximately 60% identified as either full-time farmers or agribusiness professionals • Of the 47 people who completed the post-event survey, <ul style="list-style-type: none"> ○ 98% said they would consider participating in other virtual events ○ 99% said their knowledge increased as a result of the program ○ 68% planned to change some aspect of their operation or recommendations to clientele ○ These planned changes would impact an estimated 79,261 acres resulting in an increase of \$1,050,992 in revenue or savings <p>Soybean Field Day:</p>	<p>3 Plant Sciences</p>
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		<p>The purpose of this Field Day was to provide participants with updates regarding current soybean-related research projects conducted by MSU Extension and to share timely and relevant pest and crop management recommendations.</p> <ul style="list-style-type: none"> • 67 participants attended the live webinar • Of the 43 people who completed the post-event survey, <ul style="list-style-type: none"> ○ 97% learned some new information ○ 72% said the program was very informative ○ 65% planned to make changes based on the information they learned ○ 25% expected that these changes would generate additional income averaging \$11.44 per acre <p>Relevant links: Virtual Field Days website Turgrass Field Day Sustainable Forest Harvesting Field Day</p>	
<p>3.</p>	<p>Michigan State University Extension Field Crops team provides weekly learning for producers, agribusiness professionals, and government agencies</p>	<p>The Virtual Breakfast Series was held every week from April through September 2020 to provide the latest information from our MSU Extension field crop specialists and educators. All field crop producers, agribusiness professionals, government agency personnel, and others interested in field crops production and management were encouraged to participate. Meetings focused on topics such as early season weed control, soil fertility, mitigating rutted and rough fields, and current weather patterns.</p> <ul style="list-style-type: none"> • 2,134 participants attended the live webinars, with an additional <ul style="list-style-type: none"> ○ 2,045 views on YouTube ○ 7,372 clicks on Facebook ○ 1,325 podcast listens ○ 3,112 website views 	<p>3 Plant Science</p>

		<ul style="list-style-type: none"> • Participants in the live webinars were from 11 countries, 13 states, and represented 57 counties of Michigan • Based on a year-end follow up survey of participants, 47% were farmers and 27% were agribusiness professionals • The number of acres represented by those participating was 354,298 • A total of 77% of respondents indicated a change in management and preferences based on what they learned <p>Relevant links: Virtual Breakfast Series continues into 2021 Virtual Breakfast Series on Apple Podcasts</p>	
<p>4.</p>	<p>Michigan State University Extension trains first responders to respond to traffic accidents involving livestock</p>	<p>The Emergency Response to Accident Involving Livestock (ERAIL) program is designed to provide training and resources to people who respond to traffic accidents involving animals. This program focuses on developing a network of highly trained individuals who have the tools and equipment needed to protect the safety of the public traveling the roadways, assist with accidents, and ensure the welfare of the animals involved.</p> <p>“With our vast number of livestock operations in Michigan, it is important that we are prepared to respond to unplanned events that may arise. The work of the MSU Extension ERAIL team better positions the pork industry and the entire animal agriculture industry in Michigan to safely and effectively respond to these types of situations.” - Mary Kelpinski, Michigan Pork Producers Association</p> <ul style="list-style-type: none"> • 36 counties in Michigan have responders trained through the ERAIL program • 3 operational response trailers are currently located in the state to respond to accidents involving livestock • \$45,000 of additional support for the ERAIL program has been sourced 	<p>5 Animal Production and Protection</p>

		<ul style="list-style-type: none"> • 80% of education program participants found the training they received applicable to their operations or occupations • 82% of participants found that the information shared created an awareness about the important issue of responding to accidents involving livestock • 91% of participants plan to implement new methods of accident response following the training • 96% of participants plan to provide training for their local organizations based on the information shared • 176 people have been trained <p>“We cannot thank MSU Extension and all of the donors enough for the training and equipment for our emergency response trailer. We are thankful that we now have the resources to be proactive to issues. It was very frustrating wasting four hours and the lives of many of the cattle in the rollover accident because we did not have the equipment necessary for the job. Thanks to MSU Extension we now have the right equipment and knowledge to handle accidents involving livestock.” - Otsego County Animal Control</p> <p>Relevant links: Emergency Response to Accidents Involving Livestock Example of Animal Handling Guide – Basic Horse Handling Practices</p>	
<p>5.</p>	<p>Michigan State University Extension pivots traditional HACCP Certification Training to a virtual environment</p>	<p>The Hazard Analysis Critical Control Point (HACCP) system is an approach used by the meat industry to address food safety hazards in processing facilities. HACCP focuses on identification and assessment of hazards and the implementation of control measures to prevent, reduce, or eliminate hazards. MSU Extension’s HACCP certification training is targeted to food processing business owners and managers in the meat and juice industries.</p>	<p>6 Food and Non-Food Quality, Nutrition, Engineering and Processing</p>

		<p>Due to COVID-19, MSU Extension pivoted to providing virtual HACCP trainings. Topics covered included development of an HACCP team, identification of biological, chemical and physical hazards, validation and verification procedures, and record keeping. The trainings were accredited through the International HACCP Alliance, and individuals who complete the training received a certificate.</p> <ul style="list-style-type: none"> • 27 participants attended the four offered webinars • 96% of participants had an increase in knowledge related to the seven principles of HACCP • 96% of participants rated the team exercise portions of the course as useful • 75% of participants intended to change practices as a result of this course <p>Relevant links: Seven Principles of HACCP Building a HACCP Team</p>	
<p>6.</p>	<p>Michigan State University Extension helps farmers manage stress</p>	<p>Agricultural producers suffer from poor mental health at a higher rate than the general population, and often have limited access to mental health providers. MSU Extension has developed three different programs on the topic of farm stress management, one online self-paced course, and a social media campaign.</p> <p><i>Weathering the Storm in Agriculture: How to Cultivate a Productive Mindset</i> 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.</p> <p><i>Communicating with Farmers Under Stress</i> teaches agricultural industry workers how to recognize and respond to signs of mental distress within the farm families they encounter in their work.</p>	<p>1 Human Health, Environment, Family, Youth, Society and Community</p>

		<p><i>Mending the Stress Fence</i> helps farmers, their families, and community members to build self-awareness and resources to help those in need.</p> <ul style="list-style-type: none"> ● 2,785 participants were reached by these programs ● As a result of participating in farm stress management programs: <ul style="list-style-type: none"> ○ 96% of participants increased their awareness of stress issues and plan to take steps to manage stress ○ 92% of participants learned how to recognize warning signs of depression, suicide, and mental illness ○ 97% of participants learned where to send people for help <p><i>Rural Resilience: Farm Stress Training</i> is a free online course that uses evidence-based approaches to help people recognize the signs of stress and better equip the agricultural community with tools and resources to help in times of need. This online, self-paced course provides education on managing stress, communicating with distressed farmers, and suicide awareness.</p> <ul style="list-style-type: none"> ● 816 people enrolled in the online course <p><i>Lunch Break</i> is series of weekly sessions offered on Facebook Live to keep the farming community connected and engaged. MSU Extension educators provide helpful tips on farm issues and managing farm stress. Sessions cover a variety of topics including field crops, farm financial management, mental health and stress, and beef management.</p> <ul style="list-style-type: none"> ● 5,023 people viewed <i>Lunch Break</i> on Facebook <p>Relevant links: Managing Farm Stress MSU Extension</p>	
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		<p>Resilient Farms: Financial and Management Guides - Managing Farm Stress Helping farmers and Agricultural Professionals Manage Stress Online Farm Stress Program Open to the Public Assessing Farm Stress Webinar Lunch Break</p>	
<p>7.</p>	<p>Michigan State University Extension builds entrepreneurial networks</p>	<p>The Connecting Entrepreneurial Communities (CEC) program was created to educate local community members on the value of entrepreneurship and to create an environment conducive to entrepreneurial growth. A key part of this program is the annual CEC Conference, a community development initiative that brings together entrepreneurs, business leaders, economic development professionals, and decision makers to strengthen and broaden regional entrepreneurial networks.</p> <p>Due to COVID-19, MSU Extension pivoted to a virtual conference which provided an opportunity to collaborate with Extension services in other states. MSU Extension provided leadership to seven other Extension systems (Missouri, Nebraska, South Dakota, North Dakota, Minnesota, Pennsylvania, and New Hampshire) as they came together to plan this week-long virtual conference.</p> <ul style="list-style-type: none"> • 314 individuals participated from 28 states, with high concentrations from Missouri (93), Nebraska (56), Michigan (55), Minnesota (35), South Dakota (16), and North Dakota (15) • 37 sessions were offered during the week • Each day concluded with a “Community Connections” session where attendees could debrief and reflect on what they learned and network with others • Based on the results of the post-conference survey, <ul style="list-style-type: none"> ○ 100% (n=70) indicated they would attend the conference again in the future if offered 	<p>4 Economics, Marketing and Policy</p>

		<ul style="list-style-type: none"> ○ 97% (n=71) indicated that they can “apply the ideas or skills that I learned in conference sessions within my community” ○ 92% (n=13) stated they “made new connections with peers that can help me bring these practices to my community” <p>Related links: Connecting Entrepreneurial Communities Conference advertisement</p>	
<p>8.</p>	<p>Michigan State University Extension Product Center supports food business entrepreneurs</p>	<p>The goal of the MSU Product Center is to accelerate innovation and growth for businesses, industries, and entrepreneurs in the food, agriculture, and natural resources sectors of the Michigan economy. The Product Center partners with the MSU Center for Regional Food Systems, the Michigan Good Food Fund, USDA Rural Development, and the Michigan Department of Agriculture and Rural Development.</p> <p>Venture Development: MSU Extension offers new and growing businesses counseling services in concept development, business planning, navigating regulations, and accessing the supply chain. Clients are connected to specialized services offered by campus staff and faculty, such as product classification and process authority review, nutritional labeling, food science, food processing and safety, and packaging assistance.</p> <p>Food Processing and Innovation Center (FPIC): The Michigan State University Food Processing and Innovation Center (FPIC) is Michigan’s leading independent commercial food development, processing, packaging, and research facility. Businesses of all sizes rent the state-of-the-art facility featuring the latest in processing and packaging technology to create and commercialize new food and drink product lines for the marketplace. The FPIC provides customized processing options to meet the needs of existing food businesses and larger-scale</p>	<p>6 Food and Non-Food Quality, Nutrition, Engineering and Processing</p>

		<p>startups in Michigan, the Great Lakes region and beyond. Products made in the FPIC are FDA and USDA compliant.</p> <p>In response to the COVID-19 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. This process allows local hospitals and healthcare workers to reuse these masks, giving hospitals an added advantage in protecting themselves from the novel coronavirus while conserving resources. MSU Extension recruited help from other parts of the University, such as MSU Health Sciences and the College of Engineering, who tested the sanitized masks to make sure they maintained their integrity.</p> <p>The Product Center had the following impacts:</p> <ul style="list-style-type: none">• 788 clients were served• Clients received a total of 4,961 contact hours• 19 new businesses were started• 139 new jobs were created• \$9,330,686 in total capital formation• \$860,876 in total sales growth• 4,704 total employees were impacted• 22 new licenses were obtained• 18 new products were launched <p>Relevant links:</p> <p>Food Processing and Innovation Center</p> <p>About - Food Processing and Innovation Center</p> <p>Innovation and Growth - Alumni & Friends</p> <p>MSU Extension Develops Decontamination Method to Reuse N95 Masks</p>	
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<p>9.</p>	<p>Michigan State University Extension increases reach with online food safety education</p>	<p>Safely Preserving Food at Home: Home Food Preservation continues to grow in popularity across the nation. However, improperly preserved foods — whether canned, frozen, or dehydrated — can potentially be contaminated with fatal <i>Clostridium botulinum</i> bacteria. MSU Extension provides research-based instruction in proper food preservation and recipes that follow food safety guidelines. Due to COVID-19, Home Food Preservation programming was offered in multiple modes: through online sessions, live classes, and as a self-paced course.</p> <ul style="list-style-type: none"> ● 8,811 consumers attended online Home Food Preservation sessions ● 302 consumers were educated in the self-paced online course ● Participants included consumers from every county in Michigan as well as across the United States and the globe ● 86% of participants reported feeling confident or very confident in their ability to find research-based recipes <p>Safe Food = Healthy Kids: <i>Safe Food = Healthy Kids</i> (SFHK) is an interactive food safety workshop for childcare providers. Educational topics include proper cleaning and sanitizing techniques, common allergens, personal hygiene, and cooking, cooling, and storing food. SFHK counts towards the annual required training hours for licensed childcare providers and has been approved by the Michigan Great Start to Quality rating and improvement system for providers.</p> <ul style="list-style-type: none"> ● 958 childcare providers, who prepare and serve meals for 21,477 of Michigan’s children, attended the workshops ● 69% of participants plan to check food temperature with a calibrated food thermometer 	<p>1 Human Health, Environment, Family, Youth, Society and Community</p>
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		<p>Helping Entrepreneurs Navigate the Cottage Food Law: MSU Extension offers an online workshop educating entrepreneurs on the Michigan Cottage Food Law. The workshop combines the business and food safety aspects of preparing and selling cottage foods safely and successfully.</p> <ul style="list-style-type: none"> ● 605 entrepreneurs received Cottage Food Law training ● 51% of Cottage Food Law participants reported they now plan to sanitize surfaces before preparing food <p>Think Food Safety Social Media Campaign: <i>Think Food Safety</i> was created through a Michigan Department of Agriculture and Rural Development (MDARD) grant to focus on lowering the number of illegal food sales, as unlicensed, illegal sales put the community at risk of foodborne illness. The <i>Think Food Safety</i> campaign shared food safety messages on Facebook and Instagram.</p> <ul style="list-style-type: none"> ● The campaign resulted in 815,228 impressions, 10,394 engagements, and 108 posts. ● Additional efforts will continue in 2021 through a new MDARD grant <p>Food Safety at the Pantry: <i>Pantry Food Safety – It’s Your Job!</i> is a new online program designed to teach safe food practices to volunteers at food pantries and food banks.</p> <ul style="list-style-type: none"> ● 416 volunteers were trained ● 85% of <i>Pantry Food Safety – It’s Your Job!</i> volunteers reported that they are very confident in their handwashing and personal hygiene knowledge after attending the program 	
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		<p>Food Safety Education:</p> <ul style="list-style-type: none"> ● 967 participants were reached through online consumer food safety education in the areas of Food Safety Q&A and Investigating Food with Science ● Food Safety Hotline experts answered over 200 consumer questions including questions about food preservation, food storage, and safe food handling after grocery shopping ● 13,217 Michigan adults and youth participated in MSU Extension’s 263 food safety sessions <p>Relevant links: Online Food Preservation Courses Cottage Food Law at MSU Extension Think Food Safety Campaign Safe Food = Healthy Kids at MSU Extension</p>	
<p>10.</p>	<p>Delivering practical education globally to areas of greatest need</p>	<p>MSU researchers Julia Bello-Bravo and Barry Pittendrigh are delivering life-improving knowledge to low-literate learners in developing countries through animations via a program called Scientific Animations Without Borders.</p> <p>The World Bank’s international poverty line is defined as living on less than \$1.90 per day, a figure that takes into consideration varying costs worldwide. More than 700 million people fit into this category.</p> <p>A lack of formal education often accompanies poverty in developing nations, where access to useful, practical educational resources can also be scarce. Michigan State University’s Barry Pittendrigh and Julia Bello-Bravo are helping to change that.</p> <p>Pittendrigh, an MSU Foundation professor in the Department of Entomology, has spent much of his career working with farmers in West Africa on sustainable pest</p>	<p>1 Human Health, Environment, Family, Youth, Society and Community</p>

		<p>management. Bello-Bravo, an assistant professor in the MSU Department of Food Science and Human Nutrition, centers her research on delivering life-improving knowledge to low-literate learners in developing countries.</p> <p>“About a decade ago, we were both working in West Africa and saw the difficulties of getting scientifically validated information into the hands of low-literate individuals,” Pittendrigh said. “Some of these people have had negative experiences with traditional education, so we knew we needed to go a different route.”</p> <p>Bello-Bravo and Pittendrigh co-founded Scientific Animations Without Borders (SAWBO), which provides educational animations at no cost to people who desperately need knowledge and skills on a particular topic. Agriculture, health and gender equality are some of the primary themes.</p> <p>“These animations are meant to improve the livelihoods of some of the poorest people on the planet, particularly women who often do a lot of work but don’t have the same access to educational materials,” Bello-Bravo said. “They are translated into local languages and can be viewed on any smartphone.”</p> <p>To date, SAWBO animations have been translated into roughly 145 languages and viewed by 41 million users in more than 100 countries. They cover a broad range of subjects, from managing fall armyworm — an invasive pest to West Africa that has devastated maize, rice, sorghum and cotton operations — to, more recently, the novel coronavirus.</p>	
<p>11.</p>	<p>MSU researcher leading Great Lakes sea lamprey eradication project</p>	<p>Helping to prevent both the decline of native fish populations and negative impacts on the fishing industry</p> <p>Sea lamprey devastated the Great Lakes fishery in the mid-20th century, contributing to the decline of native fish populations and hurting a multi-billion-dollar fishing industry.</p>	<p>2 Soil, Water and Natural Resources</p>

		<p>Michigan State University researcher Michael Wagner and a team of scientists from the Great Lakes Fisheries Commission (GLFC) are looking at biological and behavioral research, and agricultural technology techniques to continue to control these invasive species. According to the GLFC, “when control is relaxed for even a short time, sea lamprey bounce back and can inflict major harm. Elevated sea lamprey abundances take years to remedy and higher populations set back fishery and ecosystem recovery by decades.”</p> <p>“Our goal is to manipulate the (sea lamprey) movements in order to create circumstances that allow our control program to become more targeted,” Wagner said. “We have a big initiative that was the brainchild of Andrew Muir, the science director for GLFC.</p> <p>“The plan is to develop a selective fish passage device, which is essentially a biological filter that prevents sea lamprey from passing through while allowing other fish to do so, which has never been attempted before, let alone achieved.”</p> <p>The project leaders hope to secure the connections of the rivers that flow into the Great Lakes, while also preventing the damage caused by the invasive sea lamprey. Sea lampreys spend a significant portion of their lives in tributaries as larvae, so sea lamprey control begins when biologists assess tributaries to determine which ones contain larval sea lampreys. The goal then is to eradicate those populations before they can reach the lakes.</p> <p>“There's a great deal of interest -- ecologically, economically and culturally -- in reconnecting the rivers of the Great Lakes to the lakes through by allowing the organisms to move from river to lake, and back, while still blocking invasive species. And our goal is to find a way, through manipulation of sea lamprey predator/prey dynamics and other behavioral characteristics, to create a fish-pass device that will enable the fishes that we want to pass into the river and block or capture the ones we don't, such as lamprey.”</p>	
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		<p>Wagner’s research focuses on the behavioral ecology of fishes and addresses migration strategies, search behavior, habitat selection and anti-predator behavior.</p> <p>“We have to begin to view these fish as decision makers that will react to specific circumstances, and we must try to create circumstances they've evolved to recognize,” he said. “Once we get a grasp on the cognitive framework of the animal, we can combine machines that recognize what type of fish is trying to get through with this understanding of what types of conditions would equate to ‘yes, come this way’ or ‘no, don't go that way.’”</p> <p>Wagner serves on the science advisory board for the project, which is commissioned through the Environmental Protection Agency and is funded by the Great Lakes Restoration Initiative. Construction of a novel passage device is underway and Wagner expects its completion by early 2022.</p> <p>“After that we will be embarking on intensive research to try to get to the point where we can achieve this selected passage and shift this program into an operational facility instead of an experimental one,” he said.</p> <p>While the work is aimed at resolving an immediate issue for the Great Lakes, the process the team uses lays the groundwork for the future.</p> <p>“This project is an amazing crucible to figure out how to solve really difficult problems. It's multi-jurisdictional; there are two nations, multiple states and provinces at play in here that require discovery of new ways for governments to work together. It is a rich tapestry of different cultures, the value of the rivers and the lakes in different ways that have to be negotiated,” he said.</p> <p>Wagner generally focuses on the development of practical, scientifically sound and innovative management tools to control invasive species and to help manage fish populations.</p>	
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<p>12.</p>	<p>MSU scientist’s work to eradicate invasive grass carp earns national recognition</p>	<p>Research to help eradicate grass carp, an invasive species of Asian carp, in Lake Erie has garnered Michigan State University Department of Fisheries and Wildlife researcher Kelly Robinson national recognition with the 2020 Decision Analysis Practice Award.</p> <p>The distinction is given annually by the Decision Analysis Society and the Society of Decision Professionals to the best decision analysis application, as determined by a panel of members of both societies. The award includes a cash prize and assistance in getting the work published in a research journal.</p> <p>“The Lake Erie grass carp project brought together managers around the lake and organizations that have done previous research on invasive carp to develop management programs for the species and potentially eliminate it,” Robinson said. “It also establishes a framework to prepare management plans for other Asian carp species that are kind of knocking on the door of the Great Lakes.”</p>	<p>2 Soil, Water and Natural Resources</p>

		<p>According to the U.S. Geological Survey, grass carp are commonly used in aquaculture ponds to control plant growth. They escaped captivity in the Mississippi River and have been reported in the Great Lakes, except Lake Superior, for over 40 years.</p> <p>Robinson’s project engaged managers, biologists and researchers from federal, state and provincial agencies and universities in decision making to elicit grass carp response objectives and potential actions.</p> <p>Their work resulted in a five-year adaptive response strategy for the Lake Erie Committee, the decision-making entity for fisheries management. The team created a population model that predicts the effects of management and control actions and also provides a much-needed forum for members in this multi-jurisdictional arena to make decisions together.</p> <p>“Our project serves as a case study for how decision analysis can be used for invasive species management and has convinced Great Lakes fisheries managers that decision analysis will be critical if other invasive Asian carp enter the Great Lakes basin,” she said.</p> <p>Robinson worked with Aquatic Invasive Species Coordinator Lucas R. Nathan with the Michigan DNR’s Fisheries Division on the project.</p> <p>“Dr. Robinson brought her extensive experience with decision science applications to the grass carp issue,” said Nathan. “Grass carp present a complex management problem because they have the potential to impact the Great Lakes in numerous ways.</p> <p>While many uncertainties exist about the status of grass carp in the Great Lakes, Nathan said the process among regional partners to identify uncertainties and evaluate tradeoffs among management strategies has been critical in the development of the basin-wide plan currently implemented in Lake Erie.</p>	
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<p>13.</p>	<p>Supporting soybean production with new resistant varieties</p>	<p>Soybeans are the second most harvested crop in Michigan, as well as the state’s top food export. They are a food staple for many in the world, and are also used in animal feed and to make biodiesel.</p>	<p>3 Plant Sciences</p>

		<p>It is the versatility of this protein-rich legume that continuously inspires Michigan State University Plant, Soil and Microbial Sciences Professor Dechun Wang.</p> <p>“I always wanted to do work that impacts society,” said Wang, who received his Ph.D. from MSU in horticulture. “Soybean is a crop that I can work with to benefit society by solving real problems that are actually happening and support (Michigan’s soybean) industry.”</p> <p>Wang’s plant breeding program focuses on preventing soybean disease, specifically white mold, root rot and sudden death syndrome.</p> <p>“We consistently test our breeding lines to major diseases in Michigan and identify varieties that have good resistance levels and test well in various parts of the state,” he said. “We want to have good varieties with good resistance to improve the yield for Michigan farmers.”</p> <p>The majority of the research is focused on Michigan’s production, with the bulk of funding coming from in-state sources, as well as from the United Soybean Board.</p> <p>White mold is a major concern for Michigan’s soybean producers. The state’s cooler summers and high humidity lead to a higher concentration of white mold issues than many other U.S. producers.</p> <p>“White mold has been an issue since I came to this position (in 2001) and I have research to develop varieties resistant to that disease,” Wang said.</p> <p>Wang has also developed pest resistant varieties, including "Sparta -- the Soybean Aphid Shield," the trade name for the genetics he developed to combat soybean aphids.</p>	
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<p>14.</p>	<p>Detecting emerging pesticide resistance in grapes</p>	<p>Timothy Miles, assistant professor and Extension specialist in Michigan State University’s (MSU) Department of Plant, Soil and Microbial Sciences, researches the most effective management strategies for grape diseases</p> <p>Fungal pathogens, like the ones present in many specialty crops, often change over time. This means, for example, that resistance to certain fungicides might also vary from year to year.</p> <p>Improved knowledge about which types of pathogens are present will allow growers to invest in the most cost-effective disease management strategies.</p>	<p>3 Plant Sciences</p>

	<p>Timothy Miles, assistant professor and Extension specialist in the Michigan State University (MSU) Department of Plant, Soil and Microbial Sciences, works to understand how a pathogen functions to facilitate the development of pathogen monitoring tools so that more effective pesticides can be applied at optimal times.</p> <p>“We need to understand the basic biology of the pathogen in order to figure out how certain fungicides work,” he said.</p> <p>Miles is a co-investigator of a four-year, \$4.75 million project, run through Washington State University, investigating resistance to powdery mildew, the most common grape pathogen in the United States. Powdery mildew is a foliar pathogen that causes a soft, powder-like white substance on leaves and berry surfaces, which can lead to yield loss, reductions in fruit quality and off-flavors in wine.</p> <p>The U.S. Department of Agriculture-Agricultural Research Service (USDA-ARS), University of California-Davis, University of Georgia and Ohio State University are collaborators on this project.</p> <p>For this research, Miles develops novel molecular, or DNA-based, diagnostic tools for powdery mildew and surveys Michigan vineyards to assess pathogen populations annually.</p> <p>“I’m involved in the Extension and genomic aspects of the project,” he said. “For the genomic part, we wish to understand how these fungicides work so we can make tools to detect resistant fungi.”</p> <p>Grape growers, particularly in California, where 80% of the nation’s grapes are grown, are using the monitoring techniques Miles and his colleagues developed.</p> <p>“Private diagnostic companies have taken up our tools and are using them to guide their disease management plans,” Miles said. “They’ll run a test that detects a pesticide-</p>	
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		<p>resistant pathogen and then vineyard managers will decide whether or not to use a particular mode of action based on those diagnostic results.”</p> <p>In Michigan, there are several major diseases that are actively managed using pesticides in grapes, compared to only two in California, due to the difference in climate. Powdery mildew, however, exists in both states. As part of the project with Washington State, Miles is analyzing how resistance information from powdery mildew can be applied to other important diseases in Michigan.</p> <p>“I’m trying to figure out a way to bridge this monitoring system to other diseases, because what we learn about powdery mildew will be helpful, but it has to be integrated with other diseases as well,” he said. “That’s another part of my role in the grant — trying to take a Midwest spin on what we’re learning about powdery mildew out West.”</p> <p>Miles, a Southwest Michigan native, grew up near grape orchards.</p> <p>“Some of the juice grape growers are only about 15-20 minutes from where I grew up,” he said. “It’s always been a big part of the area and the economy, so it’s pretty exciting to work with them.”</p> <p>Grapes contribute about \$30 million to the state’s economy, according to the Michigan Department of Agriculture and Rural Development.</p> <p>Miles, who earned his Ph.D. in the very lab he works in now, feels fortunate to be able to help Michigan’s grape industry, and the small fruit and hop industries as a whole.</p> <p>“The most rewarding part of the job is that we’re making a difference for growers and hopefully helping them save money or get higher yields because they get less disease,” he said. “Keeping plants healthier — that’s the goal.”</p>	
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<p>15.</p>	<p>Picking up crop pace to meet demand for Michigan craft beverages</p>	<p>More and more Michiganders are growing grapes and hops to help support the state’s burgeoning craft beverage industry, which includes beer, wine, cider and spirits.</p> <p>Trey Malone, assistant professor in the Michigan State University (MSU) Department of Agricultural, Food and Resource Economics, said the state now ranks No. 4 in the nation in both hop and grape production, largely because of heightened demand from these small-batch operations.</p> <p>“Our state’s diverse agricultural production – second only to California – allows us to develop supply chains that many parts of the country cannot,” he said. “Anytime new consumer interests arise, we can respond more quickly than many other states.”</p> <p>In general, craft beverage operations are small-scale and independently owned, although the definition continues to evolve, as do federal and state regulations for alcoholic beverage production and distribution.</p> <p>There were slightly more than 2,000 U.S. breweries in 2011. Now there are more than 7,000 breweries in the United States, according to the Brewers Association, a national trade organization for small and independent craft brewers.</p> <p>Malone fondly refers to the willingness of Michigan growers to experiment and share information in collaboration with the state’s craft beverage industry as “entrepreneurial spirit.” Puns aside, the farmers’ work helps to support vintner, brewer and cider maker needs, and enlarges the market for local agricultural production.</p> <p>The Michigan craft beer industry alone generated nearly \$500 million in gross state product in 2016, contributing nearly \$1 billion and 9,738 jobs to the state’s economy.</p> <p>More on this story:</p>	<p>4 Economics, Marketing and Policy</p>

		https://www.canr.msu.edu/news/picking-up-crop-pace-to-meet-demand-for-michigan-craft-beverages	
<p>16.</p>	<p>MSU to study precision livestock farming adoption trends in U.S. swine industry</p>	<p>Michigan State University (MSU) Department of Animal Science researcher Janice Siegford is leading a team of researchers and extension agents recently awarded a \$1 million USDA-NIFA Agriculture and Food Research Initiative grant to study the advancement of precision farming in the U.S. swine industry.</p> <p>Beginning June 2021, the group will start to explore precision livestock needs, public perceptions and the willingness of farmers, producers and consumers to pay for new technology. The end goal is to determine how new technology is viewed by the swine industry at large, with respect to what is practical and useful for farmers and consumers.</p> <p>“One of the things that often occurs when researchers work with precision livestock farming is we get really fascinated by all the cool bells and whistles of the technology,” Siegford said. “We sometimes lose sight of the fact that these processes have to actually go on a farm to be practically used by farmers and be something they can afford. Our focus is to really understand, from the human perspective, what is useful and how valuable the technologies and processes are in reality.”</p> <p>To achieve this, the team has established a stakeholder advisory group to bounce ideas off.</p> <p>“Everybody from big swine breeding companies, who really want to mine this data to help precisely breed and select pigs, to companies like retailers and grocers, to auditing groups that certify animal welfare [are involved],” she said.</p> <p>“We are going to bring together these partners and ask them what precision livestock farming can do for them. How they can use technology and the data it generates for the aspect of the pork industry that they’re involved with? What they think are some of the valuable attributes that they’d like to see developed into technology. And we want to</p>	<p>5 Animal Production and Protection</p>

		<p>make sure that where farmers invest their money is useful to them as well as results in a product that consumers are OK buying.”</p> <p>To fully understand the benefits and drawbacks of precision agriculture, they will focus on two priority areas, according to Siegford:</p> <ul style="list-style-type: none"> • Maintenance of a productive workforce. Livestock farming technology can replace some labor on the farm, including technology to do repetitive work and do it in more detail, but is nowhere near enough. • Acquisition of reliable animal health data. An ongoing pressure for the animal agriculture industry to better monitor the welfare of the animals and show that progress. Precision agriculture allows farmers better data on the health of each animal. <p>“When I think about precision livestock farming, what I’m talking about is the kind of technology that can help us keep track of an animal as an individual,” Siegford said. “In order to optimize that individual animal’s performance and also its welfare, we’re thinking about things that happen at the level of that one animal in real time, collecting the data from that animal, and then processing it to tell us what it means and what actions to take.”</p> <p>MSU will partner with North Carolina State and Iowa State, in key U.S. pork producing states, as well as Scotland’s Royal College, which has been conducting social science research with producers in the United Kingdom related to on-farm issues related to precision livestock farming. Other collaborators represent MSU Animal Science researchers and extension educators Dale Rozeboom, Juan Steibel, Madonna Benjamin, Dave Thomas and Casey Zangaro.</p> <p>Ultimately, precision agriculture adoption boils down to cost. Siegford said she hopes this study will provide context on what the industry holds valuable.</p>	
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<p>17.</p>	<p>Focusing on food health worldwide</p>	<p><u>Felicia Wu</u>, John A. Hannah Distinguished Professor in Food Safety, Toxicology, and Risk Assessment, is focused on developing a healthier worldwide population through the foods that we eat.</p> <p>“It’s exciting to do work on a positive topic,” she said. “The work I do specifically focuses on improving our food safety for better public health. Not only is it important so Americans don't have to worry about the safety of their food every time they go to the grocery store, it's very nice to be researching positive messages about food safety. We’re also looking at ways our agricultural technologies can actually improve the safety and the quality of our food.”</p> <p>A professor in the Departments of <u>Food Science and Human Nutrition</u> (FSHN) and <u>Agricultural, Food and Resource Economics</u>, Wu’s research and outreach interests include diseases caused by food contaminants; world food trade and food safety regulations; risk assessment and social network models applied to population health and trade; and antimicrobial resistance, including antibiotic use in livestock production. Currently, her research focuses on foodborne mycotoxins and the economic and health impacts they cause worldwide. One of her new research projects, recently funded through a grant from USDA, examines the unexpected benefits of Bt corn – a genetically modified corn produced to contain traits with resistance to pests and herbicides – as it relates to minimizing mycotoxin contamination.</p>	<p>6 Food and Non-Food Quality, Nutrition, Engineering and Processing</p>

	<p>“I work specifically on the toxins, or the poisons, that are produced by the fungi that infect our foods,” Wu said. “When we see that any sort of mold is growing on food, most of us realize that it's not a good thing. If the mold is visible we might just cut it off and still eat the rest, or we might throw it out.</p> <p>“But there are many times when the fungus has infected our food and we might not be able to see it. We might eat it, and depending on the fungus and whether it produces mycotoxins, that could have negative consequences to our health.”</p> <p>Her work with mycotoxins, specifically aflatoxin, began 20 years ago as a Ph.D. student when she served as a Biopesticides intern for the Environmental Protection Agency. At the time, she was conducting a risk assessment on Bt corn, to determine whether to allow its continued planting in the United States. She examined whether Bt corn would have lower levels of mycotoxins due to having less insect damage.</p> <p>“Insect damage is of course something that has an effect on plant health, but it also has secondary effects on human health. Any time an insect damages a plant crop, it leaves the starches open to the environment for fungi to colonize the crop and sometimes produce toxins,” Wu said.</p> <p>Mycotoxins have the potential to cause a variety of health conditions. “We’ve known for 60 years aflatoxin causes liver cancer,” Wu said. “That’s well established, but it’s been speculated, and there’s increasing evidence, that aflatoxin also compromises our immunity, which is something that is of course on everybody’s mind right now in the current (COVID-19) pandemic.”</p> <p>Globally, aflatoxin can become more of a threat. Aflatoxin content is regulated by government agencies worldwide, but if those regulations are not enforced, aflatoxin levels in food can become dangerous.</p> <p>“In many parts of the world where aflatoxin really is a problem in the human diet, they are eating homegrown corn that has never entered any sort of regulatory inspection,” Wu said.</p>	
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		For her research on the impact of aflatoxin regulations on global liver cancer, Wu was awarded a U.S. National Institutes of Health EUREKA Award. She was also commissioned by the World Health Organization (WHO) to estimate the global burden of disease caused by aflatoxin and arsenic in food, and co-authored the WHO 2015 report on the Global Burden of Foodborne Disease.	
18.	Improving Food Safety for Immunocompromised Patients	<p>Watch Dr. Bradley Marks' lab in action working to develop new ways to improve food safety in fresh produce for cancer/immunocompromised patients against foodborne pathogens.</p> <p>https://www.youtube.com/watch?v=8S6al4XD8eY</p>	6 Food and Non-Food Quality, Nutrition, Engineering and Processing

OPTIONAL	
Youth Development Expenditures (dollars)	
State and/or Institution:	FY 2020 Expenditures (\$)
1862 Smith-Lever	Previously submitted
1890 Extension	Previously submitted