Fiscal Year 2023 Description of Funded Projects

Number of Grants Awarded: 13
Amount of Funds Awarded: $6,391,998.00

For more information, please visit the grant program's website: https://www.ams.usda.gov/acer
NOTE: The below project descriptions were provided by the grant recipients.

Connecticut

Recipient: Yale University
Project Type: Producer and Landowner Education
Award Amount: $499,985.00

Safe Sugar for All - Documenting and Mitigating Bioaccumulated Lead and PFAS Risk in Maple Sugaring Operations in Urban and Rural Syrup Production Systems

This project investigates possible lead and PFAS contamination of sap from *Acer saccharum* and *Acer platinoids* in urban and rural-contaminated settings. It also explores mitigation strategies through filtering. This project will aim to: (1) determine if there is a contamination risk from maple sap and syrup originating from areas with a history of lead pollution; (2) determine if there is a contamination risk from maple sap and syrup originating from areas with a history of PFAS pollution; and (3) expand access to safe maple production in marginalized urban, and rural degraded, environments. Researchers from Yale and Dartmouth will collect maple sap and nearby soils in urban and postindustrial areas in the Northeastern US. They will also recruit and train community assistants from historically marginalized groups to measure trees and monitor the collection sites, and administer surveys to determine if participation in a maple study increased their familiarity with maple syrup, knowledge about maple sugaring, and/or interest in becoming a maple producer. The Connecticut Agricultural Experimentation Station (CAES) will test the sap and soil samples for lead and PFAS. CAES will also process sap spiked with known concentrations of lead and PFAS into finished syrup and filter it to determine how the concentration and filtering process affects contaminant concentration. Overall, the project will improve knowledge about contaminant risk in maple sugaring, provide educational resources to current and aspiring maple syrup producers in urban and rural-contaminated sites, and expand access to maple sugaring knowledge and practices to a wider range of persons and places.

Indiana

Recipient: Purdue University
Project Type: Producer and Landowner Education
Award Amount: $499,246.00

Scaling Up "Green" Production of Maple Syrup in The Central Hardwood Region

Recent studies suggest that Indiana consumers are willing to pay a price premium for sustainable, low-carbon ("green") maple syrup. However, "green" practices are only adopted by a small portion of current producers, while most private landowners don't engage in sugaring activities. Moreover, cooperative sugaring activities are absent among producers and landowners, rendering it difficult to reach economies of scale and lower the environmental impacts per unit of production. Therefore, Purdue University sees a great need and potential for expanding "green" production in Indiana and more broadly in the Central Hardwood Region (CHR) with some similar characteristics. This project aims to respond to the consumers' preferences and unlock the producers' potential, by filling knowledge gaps through research and employing the findings to educate stakeholders more effectively. Purdue University will partner with Indiana Maple Syrup Association and Indiana Woodland Steward to achieve the following objectives: 1) understand the drivers of cooperatives (co-ops); 2) develop a proof of concept for "green" co-ops and associated decision-making and educational tools; 3) profile potential "green" producers and predict economy-wide impacts of the "green" maple syrup industry; 4) promote "green" production through targeted educational activities. Purdue will make the findings transferrable to the other states in CHR by collaborating with the University of Kentucky. The deliverables include research papers, a maple syrup school, case studies, templates of cooperative agreements, and an equipment-sharing program. The intended beneficiaries are producers and private landowners who are interested in learning about and adopting "green" practices.

Maine

Recipient: University of Maine System acting through Univ. of Maine
Project Type: Market Development and Promotion
Award Amount: $452,752.00

U.S. Consumer Sensory Evaluation of Maple Syrup Grades

U.S. maple syrup producers face uncertainty due to the impacts of climate change and competition from foreign processors and alternative syrup sources. This project's purpose is to gain a deeper understanding of U.S. consumer attitudes and preferences about maple syrup grades, which can lead to improved educational programs, marketing materials, and the expansion of domestic sales and revenue opportunities while preserving rural jobs in a rapidly changing global economy. University of Maine (UMaine) researchers will lead this sensory evaluation study of the four Grade A maple syrup classes by 100 consumers at each of four test sites (Maine, Illinois, Arkansas, and California). Partner and sub-recipient Atlantic Corporation has previously collaborated with UMaine and will assist with consumer testing under a contract with consultant Mérieux NutriSciences. The project team will deliver a free finding report and an interactive data visualization tool for maple syrup producers. Providing producers and distributors with data on consumer tastes, perceptions, and preferences of the four grades of maple

syrup will allow them to tailor sales and market plans, pricing strategies, and advertising materials consistent with consumer needs. Surveys will be sent to maple businesses before and after the sensory data tool's release to assess the information's impact. Replacing typical supply-driven decision making with market-driven planning and execution is expected to lead to an expansion of markets and improved revenue and profit margins. The intended beneficiaries of this project are the 9,492 U.S. maple syrup operations, an estimated 20,000 stakeholders across the maple syrup industry, and 33,980 consumers.

Michigan

Recipient: Michigan State University
Project Type: Producer and Landowner Education
Award Amount: $480,000.00

Pure Maple Yeast for Pure Maple Distillates

This “Producer and Landowner Education (PLE)” project will increase the diversity of commercial, maple-based distillation products by optimizing the microbiology of maple sap fermentation by wild yeast strains (“pure maple yeast”). Michigan State University (MSU) seeks to add significant commercial value to the maple syrup industry by increasing the profitability of low-quality, “end-of-the-season” sap that typically yields low or no profit. This project is based on the premise that yeast indigenous to maple trees and present in sap tubing systems naturally ferment sugars in concentrated sap and will outperform traditionally used yeast strains in the beer, wine, and spirit industries. MSU aims to identify prototypical yeast strains from sap lines of different ages over the course of the first sugaring season. Once identified and purified, the individual sap yeast strains will be evaluated for their influence on experimental distillation products made from maple sap vs commercially available yeast strains (e.g., distillers and rum yeast). They will generate small, research sized batches as part of parallel fermentation trials and age them in charred white oak barrels to evaluate the full flavor profiles of the unique spirits that are “Pure Maple.” Results will be disseminated using a broad suite of print and electronic media to stimulate future research centered on maple sap and to put into practice the refinement of maple sap into high value craft spirits.

Recipient: Grand Traverse Band of Ottawa and Chippewa Indians
Project Type: Producer and Landowner Education
Award Amount: $479,287.00

Grand Traverse Band Sugar Bush Grant

The Grand Traverse Band (GTB) community has continued a tradition of maple product production from prehistoric times through present. These activities are broadly referred to as a “sugar bush”. Due to historical events, involvement in traditional and modern sugar bush activities has waned in the past century. This project will help both the Tribal community and those in the Grand Traverse Region to connect with these traditional practices. This project will conduct a minimum of 10 events per year related to sugar bush activities. These events, open to the public, will bring in outside vendors to teach people about the modern maple syrup industry in Michigan, and highlight industry leaders in

sustainability, cultural engagement, and education. This grant funding will allow for GTB and the surrounding community of maple product producers and consumers to learn more about maple product production, and how various modern processing methods can help producers and consumers access a wide range of products. Additional tools and supplies for the GTB Sugar Bush will allow for the Traditional Agriculture Workshop Instructors to host annual events that brings awareness to the maple syrup industry and how this modern industry is based on traditional Anishinaabe tradition. Through engaging on these topics this proposal will give additional cultural significance to the maple syrup industry in Michigan's Grand Traverse region.

Montana

Recipient: Montana State University
Project Type: Producer and Landowner Education
Award Amount: $497,737.00

The Impact of Tree Health on Sap Production and Quality

This project aims to develop engineering and microbial tools to inform landowners about the current tree health: i) optical inspection of sap infrastructure for biofilm formation with comparison to the developed microbiome that allows producers to make decisions if equipment needs to be changed or different trees should be tapped; ii) evaluation of tree canopies using airborne hyperspectral imaging. Summer crown volume and the hyperspectral information will be related to sap sugar content and volume; iii) continuous measurement of electrochemical xylem properties of taped trees using sensor-functionalized taps. Sensors measure sap electrical conductivity and flow rates to determine tap efficiency and whether they need replacement. A team comprised of engineers, microbiologists, academic foresters, and outreach experts from Montana State University (MTSU) and Michigan State University's (MSU) Forestry Innovation Center (FIC (sub-awardee)) was assembled to improve producer knowledge, awareness, and understanding of sugarbush management using innovative technologies. Sugarbush management is critical since sap volume and sugar content varies with tree selection or the decision on how long a tree can be tapped. Landowner's management is often related to experience. However, the current change in climate makes sugarbush management more unpredictable, and a formal and scientific-driven decision algorithm for maple tree selection is needed. The team will host outreach meetings to equip landowners and producers with innovative sugarbush management approaches to increase sap quality and harvesting efficiency.

New York

Recipient: Cornell University
Project Type: Producer and Landowner Education
Award Amount: $491,492.00

Preserving and Adapting Maple Flavor for New Market Opportunities

Maple syrup is seen as a premium product, one where purchase depends primarily on sensory factors, making flavor crucial for market success. Maple syrup is however a product with a great and culturally important set of practices for its manufacture, making it a product where innovation, or changes in best

practices are understandably slow to emerge. In this project Cornell University proposes the development of several line extensions to maple syrup, such as barrel aging or flavor infusion, that are expected to open up new markets to maple producers particularly for lower value late-season syrup. Further, Cornell proposes the exploration of best practices for storage of maple syrup, where preliminary testing finds both light and temperature can alter the color of maple syrup in a manner common in many agricultural products containing light-sensitive or easily degradable organic compounds, which also lead to flavor changes. These experiments are intended to uncover new market opportunities for growth in the maple industry and ensure that existing syrup gets to consumers in a consistent and optimal manner.

Recipient: Paul Smith's College of Arts and Sciences
Project Type: Producer and Landowner Education
Award Amount: $499,959.00

Determining the Impact of Crown Health on Sugar Yield from Maple Trees

Many maple syrup producers face difficult decisions in managing older sugarbushes with trees in declining health. Producers are reluctant to stop tapping these large, mature trees that could theoretically produce a lot of sap. However, these trees can also be the source of significant vacuum leaks in tubing systems, reducing yield across the entire system. Producers have few tools available to them to help them navigate these tradeoffs. This project will develop a comprehensive photo guide illustrating a four-point rating system that producers can use to assess crown health and make better informed management decisions. Paul Smith's College of Arts and Sciences will designate 120 trees to intensively measure and monitor, evenly distributed across the four crown health categories and two research sites. The research team will measure a set of biometric attributes for each subject tree and its neighbors and will collect sap from each tree in individual cannisters under high vacuum and quantify the total sugar yield over a three-year period. This data will allow the team to develop a correlation between crown health and syrup yield, and then apply more advanced methods to develop an empirical multi-factor yield model. This project will provide maple syrup producers with a new tool to help steer tapping and sugarbush.

Pennsylvania

Recipient: The Pennsylvania Department of Agriculture
Project Type: Market Development and Promotion
Award Amount: $499,044.00

Increasing Consumer Awareness of Pennsylvania and U.S. Produced Maple

Prior research done in Pennsylvania showed that there is a vast disparity in consumer awareness and education of the maple syrup industry. Specifically, the study found that consumers admitted confusion as to the difference between single ingredient pure maple syrup and imitation table syrup. Approximately 52% of the maple syrup produced in Pennsylvania being sold on the bulk market to other states rather than consumed locally. The Pennsylvania Hardwoods Development Council, in conjunction with the Pennsylvania Maple Syrup Producers Council and on behalf of the maple syrup industry, will

launch a Pennsylvania and US Maple Syrup consumer marketing campaign targeting the higher population counties of the state. The goal of this effort will not only be to increase consumer awareness, but also increase industry recognition, educate citizens on the role of real maple syrup as a forest product, and ultimately increase direct to consumer sales of maple syrup and maple products. The campaign will run over a period of two years. Annual efforts will culminate each January with the Pennsylvania's Farm Show – the largest indoor agricultural event held in the US. The Farm Show is where the Pennsylvania Maple Syrup Producers Council experience the most direct to consumer sales.

Utah

Recipient: Utah State University
Project Type: Producer and Landowner Education
Award Amount: $499,280.00

Maple syrup is an important agricultural product with a total value of ~$133 million in 2021. Maple syrup production can be modulated by climate, especially temperatures. However, previous research on climate impacts on maple syrup has mainly focused on the northeastern U.S., where the bulk of the industry is concentrated. Some western and midwestern states have started developing a maple sugaring industry, but little is known about how climate change might affect long-term production in these regions. Moreover, the high-resolution spatial distributions (i.e., maps) of maple trees and potential syrup production are valuable for extension activities yet lacking. This project aims to both spark and sustain the maple sugaring industry through expanding research and extension in the Northeast, Midwest, and Intermountain West regions. Utah State University proposes three objectives to accomplish the project aim: 1) mapping maple tree distribution and estimating potential production in these regions through remote sensing technologies; 2) predicting the impacts of the changing climate on maple syrup production in these regions using high-resolution climate model outputs and knowledge of how temperature and precipitation affect maple sap and syrup production; and 3) developing a maple syrup industry in South Dakota, especially in tribal communities, and sustaining the emerging map syrup industry in Utah through extension and education activities.

Vermont

Recipient: University of Vermont and State Agricultural College
Project Type: Market Development and Promotion
Award Amount: $499,614.00

Increasing Domestic and Foreign Demand for U.S. Maple Syrup Through Integrated Consumer and Market Research, Product Development, and Producer Outreach and Engagement

Maple syrup production in the United States has increased remarkably since the early 1990s, but the industry faces the challenges of declining producer price, lack of value-added products, increasing net imports, and lack of demand-side studies and information. To address these challenges, this project proposes to increase domestic and foreign demand for U.S. maple syrup through integrated consumer and market research, product development, and producer outreach and engagement. Specifically, this project will: (1) review the consumption trends of traditional and relatively new maple products like

energy gels and sports fuel and identify potential value-added products for development and testing; (2) develop novel maple syrup products, including yogurt and ice-cream formulated with maple syrup and cannabidiol (CBD), evaluate and validate their nutritional and sensory properties, and refine the products; (3) assess consumer acceptance and willingness to pay for selected maple products and their attributes such as “local” and “certified organic”; (4) analyze how maple syrup has been introduced and distributed in Japan and China, identify potential opportunities, and develop educational and marketing materials for promoting U.S. maple syrup in these foreign markets; and (5) assess both domestic and foreign market potentials for traditional and value-added maple products and disseminate market analysis results and recommendations through multiple channels. This integrated project, developed by an interdisciplinary team of applied economists, food scientists, Extension specialists and producer collaborators, will generate highly needed information and provide actionable recommendations for addressing critical issues faced by and contribute to sustainable development of the U.S. maple industry.

Recipient: University of Vermont and State Agricultural College
Project Type: Producer and Landowner Education
Award Amount: $493,602.00

This project will integrate applied market investigation, stakeholder cases studies and national business education curricula to support maple business owner decision-making and improve business outcomes. Applied research will assess current consumer preferences, willingness to pay premiums, regional market price trends and collective marketing options in order to develop relevant and timely outreach curricula. Publications and a regularly updated market-monitor website will disseminate maple market trends and display key indicators as they change over the three-year period. Case studies will highlight

how business owners and landowners are adapting to risk factors that create uncertainty about yields, market prices and emergency events that impact profitability. A diverse outreach plan using a range of teaching formats and multi-media outreach materials will reach a national audience of maple producers, landowners, and industry stakeholders at all scales. The national dissemination plan will offer timely information that will assist business managers in short-term marketing decisions. Project resources and in-depth courses will also facilitate mid-term and long-term strategic planning for resilient business models that can adapt to risk, realize opportunities, and expand markets for maple syrup.

West Virginia

Recipient: Future Generations University Corporation
Project Type: Market Development and Promotion
Award Amount: $500,000.00
Increasing domestic and foreign demand for U.S. maple syrup through integrated consumer and market research, product development, and producer outreach and engagement

Sweet Appalachia: Building Creative Partnerships to Promote Success in US Maple Syrup
This project will promote regional markets that increase access and also raise awareness about maple sap and syrup products across West Virginia, eastern Kentucky, Appalachian Virginia, and western

Maryland. This market development and promotion project is planned to directly support the US maple industry by increasing the demand for local and regional maple syrup production in Appalachia. It will increase access to maple products, by supporting market opportunities for Appalachian producers. It will promote the US maple syrup industry by showcasing the role of sugar-making in Appalachian culture, ecology, and history. It will improve consumer demand for Appalachian as well as US made maple sap and syrup products.

Sweet Appalachia has two main objectives: 1) raising public awareness of domestic maple syrup through increased marketing, promotion, storytelling, and enhancing agritourism efforts; and 2) creating new market access opportunities for Appalachian maple syrup producers through direct-to-consumer marketing as well as brokering bulk and wholesale syrup sales across the region. This project will work with producers and communities to create the enabling environment for an increase in sales of Appalachian-produced syrup and value-added products within the Central Appalachian region defined as Western Maryland, Appalachian Virginia, West Virginia, and Eastern Kentucky. This project will work with 100 producers and 60 communities to build the network of support required for sustainable economic development.