

Urban Food Systems Symposium

Developing Urban Food Systems for Sustainable and Resilient Communities

Book of Abstracts

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Keynotes and General Sessions

Keynote Presentation: Let's Get Dirty – Cultivating Collaboration, Policy, and Resiliency in Cities
Qiana Mickie, Executive Director of the New York City Mayor's Office of Urban Agriculture

Qiana will share her experience and examples of advancing urban agriculture in New York City and how we can all work together to build a climate resilient future.

General Session: The Intersection of Climate Change and Urban Agriculture

Trent Ford and Carol Davis will each give 30-minute presentations followed by a moderated discussion with the audience by Aaron Wilson.

Climate Change and Urban Agriculture: From Impacts to Solutions

Trent Ford, climate scientist at the Illinois State Water Survey and University of Illinois at Urbana-Champaign, Illinois State Climatologist

Urban agriculture is a vital part of climate adaptation in the Midwest. However, our changing climate has already had significant impacts on urban agriculture, and the severity of impacts could increase with expected changes in the near future. Trent will discuss the fundamentals of climate change in the Midwest, impacts now and into the future, and solutions to develop climate-resilient urban agriculture in an overall healthier and more equitable Midwest region.

Planning for Food System Resilience in a Changing Climate: A Local Government Approach

Carol Davis, Sustainability Manager for the Town of Blacksburg, Virginia

At the local government level, planning for climate adaptation and resilience usually focuses on how to protect people and the built environment from anticipated changes to temperature and precipitation. Some communities like Blacksburg, Virginia are looking beyond these direct impacts to consider how to plan for a sustainable and equitable food system in the context of a changing climate. Carol will focus on an ongoing collaboration between the Town of Blacksburg and the Virginia Tech Center for Food Systems and Community Transformation – as they jointly delve into the complexity of food resiliency planning within the Appalachian region.

General Session: Urban Grower Panel

Jerry Hebron, co-founder of the Detroit Black Farmer Land Fund, a member of the USDA Innovative Production Committee, a member of the state Farm Service Agency committee, and the Director of the Detroit Cultivator Community Land Trust.; Vincent Peterson, President and CEO of VIGEO GARDENS; Amanda Stanfield, owner/operator of Richland County's only urban homestead farm – GrowFourth Urban Farm

This moderated urban grower panel will discuss the challenges they face as urban producers regarding research, education, and support needed by entry-level, intermediate, and experienced farmers, and the skills they have developed along the way. After learning about each of the growers, the panel will

be asked a few introductory questions and then the discussion will be widened to allow audience interaction.

Capstone Presentation: Urban Farmers – A Great Benefit is Coming Our Way: A Mid Tunnel Climate Smart Growing System

Reverend Dr. Carl P. Wallace is currently the chief operating officer of Abundant Life Farm, a non-profit entity in Akron, serves as one of the 12 federal advisors to the Secretary of Agriculture for Urban and Innovative Agriculture Committee.

How would you like to grow tomatoes in a seasonal high tunnel (hoop house) in the middle of a cold winter? A possible solution is coming your way. Through an Ohio State Department of Food, Agricultural, and Biological Engineering Capstone Project, students TJ Rouse, Kate Humphrey, Jaret Boetcher, and Alyssa Smith, under the leadership of Professor Jane Fife, are creating a Mid Tunnel Climate Smart Growing System that will provide a cost-efficient heating and lighting system to extend the growing season to 365 days a year in a hoop house.

Concurrent Sessions

Track 1 – Climate Change and Food Waste

Tuesday, June 11, 2:00 – 3:30 pm

Improving Drought Resilience for Urban Farms

Lucy Diekmann – University of California

Climate change is already impacting California's water resources. Not surprisingly, California farmers identify water access and/or a changing climate among the barriers to long-term farm viability. This challenge may be compounded for urban growers, who frequently rely on expensive municipal water sources. To understand how urban agriculture sites access and manage water and have been impacted by drought, we surveyed 90 urban farmers and gardeners in the state's largest metropolitan areas between December 2022 and April 2023. This presentation reports the results of that survey. The findings highlight how the unique physical and social characteristics of urban agriculture affect water use decisions. Urban growers also identified both on-farm needs and broader urban policy and systems changes that would help them adapt to a changing climate.

Utilizing Black Soldier Fly Composting on Urban Farms

Milena Agila, Laura Ingwell – Purdue University

Urban farms face unique challenges associated with growing in densely populated, post-industrial environments. This includes access to healthy soil and farming inputs to support crop production. However, they also have access to large amounts of organic material, including food waste from a variety of sources (i.e. household, food industry). A viable and sustainable technique to recapturing this organic waste material and converting it into valuable agricultural resources is through the integration of composting with Black soldier flies (*Hermetia illucens*; BSF). BSF are a non-pest insect originating from the neotropics. The immature stage (larva) of the insect is a voracious detritivore that can

consume a variety of organic waste streams, converting this resource into protein (in the form of the insect itself), fertilizer (the digestate remaining after larval feeding) and chitin (in the form of the insect exoskeletons). In recent studies, we have evaluated the capacity of BSF to be reared on a variety of organic waste streams and incorporated their fertilizer back into the soil to amend specialty crop production. Through participatory research we have deployed BSF bins on urban farms throughout Indiana and evaluated the farmer's experience in the process. The soil amendments generated through the process of rearing BSF were high in NPK, organic matter, Ca, and Zn, all of which support plant growth. The digestate and chitin have the potential to increase porosity and water holding capacity when applied as a soil amendment. In field applications, there was improved crop performance, like that achieved through the application of composted cow manure, on carrot and cucumber. Overall participants enjoyed their experience with BSF composting on-farm and had several recommendations to improve the process. BSF composting provides an opportunity to convert organic wastes into valuable agricultural resources on urban farms.

Development of an Urban Biomass Waste Circular Economy - Toolkit Perspective

Claire O'Dea, Angie Sillah, Brianna Fogel – University of Michigan

This masters project, in collaboration with community partner Pashon Murray, developed a biomass waste toolkit to be utilized in the development of a circular economy in communities throughout the United States. The goal of this project was to address the growing waste crisis and establish solutions that are beneficial to both communities and the environment. Biomass waste has the potential to act as a feedstock for a variety of products including compost and bioenergy, as well as the input for products that utilize waste as-is to develop a byproduct. A circular bioeconomy will open doors to new products and market segmentation, where stakeholders can appreciate biomass throughout the value chain, from product design to waste management. Creating market segmentation allowed us to identify the gaps in a circular food economy that can be filled with the development of byproducts and allow communities to connect companies and businesses to keep revenue and products local. Our research expanded on the growing projects that aim to keep the life cycle of food/crops local - this included all stages from crop development to end of life as compost and the development of organic fertilizers and biofuels. Given that urban food waste is a growing concern in many communities across the country, there has been a special emphasis on addressing the problems it poses. The toolkit emphasizes the significance of equity and environmental justice at every step and underscores the need for systemic changes in how waste is approached and highlights the positive potential outcomes achievable through the effective utilization of biomass waste.

Developing Produce Safety Educational Resources for Refugee Growers in Urban Areas in the Midwest

Manreet Bhullar, Sagar Pokhrel – Kansas State University; Shannon Coleman – Iowa State University; Londa Nwadike – Kansas State University/University of Missouri; Angelina Adjetey; Smaranda Andrews; Djemima Mulonda; Melissa Cater

Many refugees from various countries move to urban areas in the United States where social service organizations may provide them with opportunities to grow fruits, herbs, and vegetables. These organizations provide an excellent opportunity for growers to raise produce from their home country

and potentially to be able to sell their produce. However, it is essential these growers are provided with relevant and understandable food safety information to ensure they meet any regulatory and marketplace requirements and provide a safe food product to maintain their customer base. Unfortunately, such information is not readily available in languages such as Chin, Nepali, and Swahili, which are some of the main languages spoken by refugees growing produce in Kansas City and Des Moines, Iowa.

Accordingly, Iowa State University, Kansas State University, and the University of Missouri are working to develop videos and posters for refugee produce growers in these languages. The team formed an advisory board for the project and held a board meeting consisting of partners from Lutheran Services of Iowa, Cultivate Kansas City, Catholic Charities of Northeast Kansas and other groups. The advisory board provided excellent recommendations for produce safety resources to be developed, including the following: a) provide resources in their native languages and provide relevant contexts, b) include problem-centered and real-world scenarios, providing the growers with a broadened knowledge of proper food safety practices and an understanding when, where, and how to implement their new knowledge. After developing the videos and posters, we will evaluate the curriculum by conducting a survey of growers' knowledge, attitude, and anticipated behavior.

This model of utilizing a project advisory board for developing resources for training urban farmers, particularly underserved farmers such as non-English speakers, could be applied elsewhere to help develop stronger urban food systems for sustainable and resilient communities.

Track 2 – Food System Policy and Advocacy

Tuesday, June 11, 2:00 – 3:30 pm

Urban Farmers and Public Policy: A Fellowship Program

Patricia Allen – BIPOC Food & Farm Network; Tracy Freeman – Inspiring Outcomes

The BIPOC Food and Farming Network Policy Fellowship provides those working in agriculture and food systems fields an understanding of public policy, including knowledge in the policymaking and legislative process at the local, state, and federal levels. Fellows, who receive monthly stipends, will also learn public policy advocacy and grassroots community organizing to help them become more successful in their work and help their communities. The fellows are required to develop a capstone project that will be presented at the end of the fellowship. Throughout the six-month program, fellows will have monthly presentations from state and local officials; food and agricultural policy leaders; current and former elected officials; food policy and social justice activists; and community organizers. At the same time, fellows will develop a platform for advocating for themselves, particularly regarding current food and agricultural policies and environmental issues impacting regenerative farming practices and food production. A central mission of the fellowship is to learn strategies and tactics for removing barriers that prevent underserved communities from having access to fresh, healthy food. The fellowship comes with an \$18 per hour stipend, paid monthly. Submission of a monthly timesheet and report with a description of hours spent in lecture/instruction, individual study and attendance at relevant government and/or community organization meetings; research and work on capstone should be included in the report.

Childcare and Health Insurance: Invisible Issues Affecting Your Farm

Hannah Budge, Shoshanah Inwood – The Ohio State University; Florence Becot – Penn State University; Beth Holtzman – University of Vermont; Maria Pippidis – University of Delaware; Joy Rumble – The Ohio State University, Julia Freedgood – American Farmland Trust

Access to affordable quality childcare and health insurance is an important part of farm risk management yet is rarely discussed. Hear a brief overview of USDA and CDC funded research examining how childcare and health insurance affects farm economic development, labor needs, farm risk management, quality of life, farmer mental health, farm safety, and tradeoffs between off-farm and on-farm work. If left unaddressed, childcare and health insurance are order stressors with the power to amplify extraordinary stressors such as extreme weather, market volatility or public health issues. Childcare and health insurance are directly connected to farm social sustainability and farm quality of life – an area recognized as important yet with few farmer decision making resources available. Learn practical strategies for how to recognize and integrate the needs of children into the farm business; how to recognize and integrate health care and health insurance needs into the farm business; and will discuss how the tradeoffs between household and farm needs can inform production and marketing strategies. A variety of farmer decision-making resources developed by The Ohio State University, the University of Delaware, and the University of Vermont including “How Healthy is Your Farm?,” “Smart Choice Health Insurance©,” and “Smart Use™,” and “Starting the Conversation about Childcare in Your Farm Family” will be shared. Throughout the session participants are encouraged to share their experiences with health insurance and childcare and the strategies they have used to address these topics.

The Zoo City Farm and Food Network: Food Sovereignty Initiatives and Cooperative Extension

Remi Harrington – The Zoo City Farm and Food Network; Mariel Borgman – Michigan State University

The Zoo City Farm and Food Network is a Black woman-led local food policy council, industry association, and a network of conscientious consumers, urban growers, folk artisans, and micro-retailers. They own multiple properties and have developed a microsystem with all facets of a complete and sovereign food system in addition to setting a federal advocacy agenda for the 2023 Farm Bill. Additionally, they have developed an iterative framework of inquiry and best practices that support our ongoing work together and that we'd like to share and encourage other communities to participate in as we work to simultaneously integrate white dominate institutions and maintain ownership over our work. The reason this work is important is because we believe that Cooperative Extension Services are underutilized and misaligned in the work of urban agriculture. We would like to share how we have leveraged resources through Cooperative Extension to support our work and to discuss the history of Land-Grant Institutions.

As an Extension educator, Mariel has had to be imaginative about ways to support the work and demonstrate the humility needed to work through discomfort when strategies for progress have not been what was considered traditional in the context of the WDI. Remi has faced multiple challenges advocating for her voice and the quality of her work to be reflected within the nexus of the food

industry ecosystem. Learn how those intersections have created a sustainable and successful body of work.

Urban Land for Growing Food: Policy Change as a Community Co-Learning Process

Kara Komoto – Twin Cities Community Agricultural Land Trust (TCALT), Valentine Cadieux – TCALT and Hamline University; Jennifer Nicklay – TCALT and University of Minnesota; Stephen Carpenter – Farmers' Legal Action Group; Sebrum Herron, University of Minnesota

Considerable work in academic and planning contexts has pointed to the gap between the practice of growing food in cities and the policy frameworks supporting urban food cultivation (APA 2007/2015; Chumblor et al., 2015; Minnesota Department of Agriculture, 2016; WinklerPrins, 2017; Meenar, et al., 2017; Tornaghi & Dehaene, 2020). This case study mixes scholarly, advocacy, and applied perspectives and provides a window of opportunity for supporting changes in policy and expectations of urban food land. This work explores a case study in Ramsey County, Minnesota, in which a community network organization helped facilitate a policy review and proposed policy revisions (Cadieux et al., 2022). Assessment of how policy impacts and may better support urban food cultivation in Ramsey County was completed through conducting interviews and written surveys and reviewing municipal code and planning documents.

Outcomes included a formal policy review (by district and by topic), a series of workshops with policymakers and implementers, and an illustrated glossary zine, distributed separately from the report and including a guide to resources for urban food cultivation, organized around plants, soil, and other infrastructure. The goal of the analysis is to contribute insights on the processes involved in better matching policy supports with contemporary practice and policy goals. This analysis also contributes discussion of urban disinvestment and revitalization, and critical engagements with frameworks of liability, extraction, and control to the conversation on urban agriculture. Additionally, it helps urban agriculture networks reflect critically on metrics of success for urban agriculture.

Track 3 – Production Systems, Challenges, and Growing in Protected Environments

Tuesday, June 11, 2:00 – 3:30 pm

Significant Urban Farm Resources Developed by the Great Lakes Urban Ag Working Group

Maggie Rivera – Ohio State University Extension, Cuyahoga; Laura Ingwell – Purdue University; James Jasinski – The Ohio State University; Jacqueline Kowalski – University of Connecticut

Urban agriculture, the ability of community members to engage in growing food, is the crux of a just urban food system. The Great Lakes Urban Ag IPM Working Group was established with support from the North Central IPM Center in 2017. The mission of the group is to create a network of university researchers and Extension educators who work with growers to solve production and pest management challenges on urban farms, using an integrated pest management (IPM) approach. Membership includes Extension professionals, community organizations and garden managers,

partnering support agencies, and farmers. More than 35 people from eight states across the region have worked collaboratively to provide a set of tools to manage a range of crop production and pest challenges. Products that have been created include 15 pest cards, available in both Spanish and English, that provide identification and management recommendations. These cards have been disseminated across several states and posted online. A virtual webinar series provided specialists the opportunity to talk about scouting and trapping for insect pests, composting with black soldier flies, and a unique 360-degree virtual urban ag farm tour project. The virtual tours allow anyone to “visit” and experience the diversity of urban farms where key production and pest management information is highlighted with text, images, audio, or video. There is currently a library of 17 360-degree urban farm tours which originated in Ohio but have recently expanded to highlight urban farms in Michigan, Indiana, and Illinois. This group continues to build collaborations and create resources to train urban farmers in pest management. Learn about the resources that have been created, including how to access them, and about the structure and function of the collaboration.

Overcoming AI Model Training Barriers Toward Autonomous Controlled Environment Agriculture System

Shing Chang, Michael Prichard, Xiaolong Guo – Kansas State University; Lizhi Wang – Oklahoma State University

Vertical farming (VF) is a type of Controlled Environment Agriculture (CEA) that promises high yield, year-round production, reduced land usage, shorter supply chains, and sustainable agriculture practices. However, its operation is a challenge to small farmers. Recent artificial intelligence (AI) advances have provided opportunities to design autonomous CEV systems. Unlike classic automation, in which each component is set to operate according to a timer, the proposed autonomous system coordinates all system components based on a set of goals (e.g., yield, taste, and energy consumption). The proposed autonomous system aims to model, monitor, and control the CEV ecosystem based on the big data gathered in a proposed agriculture digital twin called Agri Digital Twin (ADT) platform in the cloud. Digital twin concepts have been applied in various manufacturing applications where data collected via sensors (i.e., in the context of Internet of Things) resides in the cloud. Manufacturers can ask what-if questions to forecast system performance and simulate potential production changes without interrupting the physical production systems. Similarly, the proposed algorithms would collect growing data from crops and the environmental factor readings into the proposed ADT platform. Collating data from various VF systems and incorporating transfer learning techniques in AI will meet the substantial data demands for training AI models. The trained AI models can design optimal growing CEA recipes based on multiple objectives such as crop yields, quality, and costs. Farmers/users that can operationalize the proposed autonomous AI models could optimize growth production and reduce costs to generate steady incomes, thus achieving sustainable agriculture practices.

Comparison of Liquid Culture and Substrate-Based Hydroponic Systems for Organic Lettuce Production

*Milon Chowdhury, Uttara Samarakoon – The Ohio State University, Agricultural Technical Institute;
James E. Altland – USDA Agricultural Research Service*

Controlled environment agriculture (CEA) and hydroponic techniques are gaining popularity in urban areas because it can produce a variety of fresh and high-quality food locally throughout the year, efficiently utilizing resources. The demand for organic vegetables is high among urban consumers due to health consciousness and environmental sustainability, and CEA producers can benefit by adapting organic methods of production. Despite several studies focusing on the preparation and evaluation of liquid organic fertilizers, none have explored the compatibility of these fertilizers with different hydroponic systems. Therefore, the objective of this study was to evaluate lettuce production using a liquid organic fertilizer under different hydroponic systems. Four distinct hydroponic methods were selected: nutrient film technique (NFT), deep water culture (DWC) (liquid culture), Dutch bucket (DB), and regular plastic container (RPC) (substrate-based). 'Green butter' lettuce was grown using the liquid organic fertilizer (Espartan) for four weeks. Shoot growth parameters (e.g., shoot width, number of leaves, leaf area, SPAD, fresh weight, and dry weight) and root growth parameters (e.g., root length, fresh weight, and dry weight) were measured. The growth performance under the DB and RPC systems was similar, with RPC being 29%-60% and 15%-44% higher than the NFT and DWC systems, respectively, for the shoot parameters. Root length was nearly identical for the NFT and DWC systems but significantly lower (around 78%) than the substrate-based DB and RPC systems. Although lettuce grown in the NFT system showed the lowest growth performance, its mineral content in the leaf tissue was comparable or sometimes higher than that of substrate-based hydroponic systems. Despite the high growth and mineral composition, the substrate-based hydroponic system leached more nutrients (around 4.5%-228%) compared to the liquid culture systems. In conclusion, the tested liquid organic fertilizer is more suitable for substrate-based hydroponic systems than liquid cultures; however, further evaluation of different liquid organic fertilizers and leafy greens is needed.

Sustainable Pest Management for New York Urban Farmers

Lori Koenick, Sam Anderson, Judson Reid – Cornell Cooperative Extension

Urban farmers face unique pest management challenges compounded by limited space, proximity to other growing areas such as community and school gardens, constructed soils, early exposure to invasive pests, climatic challenges, limited research, and historically minimal technical support from service providers. In a multiyear project, there was an exploration of sustainable pest management on urban farms across New York state using on-farm demonstration trials, workshops, routine scouting, and farm visits. Project team members worked with 15 urban farms in Buffalo, Rochester, and New York City to host demonstration trials testing non-chemical pest management strategies. Work with farms was done to identify pests of concern and co-created site-specific management plans. Some pests are common and widespread such as aphids, downy mildew and flea beetles, others are relatively new to our areas such as swede midge and spotted lanternfly. Management approaches depended on farmer preference and farm layout. Strategies included exclusion netting, manipulating planting dates, resistant varieties, and introduction of biocontrols. Most participating farms saw improved success in their social missions and an increase in revenue through the result of higher

quality vegetables, improved yields, and decreased labor on pest management and sorting. As part of this project, there were more than 22 workshops on sustainable pest management on urban farms reaching more than 350 participants to date. The project team has conducted over 300 visits with urban farmers across New York. This presentation will share lessons learned and insights gained on implementing sustainable management practices on urban farms.

Track 4 – Involving Youth in Urban Ag

Tuesday, June 11, 2:00 – 3:30 pm

Youth in Charge: Yard Corps Sprouts into Performance Arts, Catering, Farmers Markets, and More
Thomas Crain – Shanti Community Farms, Inc.; David Brooks – 36 North Consulting, Kyengye Elale – Shine the Light; Bhakta Rizal – Shanti Community Farms, Inc.

What started as an afterschool program for immigrant youth to make a few extra bucks performing the run-of-the-mill outdoor chores for their neighborhood expanded into showcasing their newly-discovered additional talents in performing arts, culinary arts, and retail arts, to name a few. Shanti Community Farm's outdoor work crew division with trained youth participating in urban farm sites include a high tunnel and high school garden, church garden, and the new Hewa Bora farm. Youth work crews mow, weed, and clean-up public and private lots; operate weekly youth-run farmer's market tables; and cater Golden Time picnics.

Yard Corps is designed to educate and train both immigrant and neighborhood youth ages 12-17 in landscape maintenance including mowing, weeding, bush/tree trimming, planting of vacant (city/county-owned) and private lots, garden prep, fencing, firepits, container gardens, and pergola building. For most Yard Corps program students, orientation, ongoing training, and Ohio learning standards study time with professional tutors will be offered. Students are paid hourly. There are also farmers markets at various locations where produce from the urban farms and international snacks made by the youth are sold.

At the urban farm sites, local churches, and parks, the youth operate "A Golden Time Picnic" program. They prepare and serve food and refreshments from their cultural heritage, including: international hors d'oeuvres, beverages, desserts with main ingredients from food they have grown. Farmers market items of local produce are provided as well as international, custom-made jewelry and accessories. Also, there's now a new division for youth dance and musical performance including the Black Beanz (African dance) and Hot Pepperz (Nepali dance) troupes.

Benefits of Engaging Students and Staff in the Evaluation in Seattle Fresh Fruit and Vegetable Program

Gurdeep Gill – City of Seattle, Office of Sustainability and Environment

Seattle's Fresh Fruit and Vegetable Program (FFVP) funded by Seattle's Sweetened Beverage Tax and managed by the Office of Sustainability and Environment (OSE), began in the fall of the 2018-2019 school year. The program increases access to a variety of produce for the Seattle Public Schools which have 35% or more of students eligible for free or reduced-price lunch. The goals of the program are to

increase student consumption of fruits and vegetables; expand access to a variety of fruits and vegetables students experience; promote healthy, lifelong eating habits; and increase student's ability to focus and concentrate in school.

From May 2022 – December 2023, OSE worked with a No Kid Hungry Fellow to conduct a process evaluation to assess the effectiveness of the program. Students, kitchen staff, and school administrators were engaged with and co-collaborators in the process. Using conversational interviews and surveys to understand the user experience of the program and assess whether the program is making its intended impact, the evaluation found that FFVP has been an impact, beneficial program, and is meeting many of the goals developed by the SBT Community Advisory Board. During this time, students were engaged to varying degrees to ensure their voice was a part of the process.

Engagement ranged from quick thumb surveys during lunch to understand preferences to in depth partnership with a 4th and 5th leadership class to lead and design a school wide survey to source favorite fruits and vegetable snacks students enjoy and want to see in the program. This in tandem with the information gathered from kitchen staff and administrators has resulted in program enhancements such as increased communication of the program through signage, flyers, joint trainings with kitchen staff and administrators and an increase in number of schools participating.

Growing Teachers Throughout the Seasons: Agriculture Awareness Through Nine School-Year Harvests

Timothy McDermott, Carol Smathers, Jamie Rickle – The Ohio State University

Research suggests that school gardening promotes healthy behaviors, increases agriculture career awareness, and improves academic achievements. Kids involved in school gardening consume more vegetables and are more likely to try new foods. However, educators aiming to maintain, sustain, and integrate agricultural engagement face many common barriers including lack of time, staff, funding, curriculum, space and continuity of leadership, and seasonality challenges. The NEW “Growing Teachers Throughout the Seasons” (GTS) guide and online learning modules walk teachers through creation of indoor and outdoor experiential growing activities to address these barriers. GTS incorporates STEM, agriculture awareness, and health, while empowering students to plant, maintain, harvest, prepare, and taste nine varieties of herbs and vegetables during the academic calendar year!

The research-based process for pilot testing the academic calendar growing methods and developing the Growing Teachers Throughout the Seasons (GTS) guide will be described. Data from 46 teachers in a large, urban school district who piloted GTS in their classrooms and applied GTS approaches in a wide variety of grade levels, subject areas, and agriculture topics will be presented. Participants will consider how GTS can support Science, Technology, Engineering and Mathematics outcomes while elevating agriculture awareness and connecting young consumers to how food is grown.

Learning activities associated with meeting the National Agricultural Literacy Outcomes will be highlighted, along with specific connections between GTS activities and career opportunities in the controlled environment agriculture (CEA) industry. GTS resources are particularly helpful for

connecting urban students to agriculture and fostering an understanding of food systems, which will ultimately support sustainable and resilient urban communities.

Confidence, Sense of Belonging, and Connection to Nature in a Youth Urban Agriculture Program
Casey Ortbahn, Marijke Hecht, Kristi Lekies – The Ohio State University; Michele Bailey – Franklin Park Conservatory and Botanical Gardens

Youth Urban Agriculture (UA) programs provide opportunities for youth to connect with nature and local food production and have been shown to improve pro-social behavior, self-efficacy, and self-esteem among children and youth (Rogers, 2018; Ulmann et al., 2018). Youth UA programs have also been shown to be places where youth feel like they belong (Delia & Krasny, 2018). Most urban garden programs are for elementary and middle school students, however, and few research studies look at UA programs for high school youth and how these programs contribute to youth's confidence development and sense of belonging (Rogers, 2018). This research project was part of a research-practice partnership between university researchers at The Ohio State University's School of Environment and Natural Resources and practitioners at Franklin Park Conservatory and Botanical Gardens in Columbus, Ohio. A qualitative case study approach was used to understand how the curriculum of a youth UA program called Teen Corps helps urban high school youth (n=16) build confidence, sense of belonging, and connection to nature. Data collection methods included ethnographic approaches such as participant observations, the digital collection of artifacts, and written observation logs filled out by program staff (Yin, 2018). Photovoice methods which consisted of youth taking photos, making posters, and taking part in brief semi-structured, audio-recorded interviews (Bellino et al., 2017) was used. Qualitative data analysis involved iterative thematic coding and triangulation across data sources (Miles et al., 2014). Findings show that youth feel confidence when they see the result of their hard work—especially when they get to harvest food they planted from seed—and the program helps youth to feel a sense of belonging by connecting youth with peers, place, nature, and the broader community. Implications for youth UA programming and recommendations for future research will be discussed.

Track 5 – Planning, Community, and Economic Development

Tuesday, June 11, 2:00 – 3:30 pm

Milwaukee Farmers Markets: Data Collection and Networking
Kristin Krokowski – University of Wisconsin Madison

In Wisconsin, most farmers markets are created independently, and they are reflections of the communities they serve. Although their uniqueness is an asset, markets often lack access to the support and expertise of other market managers. This is especially critical because the market manager turnover rate in Wisconsin is high and managers tend to be volunteers or low wage employees with multiple responsibilities. As part of a larger project funded by the United States Department of Agriculture Agricultural Marketing Service Farmers Market Promotion Program, the University of

Wisconsin-Madison Division of Extension partnered with the Wisconsin Farmers Market Association and the Milwaukee County Farmers Market Coalition to create an opportunity for farmers markets in the greater Milwaukee area to create a networking group. The goal of this group is to collect data, share ideas and work together on a project to increase vendor sales and customer counts. Learn about the successes and challenges of forming this group. They will also discuss the tools for data collection and process for gathering sales data from agricultural vendors as well as the collaborative process used with market managers to determine the network project.

Kansas Local Food Systems Community Roundtables: Developing Sustainable Urban Food Systems

Amanda Lindahl, Rebecca McMahon, Deborah Kohl, Londa Nwadike, Elizabeth Kiss, Rial Carver – Kansas State University

Kansas State Research and Extension (KSRE) conducted community roundtables, including urban areas in Kansas, to provide an opportunity for everyone involved in the food system to share, listen, and learn about what is happening in communities around local food systems. The roundtables also gave participants an opportunity to connect with others in their area who are interested in local food systems and provided information on resources available from KSRE to help the communities progress in their development of local food systems.

Local Food Systems Community Roundtables were held in late 2023 in 11 locations in Kansas, in both urban and rural areas. Four virtual sessions were also held in late 2023, at noon and in the evening, to enable maximum participation in the roundtables. 296 people attended the roundtables thus far. There was a wide range of participants, including farmers, food processors, consumers, service providers, educators, and others. Participants identified a large number of issues that would enable their communities to develop a stronger local food system, including a) what do we know, b) challenges they haven't been able to solve, c) needs they have in their area that need to be met to make progress/resources they don't have that they need, d) what do they want to see in the future in their local food system, e) who wasn't at the roundtable that should be, and f) things they would like to learn more about.

This model of holding community local food systems roundtables could be applied elsewhere to help develop stronger urban food systems for sustainable and resilient communities. The project team will share lessons learned in implementing these roundtables that can be beneficial to others working in urban food systems.

Exploring the Needs of Indiana Urban Farmers: A Mixed-Methods Needs Assessment

Nathan Shoaf, Laura Ingwell – Purdue University

In June 2020, Purdue University Extension sought to maximize engagement with urban farmers, involving stakeholder feedback at multiple steps of the survey instrument development process as part of a statewide needs assessment. The process was initiated by a team of Extension specialists and educators hosting listening sessions in the three largest metropolitan counties in the state: Allen County (Fort Wayne), Lake County (Gary), and Marion County (Indianapolis). Extension educators in each of those counties invited six to eight urban farmers to join in a conversation about their

operations, communities, challenges, and priorities they would like Extension to address. The team conducted farm visits at different urban farming operations following the listening sessions to engage in one-on-one conversations with participants to further inform the development of the survey instrument. A subset of urban farmers received a consultation fee to review the survey instrument to ensure it was linguistically appropriate and reflected their needs and wants. The survey was created in Qualtrics and was distributed via newsletters, email listservs, and social media. The survey's culmination is three new Extension publications that share the findings in the contexts of our audience's demographics, opportunities and challenges, and describe the definition of success in the words of the farmers. The results of this needs assessment have provided a list of priorities for agriculture professionals to help urban farmers increase productivity, sustainability, and the overall success of their farming operations. The urban farming community in Indiana is diverse, farm on less than one acre, and often hold additional jobs off-farm. The top challenges identified include insect pest and plant disease management, marketing and business development, soil health, nutrient management, weed management, and irrigation. Respondents provided guidance on content delivery and access, to improve Extension's ability to meet their needs.

Supporting Food Truck Entrepreneurs: Ways Academics Can Contribute to This Growing Sector

Kendra Wills – Michigan State University

Colleges and universities hold a vast network of resources that can be deployed to support community-based economic development. However, there is often a disconnect between colleges/universities and the business community. Cooperative Extension faculty often work to provide a link between these entities.

In 2019, the Grand Rapids Food Truck Association approached Michigan State University Extension with a request to create a workshop for people interested in starting food truck businesses. Food truck owners were being bombarded with questions and they didn't have time to help entrepreneurs while running their own businesses. Due to the pandemic, this workshop became a free, online, on-demand course.

Food trucks are a growing segment of the food industry. Fit Small Business reports that the food truck industry grew by almost 10% annually between 2018 and 2023. Typically, they cost less than restaurants to launch and require fewer employees to operate. According to data published in 2022, the average start-up cost for a restaurant is \$275,000 and the average cost to start a food truck business is between \$28,000 – \$144,000. In addition, many food truck owners are minority business owners, which historically have been marginalized by economic development and higher education institutions.

This presentation will focus on how university resources can assist food truck entrepreneurs. The example that will be highlighted is the partnership between Michigan State University Extension and the Grand Rapids Food Truck Association resulting in the free, online course. The course, "How to Start a Food Truck Business," is available in both English and Spanish. Organizations contributing content to the course include the Kent County Health Department, Prep Space Kitchen, Grow (a local CDFI) as

well as several food truck owners. The course is available at the MSU Product Center's website under the "Classes" tab.

Track 6 – Planning, Community, and Economic Development

Thursday, June 13, 10:30 am – Noon

Developing a Comprehensive Urban Agriculture Plan for Dallas, Texas

Jeffrey Landau, Christian Kanlian – Agritecture

Today's cities face overlapping pressures from increasing urbanization, intensifying climate change, and dwindling natural resources. Charting a resilient and equitable path forward through these challenges is an essential responsibility for city leadership. Working closely with the Dallas City Council and Office of Environmental Quality and Sustainability, Agritecture led a multidisciplinary project team to identify and address the major barriers to expanding urban agriculture in the City of Dallas. After speaking directly with over 65 key stakeholders and facilitating survey feedback from over 750 residents, the team identified five overarching goals for the new Urban Agriculture Department to focus its resources and attention for the next 5-10 years. These goals span the entire food value chain from production to consumption, emphasizing the need for sensible regulation, equitable investment, and stakeholder collaboration. One of the most unique outcomes of the project was a quantitative methodology for equitably allocating city resources to neighborhoods that most needed them and could most quickly deploy them. Using CDC data on social vulnerability and community-generated data on urban agriculture sites, the project team identified census tracts that the city should prioritize for technical and financial assistance. By emphasizing community engagement throughout the project, the team built trust with disparate local stakeholders and eventually garnered unanimous adoption of the plan by the city council in March 2023. The plan is a prime example of the importance of forward-thinking city leadership, interdisciplinary planning expertise, and intentional community engagement. Since the plan's adoption, there has been an increase in collaborative events, including a city-wide urban agriculture conference.

Farmers Markets in Municipal Planning and Policy – Protected or Neglected, and to What Effect?

Amanda Edmonds – Wageningen University

Food has long been a key concern for local governments as part of ensuring residents' basic nutritional needs where affordably and safely met; markets were the earliest form of urban food distribution to serve this purpose and have been documented throughout history. Despite their popularity today as a local food system strategy, and their long history as a core land use in urban centers, it is unclear, due to lack of research, if public markets – and farmers markets in particular—have been codified through municipalities' planning and policy instruments, despite recommendations from many planning, public health, and sustainable food bodies for this type of inclusion. In contrast, policies addressing urban agriculture—another strategy for local food provisioning—have received significant attention in both scientific literature and popular media.

Municipalities play crucial roles in all types of markets including through regulating their land use and operations, if not directly operating markets (as they did, almost universally, in the past). The lack of presence/protection for markets in municipal policy and planning instruments (as has been found through this research thus far) potentially puts markets at risk, especially amidst competition for urban land uses, rising land values and competing municipal priorities. The history of markets includes, throughout many eras, closures and forced moves when public or private land was deemed more valuable for another use.

This presentation will share research on whether and how farmers markets have been codified into municipal law and planning in North America and Europe, focusing on comparative studies in small and medium-sized cities in the United States and the United Kingdom. This research also examines how different governmental structures afford different levels of authority to the municipality when regulating or legislating farmers' markets.

Urban Farmland Tenure and Policy Models: Opportunities, Barriers, and Ways Forward for Securing Land

Andrea Franchini – University of Maryland Extension; Margaret Todd – University of Maryland-Agriculture Education Law Initiative

Urban agriculture in Maryland is often thought of as an agricultural practice in Baltimore or in and around Washington D.C. Urban agriculture has the potential to create local food systems and economic opportunities in urbanized areas across Maryland, yet land access and long-term land tenure is one of the top barriers to urban farmer success. This can be explained by several factors including: the exchange value of vacant land often trumps its use value for food production, limiting land access as municipalities hold land for more profitable use; confusion navigating local bureaucracy and regulations, zoning policies, and permissible agriculture uses in and around urban areas; and lack of coordinated support for urban agriculture across the state and even within jurisdictions.

Compounding the barrier to long-term land tenure, urban farmers often invest in alternative growing methods and infrastructure, adding to start-up costs if the infrastructure is not allowed or accessible. Urban farmers must weigh the initial investment in the land with the potential of losing access to land if tenure is short term or is contingent on sale for development.

This study broadly assessed local governments' interest in promoting agriculture in urbanized areas using surveys asking about interest, barriers, and needs of local jurisdictions to support farming in cities and towns across Maryland. Concurrently survey were distributed and interviews conducted with farmers and agricultural service providers across the country to look at trends and models for accessing and securing farmland tenure. The purpose of this study and preliminary data is to educate jurisdictions on their options for supporting urban farmland tenure by improving knowledge base for governance; supporting efforts for coordination among jurisdictions and decision makers; and increasing understanding of processes and options for securing urban farmland and production space for CEA in urban areas.

Exploring the Use of Land Evaluation and Site Assessment (LESA) for Urban and Peri-Urban Agriculture

John Jones – Virginia Commonwealth University; Jeff Everett – Rutgers University

A major challenge facing urban and urban-edge agriculture is identifying suitable land, with the failure to do so leading to significant barriers to success beyond the short-term. Land Evaluation and Site Assessment (LESA) was developed by the U.S. Department of Agriculture in 1981 as an integrated assessment of the suitability of a particular site for continued agricultural use. Deployed in 26 states, several Canadian provinces and hundreds of localities, the system can be customized by the inclusion and scoring/weighting of certain factors deemed of importance to the local agricultural community such as soil quality and presence of on-farm infrastructure. In recent decades, LESA has been paired with Geographic Information Systems to systematically evaluate agricultural land for inclusion in farmland preservation easement programs; as part of planning and zoning processes to determine whether non-agricultural development is appropriate on certain lands; and as part of valuation processes for farmland assessment/use value taxation. Despite its myriad of applications, LESA was historically designed for use for traditional agricultural operations in rural spaces, meaning that urban and peri-urban spaces often scored poorly.

This presentation explores the adaptation of the LESA technique for intensive urban and peri-urban agriculture. This adaptation is grounded in an on-going collaboration between the research team, the New Jersey Department of Agriculture, and two local governments in the Commonwealth of Virginia to create a localized LESA dataset for each jurisdiction. Through a participatory process with the partner governments, several different models with differing sets of variables emerged as potential adaptations to traditional LESA. Public agencies, land trusts, farmers, potential farmers, and consumers could use this adapted technique to develop more sustainable and equitable land use planning for their urban food system.

Track 7 – Training Urban Farmers

Thursday, June 13, 10:30 am – Noon

Starting a Sustainable Vegetable Farm: Online Education for Beginning Specialty Crop Growers

Tricia Jenkins, Claire Barnhart, Eleni Pliakoni, Cary Rivard – Kansas State University

Growing Growers is a Kansas State University Extension program that trains new sustainable specialty crop growers in the Kansas City region through apprenticeships and an annual workshop series. Program evaluation and a grower needs assessment in Kansas City revealed that new and existing farmers need more curriculum about starting and managing a farm, including business and marketing skills. To expand the curriculum offered through Growing Growers and extend the program's reach beyond the Kansas City area, an online and asynchronous course was developed as a non-credit class through the K-State Global Campus and piloted in 2023 with Growing Growers apprentices. The self-paced course was designed to augment knowledge gained through in-person apprenticeships and farm tours. Over 16 weeks, apprentices received 12 modules covering propagation, production

practices, food safety, marketing, farm management, and farm start-up. Each module contained on-demand lectures and videos provided by Kansas State University faculty, Extension specialists, and 10 local growers. Discussion boards for apprentices to connect. An in-person focus group was held with apprentices who were active online course participants to better understand how to improve learning and apprentice engagement. A discussion on how the course was developed, learner feedback, and creating a for-credit master's level option for the course will be discussed.

Urban Gardening for Building Capacity, Household Food Security, and Reducing Greenhouse Gas Emission

Lila Karki, Prem Bhandari – University of Maryland Eastern Shore

By 2050, 87.4% of the United States population is projected to live in urban areas, presenting a need to increase the role of urban agriculture (UAG) for food/nutrition security, conserve biodiversity, and promote a green economy. UAG can reduce the need to import fresh foods, thereby reducing transportation-related emissions and increasing resilience to climate change. The University of Maryland Eastern Shore Extension launched a project to educate small and minority farmers on the socioeconomic and environmental impacts of UAG. Most project participants were Bhutanese Americans (64%) from the greater Baltimore area with ethnic cultural practices and unique food habits. The Extension model consisted of identifying a hierarchy of farming needs; locating and making sustainable use of limited resources; practicing interactive needs-based learning with peer-to-peer and specialists; promoting the adoption of risk mitigating techniques such as crop diversification, rainwater harvesting, composting, mixed cropping, multi-tier production systems, and shared-use of production inputs; and developing a data-driven farm production plan for ethnic and specialty vegetables, fruits, and medicinal herbs; and marketing produce. The findings showed that 100% of participating farmers reported increased production and productivity, followed by increased consumption of fresh vegetables (91%), and enhanced knowledge and skills about agricultural production, processing, and marketing (99%). Additionally, crop diversification practice expanded to an average of 20 specialty, medicinal, and ethnic crops grown on an average of 1.2 acres. Moreover, participants benefited technically and socio-economically, reporting a total of \$14,200 in fresh produce sales as an economic benefit through direct and indirect marketing of vegetables in 2022. The project applied the concept of the von Thünen model of agricultural land use and the circular bio-economic model to measure the socio-economic and environmental impacts of UAG in the changing agricultural context.

Capacity Building in Urban Food Systems Through Professional Development

Cary Rivard, Tricia Jenkins, Jeremy Cowan, Eleni Pliakoni – Kansas State University

The complex interactions that occur within the food system require a new generation of agricultural educators with a diverse skillset and a keen interest in collaborative partnerships. The Urban Food Systems (UFS) graduate program curriculum at Kansas State University was developed with assistance from key UFS leaders and students learn directly from UFS practitioners in several venues. In 2019, graduate students worked with faculty to develop a successful NCR-SARE PDP project. The goal of this project was to provide agricultural educators (Extension, non-for-profits, NGOs, K-12, and community college instructors) with opportunities to diversify their professional skills and learn directly from urban ag professionals. The students provided leadership in the delivery of the Gaining Ground

webinar series, which utilized urban farmers and other practitioners as experts. Webinar topics were chosen based on survey data collected from the targeted audience and included subjects such as farm financing and bookkeeping, food hubs, zoning, racial equity, marketing, and aquaponics. Across the 10 webinars, there were over 1,200 registrants and 826 participants. The students also developed and hosted an online food policy council workshop called mobilizing community food systems in the era of Covid-19 and the struggle for racial equity. 65% of participants had previously worked with food policy councils whereas 85% plan to after the workshop. The project also provided and/or facilitated 97 scholarships for urban agriculture educators to attend the Urban Food Systems Symposium in 2020 and 2022. The symposium brings together urban agriculture professionals from across the United States to discuss important issues related to the discipline. Urban agriculture educators are a diverse group with a variety of needs for training to better support urban farmers and other practitioners. This presentation will discuss the project objectives and outcomes.

Specialty Crop Manager Pilot Training Program to Meet the Demand for Agricultural Managers
Michelle Wallace – Central State University – Extension; Walt Bonham, North End Community Improvement Collaborative

According to the United States Bureau of Labor Statistics, there are an estimated 922,900 jobs for agricultural managers. While many of these opportunities are not focused on specialty crops, a gap exists for trained specialty crop professionals to meet the labor needs of the growing urban agriculture industry. While large farms depend on machinery to overcome labor shortages, this type of investment for small farms is cost prohibitive. Small urban farms depend on trained labor. With the growing interest in urban sustainable production, there is a need for programs that train individuals in specialty crop production and sales.

In 2022, the North End Community Improvement Collaborative (NECIC) contacted Central State University Extension and the Richland Correctional Institution with a proposal to develop an inmate run farm to serve as a pilot program to train inmates in specialty crop production. Their goal was two-fold; provide job skill training to inmates in fields to help transition them into society; and fill the gap for trained specialty crop growers. NECIC has a farm incubator program that comprises of several smaller urban farms. It also manages a food distribution hub that markets, collects, sorts, and distributes produce to area buyers.

In 2023, NECIC established a relationship with the Richland Correctional Institute to rent the 63-acre land adjacent to the prison. A 1 ¼-acre parcel of land was mapped, fenced, and laid out for production with a group of inmates interested in learning specialty crop production. An NECIC farm mentor leads the group in day-to-day production while an educator from Central State University-Extension provides periodic hands-on training in areas of specialty crop production. The inmate growers by the end of the pilot year will each have around 1,000 hours of hands-on training and the produce sold through the RGO subsidizes the cost of the program.

Track 8 – Food Distribution Systems

Thursday, June 13, 10:30 am – Noon

Growing Food, Community, and Climate Resilience with Urban Food Forests and Community Gardens

Linda Appel Lipsius – Denver Urban Gardens; Jolon Clark – Denver Parks & Recreation; Ashley Williamson – The Giving Grove; Creighton Hofeditz – Denver Urban Garden

At a time when we're grappling with record-high heat, food insecurity, and loss of urban green space, many modern communities are embracing one of the most ancient forms of land stewardship – food forests. Food forests lead to healthier environments and people. They enrich the soil, regenerate the land, reduce the heat island effect, attract pollinators, conserve resources and help restore healthy ecosystems – all while producing accessible, healthy food. In addition, food forests enhance food access, stimulate community vitality, provide educational opportunities and engage community members around a shared experience in nature, which has been proven to positively impact mental and physical health.

Explore the benefits, challenges, and strategies behind urban food forests and share real-world examples – both successes and failures – to demonstrate why food forests are a crucial part of urban planning and how food forests in cities across the country can become a reality. From community support and engagement to land acquisition, the right community partnerships, funding and forest design, attendees will learn what it takes to bring urban food forests into their communities and why they should be a top priority.

NEW Food Access Map: Accessing Local Food Sources

Patrick Nehring – University of Wisconsin-Madison Extension

Where can you find food locally? Do all areas of the community have adequate access to food? These questions were answered by the University of Wisconsin-Madison Extension in Brown, Kewaunee, Manitowoc, and Door Counties for the Green Bay area through a research project and the resulting NEW Food Access Map.

The map contains the locations where food is distributed to the consumer. It provides current locations and operational details for grocery stores, ethnic grocery stores, farmers markets, community gardens, food pantries, meal sites, and stores that accept Electronic Benefits Transfer (EBT) card payments. EBT cards are the means used by those with limited income to purchase food through the Supplemental Nutrition Assistance Program (SNAP) program. EBT is accepted at a variety of stores, including convenience stores, dollar stores, grocery stores, specialty food stores, and other stores that sell food to bake at home. The NEW Food Access Map was developed to enable consumers to get directions, hours of operation, website, and other information.

The map is maintained by UW-Madison Extension with partners and volunteers from the communities ensuring the information is current and accurate. This has enabled Extension to accurately show where

there is limited access to food. Some of the data contained on the NEW Food Access Map is available through state and national sources. However, the data from these sources is less accurate than local knowledge, released months or years after it is collected, or is provided in a format that is not user friendly for the local food consumer. The NEW Food Access Map addresses these issues by providing all consumer distribution points, being continually updated by local observers, and illustrating the consumer food distribution system in a format that can provide travel directions on a computer or smartphone.

Using Neighborhood Grocery Stores within Food Apartheid to Change the Existing Charity Narrative

Tom Phillips – StarkFresh

Stark County, like most urban environments, has cities with areas of inequities and neglect. Many times, these areas are also food apartheid, with no affordable, high-quality groceries available to that neighborhood's residents. Over the past 10 years, StarkFresh has been developing effective retail food solutions, first with our Mobile Grocery Market, and more recently with neighborhood-sized grocery stores located in food apartheid. Learn how scalable solutions to handle operational issues that plague most small-scale healthy retail food initiatives have been created and see how visible and unexpected obstacles to open these stores have been overcome. Hear about the journey to provide healthy food access by starting with urban agriculture initiatives and eventually transforming into retail food programming. Learn how a mixture of tenacity, community buy-in, and rewriting the status-quo narrative allowed them to open their first and second brick-and-mortar grocery store locations within two different cities in Stark County, Ohio in 2020 and 2023. Learn how they're changing local thoughts on the effectiveness of charity and how this change in thought and giving is crucial to creating a real change in hunger within the community.

Farm to School Racial and Social Equity: Investing in Historically Underserved Producers

Jessica Guffey Calkins – University of Wisconsin-Madison Extension

Farm to school procurement has immense potential to support economic, environmental, and racial justice, while also respecting workers and educators, animal welfare, and student health. By prioritizing values-aligned school meals, school districts can play a critical role in the positive transformation of the food system. To do this, more information is needed about food producers' experiences in the farm to school market, as relatively few historically underserved producers have access to farm to school contracts.

This study sought to better understand how Wisconsin's historically underserved producers are participating in farm to school procurement, with a focus on identifying needs and opportunities for supporting increased accessibility and profitability of engaging in school food supply chains. Wisconsin producers who identified as historically underserved (including beginning farmers, socially disadvantaged farmers, veterans, and limited resource farmers) engaged in a statewide survey and focus group sessions in spring 2023. Through this research, four main categories of barriers to accessing farm to school markets were identified: knowledge, price, seasonality and infrastructure, and food safety. The research team developed a report (*Advancing Racial and Social Equity in Wisconsin Farm to School: Strategies for Investing in Historically Underserved Producers*) which includes in-

depth information about each of the categories of barriers. The report also provides detailed recommendations compiled for three stakeholder groups: policymakers, schools, and support organizations.

By providing a deeper understanding of the circumstances of historically underserved producers, and corresponding recommendations for change, this study seeks to produce actionable results across the state. This project is a collaborative effort between the University of Wisconsin-Madison School of Human Ecology's Civil Society and Community Research Department and Center for Community and Nonprofit Studies, the University of Wisconsin-Madison Extension Community Food Systems Program, and REAP Food Group.

Track 9 – Nutrition, Human Health, and Food Security

Thursday, June 13, 10:30 am – Noon

Mental Health Training Builds Resilience in Community Garden Programs

Whitney Elmore – University of Florida

Nobody is immune to mental health crises including community gardeners and volunteers. Everyone will be faced with depression, anxiety, mental health crises, and/or substance use issues. There are often few to no interventions available, especially early in a mental health crisis. The impacts of mental health crisis can affect the individual's health, their family's well-being, and strain community and emergency resources, leading to an inability to respond, withstand, and recover from adverse events. Globally, the impact of mental health crises can create considerable negative effects on food supplies, the economy, and ultimately human health. Immediate assistance is critical in helping prevent mental health issues from escalating. In most communities, getting mental health assistance comes with multiple barriers. From financial barriers, availability, and even stigma, mental health is an underserved area in most communities. An untapped wealth of mental health assistance lies within community gardens and those volunteering in those spaces. Typically, mental health assistance training is not a consideration for those frequenting the gardens. Community gardens tend to attract those either suffering from a mental health issue or those looking to spend their time helping others, as many are in lower income communities. When faced with an individual in crisis, a plan of action makes offering support safer, more effective, and more comfortable for all. The Mental Health First Aid Program trains participants how to identify, understand and respond to those in need. This program trains gardeners about the purpose of the program, outlines a simple plan of action, and offers participants a certificate in Mental Health First Aid. The goal is to make MHFA just as common as CPR and First-Aid. Mental Health First Aid saves lives, bridges the urban/rural divide, makes work and volunteering within the community safer, and more cost efficient.

Utilizing a Food Insecurity Index to Promote Food Access in the Greater Trenton Area of New Jersey

Joan Healy – Rutgers Cooperative Extension

Post-COVID-19 effects and inflation have resulted in higher rates of food insecurity across the United States, including in New Jersey's capital city of Trenton, and the surrounding areas of Mercer County. To more effectively and efficiently deploy resources to address food insecurity, Rutgers Cooperative Extension Department of Family and Community Health Sciences collaborated with partners to create a Mercer County Food Insecurity Index. The lead partner, Trenton Health Team, ran the data analytics to create the tool, which maps food insecurity index scores for the county. Food insecurity index scores, by census block groups, are a composite of nine demographic and socioeconomic indicators that reflect people's ability to purchase and access food. Layering in differential characteristics of these block groups (e.g., demographics, SNAP utilization, vehicle access, etc.) on the food insecurity map, has helped guide targeted action plans, and the deployment of resources, to improve food access in high food insecurity areas in the county. Initiatives undertaken include using the data/map to help guide organizations who provide free food resources (e.g., Meals on Wheels, a mobile food pantry, a mobile soup kitchen, etc.) to target providing healthy food to neighborhoods that have higher food insecurity. The data/map are also being used to assist SNAP enrollment organizations to deploy their SNAP enrollers to neighborhoods where poverty is high and SNAP utilization is low.

Using Gardens and Produce to Reach All Communities in Our County

Nanette Neal, Margaret Jenkins, Kelly Royalty, Becky Fiscus, Meghan Burdsall, & Deborah Garner – The Ohio State University

The purpose of the garden was to educate the community about gardening. Throughout the growing season, articles with photos appeared in the OSU Extension Clermont County eNewsletter (1,981 subscribers). Article topics included starting a straw bale garden, harvested vegetables, pollinators and pests observed, weather conditions, and using upcycled materials. Information was distributed at the fair, garden, community clubs, and Extension office. Master Gardener Volunteers (MGV) answered questions at their booth during the fair. Information about the advantages of planting herbs and flowers with vegetables was included in the weekly eNewsletter. Handouts at the MGV fair display described specific vegetables, herbs, and flowers that were planted together to attract pollinators or deter pests. There was signage at the garden to identify plants. The demonstration project brought new light to the MGV program within the community. The informational brochure and weekly articles in the eNewsletter highlighted MGV projects and donations.

Over 1,000 pounds of vegetables from the garden were donated to Extension programs, community food centers, and living complexes. The SNAP-Ed program utilized the donated produce throughout the growing season to introduce participants to healthy recipes. The FCS program used produce during the Dining with Diabetes program and as part of food preservation classes. During fair week, at least 250 people visited the MGV booth. Many fair visitors were aware of the garden through the eNewsletter. Some attendees indicated they wanted to try straw bale gardening and plan to encourage their children to try it as their next 4-H project. The vegetable basket demonstrated the

variety of vegetables that can be grown in straw bales. Fairgoers appreciated the vegetables that were available to take.

PLAZA Mobile Produce Market: Connecting Urban Farmers to Less Resourced Communities

Jennifer Parlin – University of Arizona; Kelly Royalty

Program participants have often communicated the need for more access to fresh local produce because much of Arizona has limited access specifically to fresh fruits and vegetables. To fulfill this need, the PLAZA Mobile Market program is being launched in one urban county and one rural county. A purchased refrigerated van will be used in both counties to transport produce to underserved populations. This will eliminate transportation issues, a known barrier of purchasing local produce by less resourced populations. In the urban setting, small urban farmers that often have less resources themselves, will supply the produce and be paid fair market value by Cooperative Extension. Cooperative Extension will take the mobile market to partner sites and sell the produce at a reduced rate. Participants will be able to use nutrition assistance benefits for payment. All markets will be accompanied by education on the available produce and recipes. Research shows mobile markets, coupled with taste testing events, have been shown to increase consumption of fruits and vegetables by less resourced participants. The session will include lessons learned while planning for the PLAZA Mobile Market program in an urban setting, community engagement results from both producers and end users prior to the launch of the program, initial results of the program, and next steps.

Track 10 – Production Systems, Challenges, and Protected Environments

Thursday, June 13, 10:30 am – Noon

A Collaborative Multi-Disciplinary Design Studio Exploring Urban Building-Integrated Agriculture

Gwynne Mhuireach – University of Oregon

With an uncertain climate future ahead, urban agriculture is increasingly becoming critical to ensure nutritional security, community resilience, and equitable access to healthy foods for growing urban populations. However, the lack of open space and surging land prices present a constraint to the establishment of new urban farms and gardens. A possible solution and a way to establish new agricultural sites is to produce food on and in buildings using methods like rooftop farming, green facades, and controlled environment agriculture. Further co-benefits can be gained by creating a closed-loop system where building outputs are recycled as inputs to the agricultural system, and agricultural outputs ultimately provide inputs to building systems and users. Despite the many potential benefits of such building-integrated agriculture (BIA), examples of commercial BIA food production remain scarce, due to a lack of qualified experts and a research base since BIA requires multi-disciplinary expertise, as well as other obstacles.

University of Oregon, in partnership with Oregon State University and Washington State University, offered a multi-disciplinary design studio to engage architecture, landscape architecture, and

horticulture students in identifying and proposing solutions to critical challenges, barriers, benefits, and opportunities. The project was situated as an adaptive re-use of the barge fabrication building at Zidell Yards in Portland, Oregon. The site has a century-long history as an industrial ship-breaking facility, thus this last remaining large parcel fronting the Willamette River suffers from soil contamination, which makes it unsuitable for traditional ground-based urban agriculture. Extension professionals, practicing architects, horticultural experts, and marketing/production specialists were brought together to provide guest lectures and critiques of students' work. Learn about student-generated BIA designs that challenge conventional architectural and agricultural paradigms, offer key social goods and ecosystem services, and reduce building and food system carbon footprints.

Improving Soil Health Using Beneficial Microbiomes in Urban Agriculture

Yejin Son – Cornell University

Urban agriculture (UA) is an emerging food production system in which farmers grow crops within cities. However, many urban farmers face challenges with their compost soils, including poor soil structure and low nutrient availability. This study aimed to utilize beneficial microbes, such as arbuscular mycorrhizal fungi (AMF) and phosphorus solubilizing bacteria (PSB), to address soil aggregation and biological phosphorus (P) cycling in UA soils while also assisting urban farmers in generating higher economic returns. Bush Champion II Hybrid Tomatoes (an indeterminate tomato cultivar) were cultivated at three organic urban farms in New York City in 2022 under four different treatments: 1) control tomatoes, which were not treated with PSB or AMF; 2) tomatoes treated with PSB; 3) tomatoes treated with AMF; and 4) tomatoes treated with PSB and AMF. The hypothesis posited that the positive interactions of PSB and AMF would synergistically enhance soil phosphorus cycling and carbon accumulation and, thereby, promote plant growth and nutrition. The findings indicate the combined application of AMF and PSB increased the overall abundance of soil microbiomes, as measured by flow cytometry. There was also an increase in the production of soil-aggregating proteins and soil acid phosphatase activity. Additionally, the nutrient uptake by tomatoes, including calcium (Ca), potassium (K), and phosphorus (P), was enhanced. Omics approaches using deep sequencing metagenomics and metaproteomics were also employed to generate meaningful insights into how AMF and PSB interacted with soil native microbial populations and defined soil microbiome functions. The findings offer novel insights into the characteristics and functions of soil microbiomes in UA soils. This knowledge will contribute to advancing the potential of beneficial microbes in enhancing food production within urban agriculture systems.

Shallow Geothermal Earth-to-Air Heat Exchange: Cooling and Heating for Sustainable Season Extension

Jaden Tatum, Timothy McDermott, Ajay Shah – The Ohio State University

Growing in high tunnels allows increased season extension for urban food production, and passively ventilated high tunnels and caterpillar tunnels are often a farmer's first step toward season extension. The next step to improve utility of high tunnels is to increase ventilation and heating capacity, which can be a high cost to growers. Additionally, the most common options for high tunnel heating are propane-fueled heaters that have high operation costs and counteract sustainability efforts.

One alternative that can provide both cooling capacity and heating at different parts of the year is a shallow geothermal earth-to-air heat exchanger (EAHX) that takes advantage of the soil's insulating properties at 3–6-foot depths. These systems have just one energy-consuming component, a fan that pulls fresh air through an underground tube where the air is tempered to be closer to the soil temperature. This research project has demonstrated that these EAHX systems can be installed on-farm for prices comparable to propane-powered heaters, retrofit to existing high tunnels and caterpillar tunnels, and provide impactful heating and cooling. In one on-farm installation in a 30- x 96-foot production high tunnel in Urbana, Ohio, it was found that the EAHX system provided a cooling capacity like a ¼-ton air conditioning system throughout the summer of 2023, bringing in air that was cooler than ventilation air alone. Through the beginning of fall 2023, the system provided heat equivalent to offset over 4 gallons/week of propane. The partner farmer reported that the EAHX system provided enough warmth to keep cherry tomatoes growing in the high tunnel through November 2023. This presentation will address lessons learned from three system installations, the benefits and costs of EAHX for season extension, and fostering fruitful on-farm research partnerships.

Pest Communities on High Tunnel Crops on Urban vs. Rural Farms and Effective Options for Management

Samantha Willden, Allison Zablah, Laura Ingwell – Purdue University

High tunnels provide many benefits to crop production, including crop protection and season extension. However, these benefits also extend to pests, as high tunnels often support higher pest densities compared to the open-field. Pest issues are especially a concern on urban farms where recruitment and retention of natural enemies is low. Pest management is also a concern for winter crops where recommendations for pest management are scarce. Learn about some of the common crops and pests observed under high tunnels at farms along the rural to urban landscape gradient and recent research identifying effective pest management options on winter spinach. Aphids were the dominant pests present under high tunnels at all sites during each growing season, including winter production of leafy greens. Urban farms tended to have the highest aphid pressure and found lower spinach marketability when high densities of aphids were present. Several commercially available predators were tested against aphids in lab-simulated and field winter conditions, and the lacewing species *Chrysoperla carnea* performed the best and showed success at high tunnel farms. None of the biocontrol predators tested were significantly impacted by biopesticide sprays targeting aphids, indicating compatibility of these products with biocontrol agents. The shared results can inform the diversity of high tunnel growers of effective options for aphid management during winter.

Featured Posters/Lightning Sessions

Assessing the Role of U.S. Urban Forests on Food and Nutritional Access Under Climate Change

Alessandro Ossola and Pooja Singh – University of California Davis

Urban forests can mitigate the effects of global warming but also ensure the availability of nutritious foods and fresh produce across communities. However, the swift rise in global temperatures not only poses a threat to the existence of some urban forests but also to the provision of food-related

ecosystem services. These challenges are expected to intensify in areas most likely affected by climate change. Currently in the United States more than 1,500 tree urban species are planted for landscaping, with over 600 having one or more edible parts for humans; nuts, fruits, bark, leaves, flowers, pollen, and sap. While limited literature on a few tree crops exists their complete culinary and nutritional potential in creating edible forests across cities and towns remains largely unexplored. We conducted an analysis on the climate resilience and nutritional values of currently planted urban tree species in the United States by employing a comprehensive big data strategy and climate projections. Additionally, we assessed the climate suitability of potential new edible species that could be strategically planted to enhance food accessibility and security, particularly in food deserts. The project will culminate with compilation of key information into a database for urban farmers to provide nutritional values, edibility, palatability, uses, and taste of these species. The portal for climate-ready tree crops will aid urban farmers and foresters across over 700 U.S. cities and 17,000 towns with planning and growing climatically-ready urban food forests that ensure nutritional values, food sovereignty, and community resilience.

Lessons from One Year of Food Policy Council Activity in Flint & Genesee County, Michigan

Kelly McClelland – Michigan State University Extension; Samantha Farah – Crim Fitness Foundation; Athena McKay – Flint Innovative Solutions; Tony Vu – Flint Social Club

The Flint and Genesee County Food Policy Council is a network of food champions representing all sectors of the food system, whose mission is to develop a resilient and reliable local food system rooted in community engagement, collaboration and education in Genesee County, MI, which includes the city of Flint. The Flint and Genesee Food Policy Council is working toward a robust and sustainable local food system that provides all Genesee County residents with affordable and healthy food. This poster will highlight the history of organization around food issues in Flint and Genesee County; the opportunities that led to the current effort to organize a food policy council; council membership growth; and adaptation of the leadership, membership, and subcommittee structure since the current council's founding. Specifically, the council's funding structure, the impact of statewide resources and collaboration, and current challenges and potential paths forward will be shared. Presenters will include the council's current officers, which currently include three co-chairs and a secretary. These individuals represent various sectors of the local food system, to have more diverse representation in council activities and decision making.

At-Risk for Food Insecurity: Developing a Locally-Relevant Measure

Laura Vollmer and Lucy Diekmann – University of California Cooperative Extension; Cassandra Nguyen – University of California, Davis

Faced with growing demand for food assistance during the pandemic, leaders in Santa Clara County, California, the heart of Silicon Valley, turned to University of California Cooperative Extension for help understanding a crisis one county leader referred to as "acute on chronic." Cooperative Extension academics worked collaboratively with a broad set of stakeholders, including county partners, community organizations, nonprofit and government food providers, and other academic institutions to understand the long-term food insecurity landscape and generate a new measure, "at-risk for food insecurity" building on the Self-Sufficiency Standard. This measure provides much more granular

information, both geographically and demographically, and revealed stark disparities by race/ethnicity, household composition, and neighborhood, within one of the wealthiest counties in the United States. This poster will share background information on currently in-use food insecurity measures and how they compare with the at-risk for food insecurity measure and the results of our analysis. Viewers will see how “at-risk for food insecurity” can add to data about food insecurity and the need for food assistance, particularly in high cost of living places. The poster will also document how the county used this measure to develop and implement programmatic and policy priorities and how place-based food security estimates may be useful in other geographies.

Amaranth Greens as a Model for Nutrient-Dense, Culturally Preferred Produce in an Urban Setting

Tori Rosen, Dr. Ramu Govindasamy, Dr. Albert Ayeni, and Dr. Jim Simon – Rutgers University

Demand for culturally preferred leafy greens in the United States is rising rapidly due to the increased awareness among cultural groups about their culinary heritage and the desire for diverse and healthy diets. This demand is heightened when considering the disproportionate effects of food insecurity on minoritized ethnic populations. Health and nutrition of immigrant populations in the United States deteriorate with prolonged stay due to acculturation, as these communities exchange their traditional diets and cultural practices for American ones. Leafy green amaranth (*Amaranthus* spp.) is a crop of economic and nutritional importance among ethnic minority communities within the Northeastern United States and around the world. From 2010-2022, Rutgers researchers conducted consumer surveys along the Eastern United States identifying amaranth as a top 10 desired leafy green among Asian Indian, Chinese, and Mexican consumers, though it has limited market availability in the United States. It is also a well-known crop of cultural and nutritional importance within African Diaspora and Caribbean communities. Amaranth is a heat-loving and drought-tolerant crop that exhibits a strong resiliency to climate change and abiotic stress and has the potential to also supplement locally grown spinach in summer months, due to its similar flavor and nutrient density. Because of its weed-like growth, it adapts easily in urban and peri-urban settings that lack the resources of large-scale farms. Production is limited by a lack of consistent germplasm, standardized growing practices, and ultimately a lack of mainstream consumer awareness of this promising nutritious leafy green. Our research aims to increase the accessibility of these promising leafy greens within large immigrant communities and the greater mainstream population to promote culturally important foods and nutritionally focused food security.

Posters: Climate Change and Food Waste

Impact of Regenerative Agriculture on Mitigation Salt Stress in Tomato Cultivars Within Urban Miami

Luis Cendan and Dr. Amir Khoddamzadeh – Florida International University

Florida faces an environmentally concerning future as one of the states most vulnerable to sea level rise. This phenomenon could be an eminent threat to tomato cultivation, a crucial component of Florida's agricultural sector and a leading contributor to the nation's tomato production, especially in Miami-Dade County. However, regenerative agriculture (RA) techniques present an opportunity for mitigating the effects of saltwater intrusion, as they can enhance crop resistance to stresses and facilitate Na⁺ leaching out of soil biomes and improving crop yields. This research project aims to test

three RA techniques (cover cropping, green manure, and mycorrhizal inoculation) as ameliorating agents of salt stress in two tomato cultivars (*Solanum lycopersicum* cv. “Tasti-Lee” and *Solanum lycopersicum* cv. “Sanibel”). In three-gallon pots, three quantities of pigeon pea (*Cajanus cajan*) plants will be grown as cover crops until just prior to flowering (0 plants [control], two plants, and four plants). These pigeon peas will then be mulched into the soil as green manure, after which tomatoes will be transplanted into the pots. Following this, four sets of salinity treatments will be applied to tomatoes (0 [control], 2, 4, and 6‰ NaCl). Tomato phenotypic characteristics such as height, number of leaves, growth rate and plant health will be measured using Li-Cor (LI-600), SPAD, Greenseeker, and atLEAF. Nutrient uptake will be monitored via soil leachate analysis, and tomato crop quality will be assessed via antioxidant, sugar, lycopene, and acidity content. The results of this study will yield practical knowledge for the management of one of Florida’s most important crops threatened by climate change, as well as reveal the efficacy of affordable RA practices which could prove beneficial to working class farming communities and large-scale producers alike.

Role of UPA in Climate Change: A Review of GHG Emissions and Carbon Sequestration Methods *Abdulhakeem Al-Qubati – UNU-FLORES*

Global long-distance supply chains characterize our food sector, and local food production is gaining more interest in tackling environmental and food security problems. Urban and peri-urban (UPA) agriculture is one strategy to provide food and reduce cities’ carbon footprint.

This literature review collected scientific articles that estimated carbon sequestration (CS) and GHG emissions using Scopus and Web of Science databases. We focused our review on the methods estimating the contribution to climate change as measured by GHG emissions and CS. We categorized the results into the study’s location, UPA’s type, UPA’s scale, methods, and ecosystem services or disservices studied. Eighty-one studies were included. Two-thirds of case studies were in the global north. 56% of case studies were at the site scale, followed by 36% at the city scale. Open-field agriculture was the most studied UPA type (42%), followed by green roofs (18%), and greenhouses (18%).

Most studies focused on GHG (66 studies), and 22 focused on CS. Most studies used life cycle assessment to estimate GHG emissions (39 studies), followed by emission coefficients (18 studies), field measurements (7 studies), system dynamic modelling (1 study), building simulations (1 study), and an accounting model (1 study). For CS, the most used method was coefficient to estimate carbon stock (12 studies), followed by allometric equations (4 studies), modelling, remote sensing, and field measurements (1 study each).

As most studies focused on GHG emissions, more studies are needed to assess the benefits of UPA in CS. A better spatial definition of UPA should also be used to identify UPA areas that go beyond administrative definition. To better understand the UPA’s contribution to climate change, a spatiotemporal analysis is needed to understand the dynamics between land cover and climate. More studies with spatiotemporal analysis using modelling and remote sensing approaches for urban areas are needed.

Posters: Food System Policy and Advocacy

Mapping Support for Urban Agriculture in California

Jennifer Pihlak – Cal Poly Pomona

Urban agriculture (UA) can be done in a variety of ways such that it can be tailored to support the needs and goals of nearly any urban community (Azunre et al., 2019; Ilieva et al., 2022; Zasada, 2011). As the closest level of government to the community and the site of UA, local municipal governments are best situated to create policy that promotes or restricts development in line with the needs and values of the community (Ramos-Gerena, 2023). However, most support in the form of funding and technical assistance stems from state agencies. Despite the need for vertical alignment between these levels of government, actors remain siloed. The Urban Agriculture Incentive Zone Act (Urban Agriculture Incentive Zones, 2013) can be viewed as an attempt to align California state-level and local-level governance. For my master's thesis, I propose using sub-state level governments that enacted Urban Agriculture Incentive Zone ordinances as a population to examine how local ordinances interact with state support. To do this, I will perform a content analysis of municipal codes that influence UA of the sample entities. I will also create a database of state support for UA by compiling addresses of offices, grant awardees, and other forms of manifested support. I will use the toolkit of exploratory spatial data analysis to look for patterns. I expect to find correlations between types, and perhaps the number, of policy tools in place in local governments and particular types of state support. I believe this method of examining the interactions of state and local governments will be useful to policymakers, those in government and those on policy councils.

Increasing Local Food Consumption in K-12 Schools in South Dakota

Blake Pulse – South Dakota State University

Food insecurity is a persistent challenge in South Dakota, one in 11 children experience food insecurity, but children in tribal communities are disproportionately affected as one in four children are food insecure. School lunch programs are vital to food-insecure children because school-provided meals may be the only meal a child receives that day. Children who receive balanced nutritious meals perform better on standardized tests, display fewer behavioral issues, and have an enthusiasm for learning. Farm-to-School is a federally funded initiative that can be leveraged to incorporate fresh locally grown, fruits, vegetables, and proteins into school lunch programs. Small- to mid-sized local producers are challenged by South Dakotas short-growing season, lack of access to infrastructure for processing, and small volumes produced by individual farms. School districts face their own set of challenges working with tight budgets, awareness of local products, availability, and procurement. All these challenges are underscored by a lack of state support for the local food system. There is a disconnect between the food that is produced and served in South Dakotas school lunchrooms. This research uses data from interviews (n=50) and focus groups (n=6) with school lunch staff, administration, state agencies, organizations that support local foods and local fruit, vegetable, and protein producers. The grounded theory approach was used to identify relevant themes to describe the gaps and opportunities and develop policy and management recommendations to increase the consumption of local food in the K-12 school system in South Dakota.

Innovative Urban Ag Curriculum and Federal Partnership; Bridging Gaps, Building Community

Kyle Karnuta, Judson Reid, and Victoria Giarratano – Cornell Cooperative Extension

Federal acknowledgement of and investment in urban agriculture are essential for the long-term health and resiliency of our urban communities. As urban populations and public interest in food systems simultaneously grow, the United States Department of Agriculture (USDA) is increasing investment in urban agriculture programming. The 2018 Farm Bill authorized a pilot expansion of Farm Service Agency (FSA) service centers to select urban areas across the country. This pilot allows USDA agencies to address a history of discrimination and a lack of investment in urban production by targeting urban farmers for participation in FSA programs. To execute this pilot, the FSA is collaborating with three Land-Grant institutions: Virginia State University (project lead and 1890 land grant), Virginia Tech, and Cornell University. Given its prominent urban agriculture Extension program, Cornell Cooperative Extension will work with partners from each pilot city to develop training materials for USDA employees. This training seeks to improve knowledge of urban agriculture practices and motivations, enhance program participation and interactions between USDA and urban growers, and identify recommendations for federal program modifications. See an overview of the context informing this initiative, unique and innovative approaches to curriculum development, and a snapshot of the training curriculum itself. Learn insight into an innovative approach to food system policy advocacy partnerships between federal, state, and local urban stakeholders.

Improving Information Access via Prototype Design with Memphis Food Providers and Community Members

Angelica Carey – Innovate Memphis

This research was to determine how to design a resource and information aggregator that served providers and community members regarding available food assistance in Memphis, Tennessee including national programs. From prior engagements, local food assistance providers from community organizations identified a need for existing programmatic information and resources to be centrally located to better understand the current food and other service assistance available. Providers felt that having a unified source for local and federal programs would not only improve their organization's capacity via increased access to information and collaboration opportunities but would improve their personal knowledge to better serve their clients and offer streamlined accurate information for their client's journeys to finding help. Interviews and focus groups were conducted with over 20 providers and 30 community members to envision the resource aggregator as a functional tool serving various user-groups. Questions included how these user-groups conduct their information searches and what sources they rely on for information, then followed with open recommendations for design and content regarding the creation of an online information aggregator. Results from thematic analysis determined initial site construction and were presented at subsequent in-person and virtual feedback sessions with the hired designer in attendance. Feedback from these sessions was integrated into the final site draft and catalogued for further site iterations in long-stage development. Community member feedback was especially important for creating a website that seemed trustworthy, easy to understand, welcoming, and directional by incorporating a food finder mapping application. Due to the nature of this qualitative work, recommendations outside of the scope of the website were developed into a policy document and a list of best practices shared amongst service providers. Continuous

engagement with organizations is underway to determine a long-term strategy for the Memphis Food Finder site development, launch, and maintenance.

Urban Agriculture Incentive Zones: Assessing the Viability of California’s AB551

Belinda Ramírez – Stanford University

In 2014, after years of advocacy, California implemented Assembly Bill 551—known as the Urban Agriculture Incentive Zones Act (UAIZ)—which aims to encourage urban agricultural initiatives by offering a significant property tax reduction to landowners in metropolitan areas who agree to put their vacant land to agriculture use. Although this is a statewide bill, cities and counties must first create urban agriculture incentive zones before local and aspiring producers and landowners can take advantage of such opportunities. In the last 10 years since its implementation, around a dozen cities and counties in the state have adopted UAIZ, including Los Angeles, San Diego, San Francisco, Sacramento, San Juan Capistrano, Long Beach, and San José. At first heralded as a brilliant solution to the issue of land access for urban farmers, over time UAIZ has proven to be less helpful than initially expected. The tax incentive offered to landowners—changing the property tax rate from residential zoning to agricultural—does not seem to be enticing enough to compel them to tie up their vacant parcels as community gardens or urban farms. Parcel owners would rather their plots remain empty and open to the possibility for more capital-accruing development opportunities. As such, participation in UAIZ is incredibly low and even nonexistent in some cities and counties. Learn the potential for UAIZ to serve as a catalyst for healthier and local urban foodways, but also assess the deep challenges that arise when using private property and capital-driven frameworks for making structural change. Besides cultural change, a deeper engagement with both incentives and penalties to work around entrenched interests steeped in ideologies of development and individualism is needed. Only then can we move toward productive urban food systems.

Posters: Production Systems, Challenges, and Growing in Protected Environments

NURTURE KG - Navigating Urban Resilience Through Urban Food Ecosystems Using Knowledge Graphs

Aryan Dalal and Handey Küçük McGinty - Kansas State University-Manhattan; Majid Jaber-Douraki and Eleni Pliakoni – Kansas State University-Olathe

The escalating demand for urban agriculture is increasingly evident on a global scale, particularly in the United States, where a decline in available farmland is met with a parallel surge in population growth. Recognizing the heightened importance of urban agriculture, which involves the practice of cultivating, processing, and distributing food in or around urban areas, is crucial. There is also a critical need to delve into the complexities of agricultural data. This unstructured data could be represented by using mappings that help organize the data and uncover relationships among the different agricultural elements using knowledge graphs. A knowledge graph serves as a structured depiction of knowledge, encapsulating elements such as fruit/vegetable/food products, their attributes such as origin and type, and relationships within a graph framework. This organizational framework provides a means to

enhance comprehension by presenting information in a graph format, fostering a nuanced and contextual understanding of the intricate relationships among diverse elements. This mapping out of data using knowledge graphs allows using the structured information for various advanced applications using machine learning and artificial Intelligence which could in turn lead to aid in improving urban agriculture. We will present an initial schema for the Urban Agricultural Systems knowledge graph being created as a part of K- State's Development of Resilient Urban Food Systems Initiative that ensures food security in the face of climate change. With this knowledge graph, we aim to create an infrastructure for better representation, standardization, and analysis of urban agriculture data. We will use knowledge acquisition and representation methodology (KNARM) while building our knowledge graph. This approach is intended to result in a prepared knowledge graph that can be readily applied for downstream applications, including machine learning algorithms and natural language processing applications.

Shredded Cardboard Mulch Reduces Weed Pressure and Irrigation Needs for Twin Cities Urban Gardens

Morgan Smith – University of Minnesota

Mulching is utilized by urban growers to build soil health, mitigate weed pressure, and reduce water use. Despite these benefits, urban growers in the Twin Cities (Minnesota) have shared that many mulching materials have become too expensive to purchase and transport to their farms and gardens. During the COVID-19 pandemic, the Urban Farm and Garden Alliance in St. Paul, identified residential cardboard waste from increasing home delivery as a potential mulch material. The objectives of this community-based participatory research project are to assess the impacts of shredded cardboard mulch on weed density and biomass, soil moisture, and soil carbon and nitrogen cycling; and build shared knowledge about mulching with community gardeners.

This presentation focuses on the first objective, for which research plots have been established at the University of Minnesota Agricultural Experiment Station (MAES) in St. Paul. Collard greens, strawberries, and dragon tongue beans under three mulch treatments: shredded cardboard, straw, and no mulch (control), and each mulch-crop treatment was replicated four times. To assess the impacts of the mulch treatments, crop yield, quality, and marketability; weed biomass; soil moisture and temperature; and soil physical and chemical properties were measured.

Preliminary data following the first year of this two-year study suggests that while there are no significant differences in yield between mulch treatments, shredded cardboard significantly decreases weed pressure and increases soil carbon compared to straw mulch and bare soil. Furthermore, soil moisture remained stable longer under both shredded cardboard and straw treatments and significantly reduced diurnal temperature fluctuations when compared to bare soil. These results will continue to inform the development of activities to build shared knowledge about mulching with growers (objective two) and highlight the importance of mulch as one strategy for growers to adapt to more frequent and severe droughts under climate change in Minnesota.

Posters: Involving Youth in Urban Ag

Minority Youth Perspectives on Sustainable Agriculture Through Experiential Learning Opportunities

Charles Carpenter and Jeremy Cowan – Kansas State University

Urban minority youth have little exposure to sustainable vegetable production and therefore have little understanding of the potential for and benefits of growing vegetables in urban environments. To combat this knowledge discrepancy, the Diversity Programs Office (DPO) at Kansas State has hosted Junior MANRRS (Minorities in Agriculture, Natural Resources, and Related Sciences) groups since 2003 to expose them to different facets in agriculture and provide students with hands-on/experiential learning opportunities. During the summer of 2023, two Junior MANRRS organizations (KSU Switzer-Nicodemus education camp and High Aspirations) were hosted by the DPO in partnership with the Willow Lake Student farm. This study seeks to evaluate the impact of different hands-on activities for student learning outcomes regarding sustainability, urban farming, and agricultural knowledge. In total, 51 minority youth participated (age 7 - 16) during both summer camps. The activities were designed to introduce minority and urban youth participants to small-scale, sustainable vegetable production to improve their awareness, understanding, and attitudes toward urban crop production. Participants completed pre- and post-event assessments to evaluate changes in their perspectives throughout the program. The instruments included four questions (pre-) and (post-) questions presented in a Likert-scale and one open-ended question. Data was analyzed and compared to evaluate student learning outcomes from the programs. The results indicated that the duration of the camp may have had an impact on students' responses and learning outcomes.

Youth Cultivating Change with the Food Literacy Project in Louisville, Kentucky

Grace Mican, Leticia Campbell, Gabriella Hohman & Youth Community Agriculture Program Crew Member – The Food Literacy Project

Youth Community Agriculture Program (YCAP) participants with the Food Literacy Project (FLP) will present on the importance of youth engaging in the meaningful work of growing food, feeding their community, developing leadership and culinary skills, and learning about inequities within food systems. During their paid employment with the Food Literacy Project, YCAP crew members connect with food justice leaders, community members, and policy makers; visit urban farms, homesteads, gardens, farmers markets, and grocery stores; and distribute approximately 2,000 pounds of youth-grown produce to the community. YCAP crew members develop their leadership skills while engaging 3rd-5th graders and their families in gardening and seasonal cooking activities through FLP's Field-to-Fork (F2F) after school program. The YCAP crew brings together different generations, serving as a bridge between older and younger folks as teachers and role models.

Applying the Youth-Adult partnership model rooted in Social Justice Youth Development, FLP supports YCAPers as they activate their power, develop critical consciousness, and organize toward the changes they want to see in their communities. Each season, crew members take on a Youth Participatory Action Research project, digging deeply into a topic of their choosing that relates to food systems, urban farming practices, the role of youth in food justice work, and opportunities for youth

development. The findings of their research are shared with community members through canvassing, crew-hosted gatherings and discussion panels, and during their participation in food systems events and meetings.

Learn how impactful their experiences have been while working on an urban farm, engaging F2F participants, and taking on research to support the development of the FoodVision 2030, the multi-year strategic plan for food justice in Louisville, Kentucky.

Posters: Planning, Community, and Economic Development

Ag in the Community

Nanette Neal and Trevor Corboy – The Ohio State University

Agriculture and community development go hand in hand with the increasing urban and rural interface in Southwest Ohio. Addressing the needs of agriculture and the community and how they work together to provide the necessary resources for everyday life is essential. Southwest Ohio has a diverse audience that attends the county fair and other community educational events: rural, urban, and suburban. The area and surrounding counties continue to experience economic growth, so education on rural and urban aspects of agriculture is critical. Educating the audience through poster presentations (Ag in the Community) was created with facts from United States Department of Agriculture statistics, county statistics, and various commodity organizations to educate the public on agriculture and community development. Each poster has a QR code or barcode, to be scanned with a smart device, which is linked to online digital media for data collection. The audience targeted were the public and exhibitors who attended the county fair and other events.

The results included over 400 viewed QR codes. Fair attendance was approximately 100,000 people who could have viewed the educational materials but not viewed them through the QR code. Posters were printed in color on 11"x17" paper and laminated before being displayed around the fairgrounds at designated locations according to their topic (i.e., milk statistics in dairy cattle barns). The results of the Ag in the Community posters were twofold: 1) educate the public on types of agriculture and community development items in our communities and 2) gather contact data for our newsletter and digital newsletter in conjunction to find out if a participant knows about Extension or has ever used Extension's services.

Urban Metabolism of ASEAN Night Markets Based on Biological Principles

Maria Villaseca – The Ohio State University

In urban metabolism, attaining sustainability includes viewing urban areas as organisms and manipulating urban stock flows from linear to circular systems to mimic natural ecosystems. Thus, quantitative studies such as material flow analyses are common but criticized as excluding of non-quantifiable factors like culture. This study sees urban areas as biological organisms and aims to

defend it through a constructive analysis based on ethnographic data collected. Here, ASEAN Night Markets (ASM) are seen as microcosms of complex urban areas. The concept of urban areas as living organisms is explored by contextualizing stock flows in Night Markets (NM) of Bangkok (Thailand), Davao (Philippines), and Ho Chi Min City (Vietnam) parallel to biological principles of metabolic exchange. In biology, metabolism is the molecular exchange patterns occurring within organisms to sustain life. The discourse includes epistemological correlations of biological macromolecules to urban stocks, comparisons of adenosine triphosphate (ATP) production to economic activity in ASMs, and commonalities in factors that sustain the organism and the ASMs. The abduction is that night markets are stem cells of cities, where non-quantifiable factors such as culture and policy are nucleic acids that carry instruction molding its spatiotemporal configurations. The findings expound on the impact of the paradigm to the development of urban areas.

Cut-and-Come-Again Lettuce Production: Lessons Learned from Research in Urban Production Systems

Leigh Whittinghill – Connecticut Agricultural Experiment Station; Christine Jackson – UF/IFAS Extension; Pradip Poudel – Pennsylvania State University

Cut-and-come-again harvesting is a technique used by small and urban greens producers where multiple harvests are taken from a single planting of the crop. Greens are especially suited to this harvesting technique where outer leaves are removed, and the inner growing center of the plant is left intact. Leaf lettuce can be harvested in this way by cutting the plants about 2.5 cm above the soil surface after about 30 days, then again, every one to two weeks depending on weather. Research to support nutrient management over multiple harvests to maintain yields and crop quality is still lacking. Two experiments were performed at the Kentucky State University Harold R. Benson Research and Demonstration Farm using cut-and-come-again lettuce production in three urban agriculture production systems; raised beds, small plastic pool containers, and green roof platforms. These projects also used several nutrient management strategies using organic and conventional fertilizers and compost. Following nutrient recommendations for lettuce production in Kentucky, significant drops in lettuce yields were seen after the first two to three harvests from a planting, suggesting that additional fertilizer applications would be needed to maintain yields through more harvests. Several other observations suggest important areas of research to maximize yields in this production system. These included necessary adjustments in cut height as some lettuce variety stems grew larger than the 2.5 cm above the soil surface. Other varieties stayed very low to the soil surface, increasing the labor needed to cut all the lettuce in the mix being grown. Further observations about regrowth and the number of possible harvests suggest areas of exploration including the maximum number of harvests possible from a single planting, and optimal planting times to avoid germination issues, and ways to reduce lettuce plant loss due to water stress.

Harmonizing New Jersey Preservation Policies for Conservation Community Development

Alex Rivera – Kean University; Meredith Taylor – Rutgers University; Jeff Everett - Rutgers University

New Jersey officials have competing economic, social, and environmental policy objectives to balance, particularly in divested, urbanized areas with minoritized people. Desirable land uses and intensity is at the core of competing policy considerations. New Jersey has a history of using land preservation to

achieve policy objectives important to wealthy white landowners, enhancing the desirability of their communities and entrenching land-based wealth. While critical environmental, agricultural, and recreational policy objectives are achieved through New Jersey's current land preservation programs, the prevailing paradigm also perpetuates a dichotomy between people and nature, stymies community development, and exacerbates racial and social disparities. Almost exclusively rural-focused and permitting minimal development, this status quo philosophy puts urban communities at a systemic disadvantage in accessing preservation funds despite the potential of those funds to achieve policy objectives related to climate adaptation, public health, food security, and environmental justice. New Jersey needs policy innovation fueled by a "conservation development" ethos rather than an antiquated "preservation" mindset to catalyze climate-adapted redevelopment in urban, minoritized communities. Disparate New Jersey statutes establish authority for a conservation development approach – allowing multiple land uses on the same lot to achieve diverse economic, social, and environmental policy objectives. A conservation development approach, in our view, necessitates the creation of organizations termed "Conservation Community Land Trusts" (CCLTs). A CCLT performs land conservation and community development activities, often on the same urban lot, with agriculture, horticulture, and arboriculture anticipated to be essential components. Learn the shortcomings of New Jersey's existing preservation policies from the perspective of urban, minoritized communities needing redevelopment, and set forth a novel methodology to harmonize the existing statutory framework with CCLTs as the vehicle to achieve food security, climate resiliency, and other community development goals.

Exploring the Relationships Between Built Environment and Food Accessibility in a Large Metro Area

Shahadat Hossain and Dr. Shakil Kashem – Kansas State University

Adequate access to healthy foods, both physically and financially, is one of the major challenges faced by residents in large U.S. cities, primarily low-income and minority households living in food deserts. Planning and community development initiatives in those cities are now actively looking for solutions to address this accessibility gap to ensure food security for all. To date, the majority of research has used the distribution of healthy food sources and travel time to the closest grocery stores to determine how accessible food is. It is also identified that social and economic factors have an impact on food accessibility. Studies have also explored how built environment influences physical activity and health outcomes. However, the connection between built environment characteristics (density, walkability, etc.) and food access at the neighborhood level is yet to be explored widely. In this study, we investigate how the built environment affects food accessibility, taking the Kansas City metro area as a case study. Food accessibility data is collected from USDA Food Accessibility Research Atlas and built environment data is collected from EPA Smart Location Database. Correlation and spatial regression analysis was applied to evaluate how different measures of food accessibility is influenced by the parameters of urban built environment at the census block group level. It was found that there is a significant correlation between food accessibility and built environment indicators such as housing density, road network density, walkability index, and transit accessibility. The regression analysis also indicated the significance of these built environment parameters toward food accessibility at the local level. It showed the importance of considering overall built environment characteristics, in addition to location of healthy food sources, to ensure food security in urban environments. Possible planning solutions are recommended based on the findings of this study.

Southern Nevada Agricultural Roundtable: Building the Movement

Kaley Chapin, Carolina Martinez, and Staci Emm – University of Nevada, Reno

Southern Nevada Agriculture Roundtable was created in the summer of 2023. The purpose for this group was to explore agriculture production capacity in a desert-like region and to identify the challenges that come with it. Southern Nevada producers and University of Nevada, Reno Extension staff partnered to identify the need to build capacity in urban areas and to address obstacles. Since the creation of this collaboration, six committees have been formed and have held committee meetings to discuss topics such as expanding capacity, increasing consumer knowledge, creating resources for producers, and building connections among producers in both the urban and rural areas of Southern Nevada. This presentation will discuss the collaborative process that was created to build the Southern Nevada Roundtable and the workgroups that are focusing on Urban agriculture community and economic development. Participation of volunteers increased from 15 to over 60 in a matter of three months and participation continues to increase. The workgroups are bringing back programs that were phased out like Farm City Days, and focusing on policy for cottage foods and work toward creating the first food-hub in the Las Vegas area. Successes and failures will be discussed as well as Extension facilitating a movement in urban agriculture.

Posters: Training Urban Farmers

Developing the Bearcat Pantry and Resource Center Urban Garden at the University of Cincinnati

Joy Kostansek – University of Cincinnati; Brian Grubb

The University of Cincinnati Bearcats Pantry and Resource Center (BCP) provides basic needs to students, staff, and faculty in need. A core component of the BCP's work is to provide healthy food options for those experiencing food insecurity. In March 2023, the BCP team started a campus garden to help meet this need. This quickly evolved to include a partnership with academic programs, mainly the horticulture program in the School of Planning. This partnership creates a landscape for collaboration, including connecting university curriculum to improve student learning outcomes. The outcomes of this partnership include providing fresh food to combat campus food insecurity, providing students to learn and connect in a garden space, and to provide general education about the benefits of urban gardens.

Posters: Food Distribution Systems

Urban University Food System Roles and Reflections

Julie Fox – The Ohio State University

Urban universities are uniquely positioned to make powerful and lasting contributions to food security. To better understand the various dimensions related to the university's role in food systems, this poster presentation explores intentional linkages, significant developments, natural tensions, and emerging impacts at The Ohio State University. Discoveries and new reflections from a case study analysis, originally published in the Metropolitan Universities Journal, can guide urban university decision makers as they confront complex food system challenges.

Local Procurement Guides Informed by an Early Care Coalition and a Multi-Season Purchasing Pilot

Ali Segna, Robin Peth-Pierce – The Ohio State University

Research shows that strategies including three core elements—local food procurement, school gardens, and food education—are associated with increased knowledge of foods, improved nutrition and consumption, and improved student behaviors overall. Addressing procurement and food education within Early Care and Education (ECE) programs is critical because eating behaviors are formed in early childhood, over 80% of children ages 0-5 receive care outside the home, and ECE sites have the potential to offer sustainable food chain markets, engage children in gardens, increase families' access to food, and influence nutrition behaviors.

Results from a survey of ECE providers across Ohio (n=1,680) conducted by the Ohio Farm to Early Care and Education coalition in 2019 indicated that while there is a great interest in serving and teaching about local foods, early childhood educators experience many barriers to buying local. The most common barriers reported were cost, seasonality, challenges finding local producers, followed by onsite storage, delivery limitations, and not knowing how to order.

Local procurement pilots conducted at multiple Head Start centers and other ECE sites in the summer and winter seasons revealed successful approaches for procuring local foods for ECE sites and addressing barriers. In an additional pilot, regional coordinators across the state connected early care providers with producers, collecting pre- and post- questionnaires about purchasing and selling practices, specific payment options (i.e. cash, check, purchase order), ordering preferences, pick-ups, deliveries, etc.

Two state-specific local procurement guides were informed by coalition input and pilot study findings: A Guide to Buying Local Foods for Children in Early Care and A Guide to Selling Local Foods to Early Care Providers. These guides and the process for developing them will be shared. Learn how the guides' decision trees can be used for technical assistance, especially in urban settings.

Posters: Nutrition, Human Health, and Food Security

WIC Perks: 5 Years of Incentivizing WIC Farmers' Market Nutrition Program through Extension

Amanda Osborne – The Ohio State University

The WIC Perks program is a partnership between Ohio State University Extension, the Cuyahoga County Women, Infants, and Children (WIC) Program, and local farmers' markets. WIC Perks is a nutrition incentive program that enhances the existing WIC Farmers Market Nutrition Program (FMNP) by offering additional resources to families receiving WIC. Eligible families have the option to engage in a taste test or brief educational activity during select WIC FMNP distribution dates at local farmers' markets. In exchange for their participation, families receive an additional set of coupons for fresh fruits and vegetables valued at \$20 and relevant culinary tools. Over the last 5 years, the Extension led WIC-based incentive program has generated significant impacts including increased awareness and utilization of other nutrition incentive programs, increased SNAP sales at farmers' markets, and increased participant turn out and efficiency for WIC FMNP distributions. This poster will describe Extension's model for incentivizing WIC FMNP and provide supporting data for the programmatic outcomes previously stated. The WIC Perks program has served over 3,200 families and funneled more than \$37,000 into the pockets of small- to mid-size farms since 2019.

Expanding Access to Locally Grown Produce for Recipients of Nutrition Benefits

Suzanne Saggese – The Ohio State University; Amy Abodeely – Toledo-Lucas County Health Department

Health Policy Institute of Ohio identified food insecurity as one of Ohio's greatest health challenges and recommends nutrition benefit programming as a top-rated strategy to address food insecurity and improve health outcomes. However, in many urban areas, participants of these programs have difficulty redeeming the benefits for local produce. Economic opportunities for local farmers are then reduced, as potential customers cannot reach them.

Toledo, Ohio has a population of approximately 426,000, with nearly 22% of the population receiving SNAP benefits. Food Insecurity is at 16% in the county, concentrated mainly in the city of Toledo. Limited income individuals in Lucas County have access to SNAP, WIC Farmers Market Nutrition Program, Senior Farmers Market Nutrition Program, TANF Fruit and Vegetable Coupon Program, and Produce Perks. Many of these program participants live in households without a vehicle and more than one-half mile from a supermarket. For these participants, access to local produce is limited to a single year-round farmer's market. A few other farm stands near the downtown core are open seasonally.

The Eat Fresh, Live Well Coalition of Greater Toledo worked to develop solutions to address these challenges and improve redemption of nutrition incentive programs. Steering Committee Members, OSU Extension Lucas County, and Toledo-Lucas County Health Department coordinated the facilitation of pop-up farmers markets in neighborhoods so individuals could redeem their nutrition

benefit coupons. An employee from Toledo Farmers Market was present to accept the benefits, and a local farmer provided the produce. Additional organizations attended the markets to provide other resources. Participants could also sign-up for benefits on site. In over four years, 17 pop-up markets resulted in about \$8,200 in nutrition benefit redemptions. These events have proven successful for the farmer, as well as providing access to individuals who might not have the opportunity to redeem the coupons otherwise.

Safely Growing in Mildly Lead Contaminated Urban Soils – Case Studies from Kansas City, Missouri *Chandima Wekumbura Wekumbure Gedara, Dr. Ganga Hettiarachchi, & Jack Murphy – Kansas State University*

Field studies were conducted to assess the changes in bioaccessible Pb (BaPb) after incorporating organic and inorganic P amendments in mildly Pb-contaminated urban soils. Three different field sites with elevated Pb concentrations (KC2210: 114 ± 50 , KC2409: 143 ± 75 and KC3817: 325 ± 50 mgkg⁻¹) in Kansas City, Missouri were treated on-site using the best treatments identified by prior laboratory incubation studies for reducing BaPb. After incorporating treatments in field plots, each treatment plot was further divided to establish two types of covers: grass and wood mulch. Inorganic P treatments included liquid and solid commercial P fertilizers and as organic P treatment Class A-biosolids were used. Changes in BaPb concentration using a modified physiologically based extraction test and soil pH were measured at different time intervals after treating the soils. When grasses were fully grown, above-ground portion was harvested and analyzed for total Pb. Site KC2409 showed a significant reduction of BaPb over time with both inorganic and organic P treatments compared to control. Among the treatments, highest BaPb reduction was found in soil treated with ammonium polyphosphate followed by diammonium phosphate < biosolids = triple superphosphate. The reduction of BaPb was 21-36%. Site KC2210 BaPb ranges from 9-10 % in all the treatments while site KC3817 showed high variability in both total and BaPb. All grass covers and volunteer plants grown in wood mulch showed < 6 mgkg⁻¹ total plant Pb in all the treatments ($p > 0.05$). The lowest total plant Pb was found in KC3817 < KC2210 < KC2409. Although plant samples were cleaned following the laboratory cleaning procedure, relatively high (0.8-8.2 mgkg⁻¹) and variable (± 0.2 -3.3) plant Pb found at site KC2409 may be due to soil contamination facilitated by poor and short grass cover establishment. Results suggested that mildly lead-contaminated urban soils are safer for growing plants with and without soil amendments.

Utilization of Community Gardens During and Since COVID-19 Among Underserved Communities in Rockford

Ravneet Kaur – University of Illinois, College of Medicine Rockford; Carol Erikson – University of Illinois Extension; Kristine Zimmermann; Shannon Layng; Vicki Weidenbacher-Hoper; Mathew Dalstrom; Manorama Khare

Introduction: Food insecurity, a longstanding national concern in the United States, was exacerbated during the COVID-19 pandemic when about 38% of the U.S. population experienced it. Numerous programs were offered to combat the nutrition related challenges encountered during the pandemic. Concurrently, the interest in community gardens (CGs) increased all over the world. CGs have a strong history of strengthening communities by challenging racial segregation and serving as a local food

source during economic crises. This study explored the utilization of CGs during and after the COVID-19 pandemic among underprivileged urban neighborhoods.

Method: We conducted a survey among residents to explore their food insecurity and usage of CGs. The semi-structured interviews were conducted with garden organizers, garden coordinators, and gardeners (n = 17) in underserved areas of Rockford (Illinois).

Results: A total of 64 residents responded to the survey and 61% have participated in a nutrition assistance program. Overall, 30% of participants did not have enough food to eat often or sometimes in the past 12 months and 15% had to reduce the size of meals eaten almost every month. Twenty-four participants had a time when family members were hungry but did not eat because they could not afford it. Overall, 54% have never participated in CGs. Among those who participated, 33% participated in receiving produce only. About half of the participants do not know how to start participating in CGs. Further exploring the lack of utilization of CGs through interviews, all participants indicated that residents were largely not aware of any garden activities. Discussing the impact of COVID-19 on CGs, interviewees stated the pandemic decreased the number of volunteers.

Discussion: To address the food insecurity among under resourced urban neighborhoods, engaging communities, and streamlining local collaborations to promote utilization of CGs can be helpful.

Development of Resilient Urban Food Systems that Ensure Food Security in the Face of Climate Change

Eleni Pliakoni, Cary Rivard, Tricia Jenkins, and Ganga Hettiarachchi – Kansas State University; Logan Britton, Agricultural Economics; Sara Hadavi, Landscape Architecture and Regional & Community Planning; Majid Jaber-Douraki, Mathematics; Tania Kim, Entomology; Hande McGinty, Computer Science; Parthap Parameswaran, Civil Engineering; Manreet Bhu

In 2022, the Office of the Vice President for Research at Kansas State University developed the Game-changing Research Initiation Program (aka GRIP awards). GRIP seeks to support innovative, groundbreaking research by forming interdisciplinary teams of K-State faculty across departments, colleges, and campuses to address complex challenges that require a transdisciplinary approach. The KSU Urban Food Systems team developed a group of collaborators that includes 22 faculty across 14 departments and 6 colleges that was successful at securing one of three GRIP awards. Food systems research is inherently transdisciplinary. Our team aims to develop analytical tools to assess the long-term sustainability of urban agricultural systems. One of our goals is to develop an assessment tool that will evaluate the impact of urban agriculture on agricultural productivity, community health, environmental sustainability, and overall food systems resiliency. Numerous “seed projects” including topics such as “Vegetable Production with Agrovoltatics;” “Utilization of an Anaerobic Membrane Bioreactor to Reuse Municipal Wastewater and Nutrients for Urban Agriculture,” “Disaster-Resilient Food Systems: Scenario Planning for Post-Disaster Food Security” and “Understanding Community Civic and Political Engagement that Results from Urban Agriculture” will be conducted and the entire project will be guided by a Community Advisory Board. In addition to research and outreach, one of our short-term goals is to develop a successful proposal for the NIFA Sustainable Agriculture Systems program. Our long-term goal is to conduct work that will result in transformational change to address

global food security. The results of this work will be relevant to policymakers, city planners, educators, consumers, and agriculturalists in urban and rural communities. This project will introduce the KSU team and how we plan to meet our short- and long-term goals, in addition to other lessons learned when working in large, transdisciplinary teams.

The Hudson County Produce Prescription and Food Pharmacy Initiative

Delma Yorimoto – Rutgers

Hudson County, situated in northeastern New Jersey, stands as the state's smallest and most densely populated county. The USDA reports that approximately one in 12 individuals in New Jersey grapples with food insecurity. A study commissioned by the New Jersey Economic Development Authority (NJEDA) in February 2022 identified six communities within Hudson County ranked among the top 50 food desert communities in the state.

Recent research underscores the strong correlation between food insecurity and the emergence of chronic health conditions such as anemia and high blood pressure, among others. According to the New Jersey State Health Assessment Data, 30.4% of adults aged 18 and over in Hudson County were diagnosed with high blood pressure between 2013 and 2019 (New Jersey Department of Health, 2019). Additionally, 11.4% of adults were diagnosed with diabetes during the period from 2019 to 2021 (New Jersey Department of Health, 2021).

In response to these challenges, the Hudson County Department of Health has initiated a partnership with local health clinics and is in the process of establishing on-site food pharmacies. These pharmacies will enable patients receiving produce prescriptions to redeem vouchers for free fruits and vegetables twice a month. Moreover, the program is designed to offer comprehensive support to participating patients, including nutrition education through both group sessions (in person and online) and one-on-one sessions. The overarching goal is to cultivate sustainable, healthy habits among the patient population.

This innovative project targets individuals experiencing financial hardships and at risk for prediabetes, diabetes, and hypertension. Through rigorous research and evaluation, the initiative aims to generate new evidence on the effectiveness of produce prescription programs and, concurrently, underscore the value of community-driven efforts in augmenting fruit and vegetable intake among neighbors facing poverty.

Exploring Food Insecurity in Historically Redlined Areas: A Case from Kansas City, Missouri

Sara Hadavi – Kansas State University; Paden Crews – Confluence

Food security is anticipated to continue to be disrupted by the consequences of climate change, challenging urban dwellers in many cities, and placing them in the path of vulnerability and food insecurity. Food insecurity and lack of equitable access to healthy food are more challenging issues in disinvested areas with low-income communities of color, demonstrating lower life expectancy and quality of life. This study examines food insecurity across nine neighborhoods of Eastside Kansas City, Missouri, a historically redlined and disinvested area with high vacancy. Spatial analysis was conducted

using GIS to identify areas of food vulnerability and opportunity for potential food-sharing development. A survey (n=68) was then distributed both online and in-person in two neighborhoods identified as most vulnerable (Ivanhoe and Oak Park neighborhoods), to examine residents' concerns about food security, food access, and involvement in food production, as well as their preferences for food production and consumption that would inform potentials for food-sharing programs. The results showed that more than 50% of the participants utilized food assistance and ate fast food almost every day. About 66% reported not being able to afford to buy healthy food. We developed a Food Insecurity Index based on responses and explored its association with food store choices through linear regression modeling. The results showed a moderate to strong association between food insecurity and choices for food stores meaning that when food insecurity is as high as four (out of five), price and location are the most important reasons for food store choice while food quality does not play a role in decisions. The resulting information on food preferences was used to propose an integrative food-sharing program model informed by the needs and preferences of residents and shifted toward sustainable food production, equitable access to healthy food, and decreased health implications associated with food insecurity.

Rutgers SNAP Gap Project: Community Based Participatory Research on SNAP Enrollment

Jennifer Taylor, Veronica Jones, Ricardo Kairios – Rutgers Cooperative Extension

The Supplemental Nutrition Assistance Program (SNAP) is critical in achieving food security, yet many eligible individuals don't enroll due to stigma and various barriers. Food access barriers can be influenced by cultural and social factors. Understanding these aspects helps in tailoring food security programs and interventions to respect cultural values and practices. This project worked to elevate community voices in urban areas about their experiences and perspectives of SNAP.

The SNAP Gap is the difference between who is eligible for and who is participating in SNAP. The objectives of this exploratory study were to identify the reasons why some New Jersey families who qualify for SNAP are not enrolled in it and propose solutions to increase SNAP enrollment. Working with six school districts across the state, the team conducted 19 focus groups with SNAP eligible guardians of school-aged children. Additionally, five Department of Human Services administrators were interviewed to learn their ideas on how to increase SNAP enrollment.

Focus group findings highlighted issues with the SNAP application process and lack of awareness of the benefits SNAP offers. Interviews with SNAP administrators confirmed challenges in the application process and communication barriers. Based on concerns raised by study participants, and successful existing strategies, the researchers recommended to prioritize increased awareness promotion of SNAP in schools, adjustments to streamline the application process, prioritize the use of technology to submit the SNAP application, and provide updates to the community on any changes about SNAP requirements. This study confirmed that schools are important locations to engage in SNAP promotion. Researchers continue to work with the Office of the Food Security Advocate to share study findings with elected officials.

Posters: Production Systems, Challenges, and Protected Environments

Exploring Nutrient Solution Management Techniques in Hydroponic Production

Puja Subedi and Dr. Teng Yang – Kansas State University Olathe

Efficient nutrient management is the key to successful hydroponic production. However, there is a lack of comprehensive research regarding the optimal nutrient application quantity and electrical conductivity (EC) levels for various leafy green vegetables in recirculating hydroponic cultivation. To address this research gap, we propose two projects on different nutrient application quantities and EC levels using the nutrient film technique (NFT) hydroponic system in the greenhouse with three replications. The first project focuses on exploring different nutrient quantities using 76, 114, and 151 liters of feeding nutrient solutions for six different leafy green vegetable species and cultivars common in Kansas including red butter and green butter type lettuce (*Lactuca sativa*), arugula (*Eruca sativa*), kale (*Brassica napas pabularia*) 'Red russian', spinach (*Basella rubra*) 'Red malabar', and basil (*Ocimum basilicum*) 'Genovese.' The second project focuses on three different EC levels (1.2, 1.8 and 2.4 mS/cm) for five different leafy green vegetables including kale (*Brassica oleracea*) 'Winter bor F1' and 'Toscana,' Swiss chard (*Beta vulgaris*) 'Fordhook giant,' one downy mildew-resistant type basil (*Ocimum basilicum*) and another cultivar 'large leaf basil.' Growth parameters will be recorded, including plant height, number of leaves, leaf area, SPAD value, shoot and root fresh weight, and dry weight. Water samples at 0, 15, and 30 days will be collected for nutrient analysis in the nutrient solutions. Additionally, plant tissues will be analyzed to detect nutrient profiles. This experiment aims to provide valuable insights into identifying the optimal nutrient application quantity and EC levels required to enhance the quantitative and qualitative growth of vital leafy vegetables in Kansas and will offer valuable production guidelines for local growers.

The Ripple Effects of Community Gardens

Patrick Nehring – University of Wisconsin-Madison Extension Brown & Kewaunee Counties

Community Gardens are found in urban communities of all sizes. In Wisconsin, they are found in Milwaukee and Green Bay and in smaller urban areas, such as Medford. The University of Wisconsin-Madison Extension has researched the impacts of community gardens.

Extension conducted focus groups using the ripple effect mapping (REM) process to document the impact of community gardens. The REM process showcases the narrow and broad impacts through the words of participants. To show the effect, potential, and long-term impacts of community gardens, REM was used to discover what community gardens provide and mean to the gardener; how the community gardens made a difference for individuals, families, and the community; and how community gardens have impacted the broader community.

The thoughts and themes that came out of the focus group sessions were similar for community gardens in the Milwaukee area and the Green Bay area. Although the focus groups collected different

information, the results of the focus groups were consistent with data from surveys of community gardeners conducted over 10 years in the Green Bay area. The results were also consistent with the results from other studies.

Community gardens provide food for gardeners and their families, increase the amount of fruits and vegetables consumed, and provide a means of exercise. Community gardens provide many other benefits to gardeners and the community beyond these physical health benefits. These benefits include strengthening social networks between family members and neighbors, understanding and appreciating culture and traditions, supplementing household incomes by growing rather than purchasing food and by the selling of flowers and produce, fostering an appreciation for agriculture, encouraging entrepreneurship, creating an appreciation and understanding of ecology, and providing mental health benefits. The impact of community gardens ripple out from the gardener to their family and to the broader community.

Enhancing Microbial Safety of Hydroponic Systems with the Use of Ultraviolet Irradiation

Manreet Bhullar, Markanna Moore, Eleni Pliakoni, and Teng Yang – Kansas State University

Introduction: There is much debate about the sources of contamination in hydroponic systems. However, it is widely accepted that once pathogens enter a hydroponic system, the recirculating water can allow them to rapidly spread to an entire crop. Preventative food safety measures for hydroponic systems could potentially reduce the risk of contamination, but more research is needed.

Purpose: The objective of the study was to test the efficacy of an ultraviolet-light (UV) device to reduce the population of *Escherichia coli* in two types of simulated hydroponic systems.

Methods: Commercially-available DWC (Deep Water Culture) hydroponic systems were used to grow romaine lettuce (*Lactuca lettuceia* var. Sparx) in a nutrient solution containing Hydro-Gro Leafy (8.87%) and calcium nitrate (6.96%); the electrical conductivity was maintained between 1.6 and 1.8 mS/cm. The nutrient solution was inoculated with rifampicin-resistant *Escherichia coli* to a concentration of 6-log and treated with a UV-C device (MiniPure MIN-1; 500ml capacity) emitting peak irradiance at 254nm at flow rates of 0, 3, 6, and 8L/min. Three samples were collected for each treatment and the experiment was repeated three times. The surviving *E. coli* was enumerated on Tryptic Soy Agar containing rifampicin (80µg/mL). The UV absorbance and transmittance at 254nm of the nutrient solution were measured using a spectrophotometer.

Results: The average UV absorbance (254nm) of the nutrient solution was 0.316. The log reduction with UV treatment of hydroponic nutrient solution at flow rates of 3L/min was significantly ($p < 0.05$) higher than the 6 and 8 L/min. At 3L/min, a maximum log reduction of 4.45-log was achieved. However, there was no significant difference in log reduction between 6L/min (3.20-log) and 8L/min (3.11-log) flow rates.

Significance: UV technology can help improve the safety of hydroponic systems and the produce grown using these systems.

Strengthening Community Capacity and Increasing Access to Healthy Food in Springfield, Illinois *Yves Doumen – Motherland Gardens Community Project*

Access to healthy food among BIPOC and communities affected by poverty is limited and efforts addressing disparities in food access has been challenging. Urban agriculture presents an opportunity to increase access to healthy food, enhance income, revitalize neighborhoods, and strengthen community capacity through social networks to affect change. In response to community needs in Springfield, Yves Doumen founded the Motherland Gardens Community Project to address disparities in access to healthy food by engaging and educating communities in sustainable urban agricultural systems and food entrepreneurship. In the past two years, Motherland has worked with communities and leaders to promote production and consumption of healthy food to impact food security and improve health. This presentation highlights activities of the organization, including appropriate framework for addressing root causes and engaging BIPOC and other communities facing food insecurity. Learn opportunities for collaboration with universities, colleges, school districts, and local stakeholders in growing sustainable communities around food and agriculture.

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See you in Kansas City - Fall 2026!

