



URBAN FOOD SYSTEMS SYMPOSIUM

# Nourishing Cities in a Changing Climate



October 7th, 14th, 21st, 28th, 2020

## Book of Abstracts

**KANSAS STATE**  
UNIVERSITY.

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Doelling & The River  
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Association*

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## **Invited Speakers**

### **Building Climate-Resilient Urban and Regional Food Systems**

*Jess Halliday, PhD*

RUAF Global Partnership on Sustainable Urban Agriculture and Food Systems, France  
Wednesday, October 7<sup>th</sup>, 10:00 am

There is no doubt that climate change is upon us and is wreaking havoc on our food systems. From chronic stresses such as droughts and prolonged low temperatures, to sudden shocks like hurricanes, floods, and raging wild fires, extreme events are already affecting food and nutrition security, and global stability. In this talk we will take a realistic look at the impacts of climate change on urban and regional food systems, including real-life examples of how catastrophes have caused crop failure, cut off supplies for local populations, and caused livelihoods to collapse. Yet despite the grim evidence there are reasons to be hopeful. Through the Inter-governmental Panel on Climate Change (IPCC) and the 2030 Agenda for Sustainable Development, there is growing international recognition of the need to safeguard food security from the impacts of climate change and climate related disasters. And there are signs, in some places, of gradual realization that food must be included in resilience strategies — not least since Covid-19 laid bare the fragility of food systems across the world. We will look at some of the policies, programs and actions that local and regional governments can put in place to increase the capacity of food systems actors to prevent, resist, absorb, adapt, respond and build back better from disasters. Finally, we will consider key questions used by the FAO-RUAF City Region Food System Programme to assess existing food systems resilience capacity, identify weak spots and vulnerable people, and determine priority action areas.

### **Urban Agriculture, Climate Change, and Food Security: Potential Solutions and Synergies**

*Charles Rice, PhD*

Department of Agronomy, Kansas State University  
Wednesday, October 14<sup>th</sup>, 10:00 am

Human influence on climate is clear, and anthropogenic emissions of greenhouse gases are the highest in recent history. Current and future changes in our climate will have widespread impacts on human and natural systems. Urban systems are vulnerable to extreme events associated with heat and rainfall. The effects will be disproportional felt on the elderly, young, those in poverty, and those with prior health conditions. In addition, climate change will affect food production and distribution. Adaptation and mitigation are complementary strategies for reducing and managing the risks of climate change. Urban agriculture could contribute to the mitigation of climate change by reducing heat island effects and mitigate flooding from extreme precipitation events. Urban agriculture could help with food security by the production of locally-sourced nutritious food. In addition to the physical effects, urban agriculture could have benefits to human health indirectly from green space and the association with nature.

## **The Role of Urban Farming in Nutrition Security**

*Elizabeth Mitcham*

Horticulture Innovation Lab – UC Davis, California

Wednesday, October 21<sup>st</sup>, 10:00 am

It is amazing and sad to observe the high percentage of individuals in the United States today experiencing dietary deficiencies. Nearly 40% of individuals over 2 years old are deficient in iron and Vitamin C, 56% are deficient in Vitamin A, and 65% are deficient in calcium. In 2010, 24% of households with children reported not having enough money for food; that number is likely higher today. There are a variety of causes of malnutrition in the United States, including poverty, access to healthy foods (think food deserts), price differentials between healthy and unhealthy foods, increased perishability of some healthy foods, time for food preparation and meals, lack of awareness and poor dietary habits. Most citizens in the United States are unaware of where their food comes from. Urban agriculture can play an important role in improving nutrition security in the local community by increasing access to healthy foods and enhancing the community's connection to food production and preservation. Community and school gardens are a successful way to reconnect adults and children to their food; especially healthier food options. Urban and peri-urban agriculture can take many forms. Fruits and vegetables are particularly suited to these locations because they can be grown on small plots, providing income and healthy foods. Plants can be produced in open fields, pots, or raised bed, on trellises and rooftops, and in greenhouses or specialized buildings. Plant production in urban areas also reduces the amount of heat generated within cities, making the city "greener". However, there are challenges to the success of urban agriculture related to food safety and policy restrictions that must be addressed through dialogue among a range of stakeholders in the community. Working together, the many benefits of urban farming will be achieved.

## **Food Justice is More than Growing Food and Feeding People**

*Karen Washington*

Farmer, activist, and Co-owner of Rise & Root Farm, New York

Wednesday, October 21<sup>st</sup>, 12:00 pm

People in poor urban and rural communities are told that if they want food security, all they have to do is grow their own vegetables, give up soda and exercise, as if, by magic, eating vegetables and drinking water are going to solve the problems in the food system, without looking at the institutional, environmental and structural determinants that reinforce racism in today's society. How has COVID-19 changed the way people now think.

## **‘Fixes that Fail:’ Using Community-based Systems Modeling to Diagnose Injustice in the Food System**

*<sup>1</sup>Jill Clark, PhD & <sup>2</sup>Jennifer King, PhD*

<sup>1</sup>John Glenn College of Public Affairs, The Ohio State University

<sup>2</sup>Mary Ann Swetland Center for Environmental Health, Case Western Reserve University

Wednesday, October 28<sup>th</sup>, 10:00 am

A legacy of racist policies in the US has embedded inequities and injustices into the American food system. Disparities in access to nutritious food, food insecurity and chronic disease illuminate these injustices. Yet, solutions largely fail to address the underlying complexity of the food system, and the underlying “rules of the game” that, for example, treat Black people differently than White people. Also, solutions most often are designed without including the perspective of people whom the solution is meant to benefit. A project based in previously redlined neighborhoods in Cleveland, Ohio, Modeling the Future of Food in Your Neighborhood (foodNEST 2.0), works to address these two deficits in approach. In the words of our university-community partners, the foodNEST 2.0 team is “doing research with the community to make positive neighborhood change in the forces that impact fair access to fresh and healthy foods and financial strength within households. The team is using system dynamics modeling to identify critical points in the food system that can tip things towards fairness.” In this talk, you will be introduced to our participatory approach to systems dynamic modeling, and be presented the model built by our community-university team. Finally, you will get a primer on diagnosing problematic patterns in food systems that reveal root causes of problems, providing a new way to think about justice-oriented interventions in the system.

## **The Hydra-Headed Food System: Imagining the Whole and Connecting the Dots**

*Mark Winne*

Food policy writer, speaker, and consultant, New Mexico

Wednesday, October 28<sup>th</sup>, 2:00 pm

Understanding the inner workings of our communities’ food systems has never been more important. Whether we are building a new food system out of the shell of the old, or attempting to repair the old one before it collapses, our attention remains riveted on the multi-faceted challenges of our local and regional food and farm landscapes. “The Hydra-Headed Food System” explores community-level food systems through the ever-evolving lens of climate change, racial equity, food security and access, diet and health, and economic development, not just as stand-alone issues but also through their interrelationships. Developing the analysis and skills for individuals and stakeholder groups to conduct their work is of course essential, but learning how to do that work collaboratively, especially in light of food system complexity, is necessary for success.

# Oral Session #1: Community and Economic Development

Wednesday, October 7, 2020, 11:00-11:45 am

Missouri EATs: Food System Development through Community Engagement

William McKelvey, Pam Duitsman, Dean Larkin, Sarah Hultine Massengale

Community Economic Development, University of Missouri Extension

Creating and sustaining vibrant community-based food systems continues to be important to Missouri communities. As this movement evolves, new tools are available to help communities engage with fellow community members, understand their local assets, create a plan for moving forward, and put their plan in to action. Missouri EATs (which stands for Engage-Act-Transform: Cultivating Community Food Systems) is a community engagement process that brings people together to understand and address issues in their local food system. It serves as a springboard for community conversations and helps people develop new working relationships. Missouri EATs provides a process and a menu of options for Community Development and Community Engagement Specialists from University of Missouri (MU) Extension to engage with communities that have an interest in developing their local and regional food system. The broad goal of Missouri EATs is to create healthy, resilient, and equitable community-based food systems. The starting point is a community-wide forum for participants to engage in an informed and facilitated discussion about the food system. This is the first step of a larger community organizing process that engages communities to make positive changes. The format allows for broad discussions related to local agriculture, hunger, health, and other related topics and relies heavily on local input from a wide spectrum of community members and organizations. The forum includes building a common language for discussing community food systems, exploring relevant data, identifying food system priorities, sharing a meal, and creating a Community Food System Action Plan. The action plan keeps communities engaged after the event, guides their ongoing effort, and provides an opportunity to link communities to additional MU Extension programs and resources from other community partners. Missouri EATs initiated two pilot projects in 2019 with the urbanized City of Pine Lawn and a more suburban City of Smithville. Additional pilot projects in 2020 will likely be located in more rural parts of the state. While the outcomes of Missouri EATs are hard to predict, it is anticipated that those involved will learn about new food system opportunities, challenges, and resources; make new connections; and engage with new people to carry out programs. Likewise, for communities, longer-term impacts include an increase in the availability of healthy food, the creation of a more equitable and resilient food system, and enhanced civic engagement. These outcomes are measured directly after the community-wide forum, and then again six months and two years after the forum.

## Fair Food Network's Approach to Growing Community Health and Wealth Through Food

*Holly Parker*, Oran Hesterman, Mark Nicholson, Noah Fulmer

Fair Food Network

Fair Food Network was founded in 2009 to connect people to the power of food to improve health, ignite local economies, and open opportunities for all – especially in the nation's most underserved communities. Together with our partners, we pioneer and prove innovations that can be owned locally and scaled nationally, growing a future where everyone can harness the full potential of food to transform their communities for good.

Double Up Food Bucks, our flagship program, is a national model for healthy food incentives that began in the city of Detroit in 2009 and is now active in 25+ states and growing. Double Up matches SNAP, or food stamps, spent on fruits and vegetables. SNAP represents the largest federal investment in our food and farm system — at more than \$70 billion dollars a year. In communities that are low-wealth this is a major portion of the local food economy. What if we could harness even a small percentage of those dollars toward fresh, healthy, locally grown food? Double Up's track record of positive and proven impact for families and farmers in communities across the nation helped make federal support for incentives a permanent part of future farm bills.

Fair Food Fund, our impact investing arm, models how local food economies can address health and wealth gaps that disproportionately affect communities of color. The Fund's catalytic capital, business and technical assistance, and creative programming support entrepreneurs growing profitable businesses and access to healthy, affordable food. To date, the Fund has deployed nearly \$4 million and has reached over 150 entrepreneurs in 10 states with business assistance. The Fund is undergoing a national expansion and deepening connections with Fair Food Network's Double Up Food Bucks healthy food access programming. This tighter collaboration aims to more fully harness food to create more equitable communities.

We will present on how systems-oriented approaches like Double Up Food Bucks and Fair Food Fund together are advancing the health and wealth of local communities at a national scale. Over the past 10 years, Fair Food Network has led program design, implementation, evaluation, and replication of this work and our presentation will include how these programs came to be and what has been learned about impact on urban communities.

## The Changes and Adaptation of Food-ways with Residential Relocation during Urbanization in South China

*Yaolin Chen*

Department of Sociology, University at Buffalo (SUNY)

After four decades of economic reform, China has experienced rapid urbanization with unprecedented mobility, not only in the sphere of urban development but also in people's daily life. Although the impact of urbanization is well studied, especially with forced relocations and housing demolitions, the transition is not perfectly understood. This paper explores changes both in humans and space — farmers turning into citizens and the countryside turning into the city — from the view of food-way with ethnographic data.

During this transformation, food-ways play a vital role in reshaping social relationships over community relocation, which further represents the conversion of lifestyles when people of different generations and genders settle into a new urban life. The distinctions and tension between the forces of the city and countryside are illustrated by documenting the adjustments of social relationship networks and food-ways. By using personal interviewing, participatory observation, and field research out of different years, the research shows that the spatial arrangement of the village, that previously was in the shape of a flat scale with houses, has been converted into vertical apartment buildings. This transition remodels the space, especially interactions in the neighborhood. Furthermore, it gradually leads to social bonds breaking down and their reconnection.

Besides the variation in social relations, their food-ways also undergo transitions both at the scope of family and community level. Before relocation, local people lived a self-supporting lifestyle with a small amount of replenishing necessities from markets, where they farmed abundant vegetables and food crops by themselves. Later, they are more dependent on supermarkets and local markets after relocation since food from the garden is insufficient. They continue to exploit fragmental farmlands and maintain previous dietary habits by gardening vegetables on their own and sharing home-grown food with new neighbors in order to fit into migration and urban life.

In conclusion, the work contributes to providing descriptive aspects of demolition and relocation studies in Chinese urbanization, apart from existing literature mainly covering the fields of politics and economy. This paper elaborates on the relationship networks regarding how food-ways change, spanning over urban and rural, family and community. The process of urbanization is not just farmers turning into citizens, but also the renewal of life. People develop a relationship with food and land by farming and produce interactions with families and villages via food. Food-ways play a fundamental role in social interaction and become the new field of knowing the impacts of urbanization.

#### Innovative Technologies to Enhance the Seasonal Availability of Nutritious Foods in Rural and Urban Settings

<sup>1</sup>*Angelos Deltsidis*, <sup>2</sup>Amrita Mukherjee, <sup>3</sup>Mohd. Rezaul Islam, <sup>3</sup>Elizabeth Mitcham

<sup>1</sup>Department of Horticulture, University of Georgia

<sup>2</sup>Department of Horticulture and Natural Resources, Kansas State University

<sup>3</sup>Department of Plant Sciences, University of California, Davis

Approximately one-third of the food produced in the world is lost or wasted, which amounts to about 1.3 billion tons per year. In South Asia, particularly Bangladesh, the problem of food losses is exacerbated by poor infrastructure and the availability of economically sustainable technologies to preserve food. Despite the efforts of the government and international players, significant percentage of the population in Bangladesh suffers from chronic malnutrition. High population density coupled with urbanization along with a globalized economy and a low-income status of much of the population add to the equation. Climate change results in erratic weather that reduces the capacity to secure year-round availability of nutritious foods. The lack of accessible, low-cost methods to maintain produce quality after harvest along with the high prices of imported produce further reduce off-season consumption of fresh horticultural crops. A number of low-cost technologies have been implemented in selected locations in southern Bangladesh. The hypothesis was that these technologies can reduce food losses

and extend the availability of nutritious foods while they support the incomes of smallholder farmers and entrepreneurs. Cooling is the most important method for food loss reduction, but is out of reach for smallholders due to high installation and operational costs. The project installed low-cost, CoolBot-operated cold rooms that act as local, short-term cold storage points. Drying is a popular preservation technique which often produces lower quality or contaminated products due to high humidity levels. Our team installed innovative UC Davis-invented solar dryers, which facilitate airflow and reduce drying times while improving the quality of dried products. Urbanization, seasonal flooding and expansion of aquaculture reduce the availability of suitable locations for family gardens. A bamboo raft was designed to hold soilless media for vegetable production while floating in fishponds. This technology can combat food insecurity when water levels in the region rise by providing small plant-growing platforms that can be used in all seasons. Our team gathered an extensive number of data points including inputs and outputs to extrapolate the profitability prerequisites and potentials for each technology. Based on the preliminary results, the implementation, operation and scaling of the above technologies supports household nutrition, adequate food intake, and can potentially reduce illness while supporting inclusive economic development. Data points show that, despite using rural locations as test sites, the small size and adaptability of these technologies make them good candidates for the ever-growing cities of this part of the world.

## Oral Session #2: Food Systems Policy and Advocacy

Wednesday, October 7, 2020, 12:00-12:45 pm

### Evolution of Food Systems Work in the Omaha-Council Bluffs Metropolitan Area

Susan Whitfield, Elisabeth Smith, Megan McGuffey

No More Empty Pots

Bringing together diverse stakeholders to drive change in urban food systems is a challenging and evolving process. This presentation shares the journey of one metropolitan area in the Midwest: Omaha-Council Bluffs along the Nebraska and Iowa borders. We will discuss the different organizational forms and focuses that food systems stakeholders have participated in since 2005. The presentation will also cover the publication of the Healthy Food For All Plan, a community food security plan created from a two-year collaborative process and how multiple food systems-focused groups are able to collaborate together to implement a community-wide vision. We will conclude with a discussion of specific policy successes and priorities that have been pursued through these efforts both at the city, regional, and statewide levels. The partnerships that have been developed through these various phases of organizing between city government and food systems stakeholders in order to pursue policy changes supportive of healthy urban food systems, such as land use and food equity goals will be discussed.

### Food Security and Sovereignty in the Local Food System of Rhode Island

Anna Palliser

Department of Environmental Management, Southern Institute of Technology, Johnson and Wales University

This paper analyzes the results of a four-month research project into the local food system of Rhode Island, with a focus on food security and food sovereignty in the urban environment. An in-depth desktop study was followed by twenty-two interviews with policy makers, people working in the food bank and other relevant non-profit organizations, health workers, urban farmers and community gardeners. A brief price comparison of fresh produce at farmers markets and local supermarkets was also undertaken. Rhode Island has an extensive network of community gardens, small urban and semi-urban farms and farmers markets. The local Bonus Bucks initiative enables people using federal SNAP benefits to double the fresh produce they can buy with their benefits at the farmers markets. Local non-profit organizations provide training opportunities to beginner farmers and gardeners, assisting them in finding land to grow on and with tools, seed and compost as well as helping with urban land reclamation for food-growing spaces. Workshops teach people how to cook healthy meals with fresh produce, sharing local recipes with refugee groups who in turn share how to grow and cook their culturally appropriate food. A local food distribution system connects local farmers with buyers such as restaurants, schools and hospitals. At the policy level the Rhode Island Food Policy Council is working towards increasing access to fresh food for low income people who often live in food deserts as well as increasing opportunities for local food producers to grow and sell food locally. However, despite some headway being made, racial minority perspectives require greater representation in the Rhode Island local food system, both at the level of policy development and in terms of support for gardeners and

farmers. Organizations focusing on minority groups complain of difficulties attracting funding and argue they need more sovereignty over land rights and how to use the land they gain access to. At the same time, food deserts in Rhode Island remain and food insecurity is still rising. Prices at many farmers markets are significantly higher than supermarkets, with some interviewees saying they are too high for people to buy from, especially people on low incomes who are not entitled to SNAP credits. Fears that the local food system in Rhode Island is catering more towards higher income levels, despite sincere attempts to increase food security for lower income groups, were raised.

### The Role of Food Policy Networks in Local Public Policy

*Megan McGuffey*

School of Public Administration, University of Nebraska at Omaha

This presentation explores the role of food policy networks (commonly known as food policy councils) in local government policy processes. Food policy networks (FPNs) are defined as embedded networks of the social movement around food and farm issues influencing the food system through policy and projects. Findings from three case studies in the Midwest are presented with varied levels of connection to the local governments of their communities. The importance of internal structural decisions, the external community environment, connections to the large food movement, role fit for various stakeholders, and the interplay between policies and projects in FPNs are discussed. Lessons for those working in or with FPNs as well as future research needs in this area are explored.

## Oral Session #3: Extension and Outreach in Urban Food Systems

Wednesday, October 7, 2020, 1:00-1:45 pm

University of Missouri Extension Metro Foods System Team

<sup>1</sup>*Londa Nwadike*, <sup>2</sup>Pam Duitsman, <sup>2</sup>Matt Herring, <sup>2</sup>Leslie Bertsch

<sup>1</sup>Extension, University of Missouri/ Kansas State University

<sup>2</sup>Extension, University of Missouri

University of Missouri Extension established a Metropolitan Food Systems Team in September 2011 with the goal of creating a framework for the identification, development and implementation of Extension food system programming in and near Missouri's urban areas. The membership and activities of the team have shifted over the years with various personnel changes and different topics of interest in the state, but overall, the goal of the team has remained the same. The work of this team can provide ideas for other states of the role that Extension can play in helping to strengthen urban and peri-urban food systems. We will outline specific elements that have contributed to our team's successes and recommendations to other University Extension systems who may be interested in developing a similar initiative.

Since its formation, the team has developed several Extension curricula, including Stock Healthy, Shop Healthy (which has been implemented nationally) and Selling Local Foods; and had the opportunity to visit two other state Extension programs to learn about their urban food systems work. The team held a conference for producers, buyers and food system stakeholders in all of Missouri's metropolitan areas. The team has also established a food systems website (<https://extension2.missouri.edu/programs/food-systems>) which serves as valuable clearinghouse of information of the various resources that MU Extension has available in each of the different sectors of the food system. Rather than categorizing information by only the academic discipline that developed those resources, the website groups the information by sectors including 1) grow/produce/harvest, 2) deliver/process, 3) market/distribute, 4) display/purchase, 5) prepare/consume, 6) surplus/waste. This is a useful resource for both internal Extension personnel, but also for external groups looking for resources.

In 2019, the team engaged in a strategic planning process to determine our best approach for future work in light of new Extension and state initiatives around regional food systems.

One of the main benefits of this team is that it brings together Extension personnel working in various disciplines from different parts of the state, which has enabled the team members to learn about ongoing and future initiatives occurring in other disciplines and areas of the state that are of interest to others. This multi-disciplinary approach has fostered extensive collaboration between different disciplines in projects that team members may have otherwise worked on independently or only within a single discipline.

This presentation aims to inspire other university Extension services to also implement similar teams and will help provide recommendations on how to do so, based on our experiences.

## Pilot In-Field Food Safety Training Assessment in Donation Gardens Managed by Master Gardeners in Iowa

*<sup>1</sup>Shannon Coleman*, <sup>1</sup>Smaranda Andrews, <sup>1</sup>Bridget Perry, <sup>2</sup>Ann Williams

<sup>1</sup>Department of Food Science and Human Nutrition, Iowa State University

<sup>2</sup>Independent Consultant

Lack of access to safe, healthy food is a significant concern. Many non-profit organizations, such as local food pantries, are exploring ways to increase access to fresh produce in both rural and urban areas. Due to the vulnerability of the target audience that frequents the pantries, gardeners must distribute produce that is safe to eat and free of pathogens. Vulnerable population includes young children, immunocompromised people, older adults, and pregnant women. The objective of this study was to assess Master Gardeners' (MG, n=39) awareness, knowledge and attitude following a pilot in-field food safety training in donation gardens. Each hands-on activity in the training was designed to teach gardeners the importance of reducing risk in the garden. To evaluate the training, the team adopted a three-stage process: 1) Qualitative research to learn more about MGs perceptions of food safety and their motivations for engaging in the volunteer activity with the goal of informing workshop development, 2) Pre/post measurement of changes in awareness, knowledge and attitude at the time of the workshop, and 3) Measurement of any changes in the practice of key food safety protocols two to three months post-workshop. The evaluation results showed that knowledge increased significantly after the gardeners participated and completed hands-on activities. For example, we observed that gardeners gained significant knowledge regarding what items were crucial in a food safety tool kit. The post-training follow-up evaluation indicated that participants not only made significant changes in their practices, but also purchased items to help them implement food safety practices in donation gardens throughout Iowa.

## Two Years in Review: National Food Systems Certifications Next Steps

*Kaley Hohenshell*, Courtney Long

Agriculture and Natural Resources, Iowa State University

The Food Systems team at Iowa State University piloted two new certification programs in 2019. Curriculum partners included North Carolina State, Ohio State University, Southern Extension Risk Management, Texas Center for Local Foods, Alaska Cooperative Extension, and the Iowa State Community Design Lab. These certifications support food systems practitioners in individual skill development for building trust and effective relationships as well as community food systems development processes. They were piloted with 14 state partners between 2018-2019 with funding from the Agricultural Marketing Resource Center as well as local partner support.

Two unique components of these certifications exist. First, these certifications were offered in collaboration with both Extension and non-profit audiences and the goal to provide training relative to both audiences. Throughout the pilot, multi-disciplinary groups and audiences went through the course. Second, the certifications are offered with both an in-person workshop and online modules. Allowing multiple avenues for participation and learning.

This presentation will review the certifications and how they support urban food systems and provide professional development support for food system practitioners and ag professionals. Additionally, a

review of the certification and curriculum development process will be shares, along with our learnings from evaluations. Changes to the curriculum and new standards for teaching will be discussed as well in hopes of providing feedback to others that are considering new curriculum in their own communities. The presentation will highlight the qualitative and quantitative evaluations and benchmarks for the curriculum gathered throughout the pilot. We will also discuss the impact the certifications can have on community engagement and capacity and the economic impact of food systems.

The goals of this presentation are to address lessons learned from the pilot certification courses, share next steps and goals for the future, and showcase the new curriculum. Participants will walk away with an understanding of the curriculum and foundational competencies for food systems; take away ideas and considerations for their own curriculum and training practices; and network with individuals in the room with similar interests.

### Updating Youth Programming to Meet Needs of Urban Schools

*Rebecca McMahan*

K-State Research & Extension-Sedgwick County, Kansas State University

Sedgwick County, Kansas is home to the largest school district in the state of Kansas, USD 259 – Wichita Public Schools. The county is also home to several suburban and rural school districts. Because of the urban-rural continuum present in the county, many students have very little experience with hands on plant science, gardening, or agriculture while other students are exposed to those concepts daily.

K-State Research & Extension - Sedgwick County Master Gardener volunteers have been providing 4-H plant science school enrichment lessons for over 15 years as a way to engage the next generation in plant science, gardening and agriculture. These lessons were popular with teachers and volunteers, but the lessons did not meet the new Common Core / Next Generation Science Standards. Over a period of three years, requests by teachers had dropped in half. Also, teaching methods of the volunteers did not meet the expectations of modern students and teachers for hands-on and interactive learning.

At the same time, interest in school gardens and school gardening programs has increased in our urban schools, but we were not prepared to meet that need for programming. We will present how we navigated the process of updating our lesson plans to meet the needs of urban schools, matched up with the science standards, improved hands-on learning, enriched the exposure of students to plant science, and engaged passionate volunteers in program delivery. We will share what has been successful since revising our programming options and what is still a work in progress.

## Oral Session #4: Urban Food Production Systems

Wednesday, October 14, 2020, 11:00-11:45 am

IPM for '-ponics': Assessing Industry and Community Needs for Pest Management in the Twin Cities

Mary Rogers, Natalie Hoidal, Claire Hodge, Neil Anderson

Department of Horticultural Science, University of Minnesota

Aquaponic and hydroponic ('-ponics') vegetable growing systems are rapidly emerging in urban areas to help meet demand for local food production and fulfill educational outcomes in schools. The Minnesota aquaponics industry, in particular, has grown from three producers in 2010 to now more than forty, with even more hydroponic vegetable systems established. In the Twin Cities, these systems may range in scale from small demonstration tables established in schools and shipping container farms, to large-scale commercial producers in peri-urban areas serving urban markets. Advantages for '-ponics' farming include strong consumer demand for fresh local produce, proximity of urban operations to buyers, sustainable use of water and nutrients, climate control and the ability to grow consistent products year-round. In addition to these benefits, '-ponics' farming systems also serve educational goals for farm to school programs and can be more adaptable and accessible to students than outdoor gardens, particularly in cold climates. Despite the increased level of environmental control, 'ponic' systems are challenged by pests and diseases that may cause substantial losses to crop yield and quality. Pest management can be challenging for these systems due to social demands for decreased pesticide use, system restrictions and regulatory constraints. Furthermore, '-ponics' systems are often highly variable in terms of production goals, growing systems, scale, environment, crops grown, fertility practices and other management practices, as well as experience of the grower. These factors make it difficult to apply one-size-fits-all IPM recommendations. To meet the needs of emerging '-ponics' growers, we completed site visits and conducted interviews to assess specific pest management challenges and needs across different systems serving the Minneapolis-St. Paul metro in Minnesota. Here, we report findings from five different '-ponics' growers highlighting different management challenges related to pest pressure, other production issues, system constraints, and knowledge and education needs. This information will be used to design and inform upcoming research experiments that address the most critical pest management issues faced by '-ponics' growers and guide the development of accessible and appropriate outreach and education materials.

Noble Hill Agricultural Project

John Chiles, Mike Chiles, Pam Duitsman, Maria Rodriguez-Alcala

Noble Hill Agricultural Development

Promoting Springfield Missouri as a forward-thinking community to live and grow, the Noble Hill project will be the first comprehensive project of its kind in the nation. Working with non-profits, educational institutions, businesses and government institutions, Noble Hill will be a high-profile demonstration of Springfield's collaborative culture.

The Noble Hill project will combine the most comprehensive set of sustainable practices to create an agricultural accelerator that will spur economic development in southwest Missouri. The Noble Hill site covers over 60 acres of city owned rural property, and will include irrigated produce and agroforestry farms with season extenders, a food hub, classroom, maintenance facilities, and a state of the art hydroponic greenhouse powered by existing on site waste heat and very low cost municipal renewable power. It will house high-tech greenhouses and open- field specialty crops as well as combined educational programs (K-12 and colleges). Training for farmers will combine hands-on production experience with best business practices. Partners include Missouri State University to offer an agricultural certificate program, University of Missouri Extension to offer technical expertise, and other institutions of higher education in the southwest region of Missouri to offer paid internships and other learning opportunities. The city of Springfield, Springfield City Utilities, Springfield R-12 school district, Farmers Market of the Ozarks, local hospitals and Ozark Food Harvest Food Bank are among the key supporters of the food hub — a component that will offer value-added and market access for farmers in the region. We believe that Noble Hill will serve as a successful example to other states and Missouri regions of a sustainably funded project of regional job creation and economic development for both rural and urban areas. The aim is to foster the growing, processing and distribution of local foods in the Ozarks so that jobs, businesses and income remain in the Ozarks. In sum, the Noble Hill seeks to take the local foods movement to another level.

#### Yields of Relay Cropped Greens Grown in Green Roof Production Systems.

*Leigh Whittinghill, Pradip Poudel*

College of Agriculture, Communities, and the Environment, Kentucky State University

As interest in urban food production increases, urban farmers are looking for solutions to the challenge of space availability. One solution is to move production to building rooftops, a space that is often underutilized. The use of green roof technology is one method of achieving food production on rooftops; however, that are some additional challenges associated with this practice as a result of the fast draining, low nutrient media used. This is particularly challenging for vegetable crops, which typically require more nutrients than the ornamental plants traditionally grown in green roof media. Some rooftop farmers are adding additional organic matter in the form of compost to their beds as an alternative to chemical fertilizers. Currently, there is little research on how rooftop production systems affect crops. Green roof platforms were established at the Harold R Benson Research and Demonstration Farm in Frankfort, KY, to examine crop yield in green roof systems supplemented with compost. Treatments were a topsoil no compost control, a green roof media no compost control and 3 green roof media treatments: the addition of 0.33, 0.66, or 1 kg/m<sup>2</sup> of compost. Organic fertilizers were used to supply additional nutrients to vegetable plants. The crops selected were lettuce, arugula, mizuna, mustard, Swiss chard, kale, and spinach. These were relay cropped in succession during two growing seasons (2018 and 2019). At each harvest, the amount of time harvesting required (in seconds), total yield, and marketable yield (determined by visual examination) were measured for each platform. Yield results were analyzed in R. Analysis of variance was performed on all variables for each crop; compost treatment and year were fixed effects. Significant differences between treatment means were analyzed using Tukey HSD (alpha of 0.05). Results for kale show differences between 2018 and 2019 for harvest time and total yield in the topsoil control, but no differences for marketable yield. These

differences are likely due to weather conditions. Kale harvest time, total yield in 2019 but not 2018, and marketable yield were highest in the topsoil control. Harvest time of the topsoil control was not significantly higher than the 1 kg/m<sup>2</sup> of compost in green roof media. The marketable yield of the topsoil control was not significantly higher than 0.66 or 1 kg/m<sup>2</sup> compost treatments in green roof media. Results for additional crops will also be presented.

Reroot Pontiac: Urban Sustainability in Michigan  
*Khurram Imam*, Jonathan Weyhrauch  
Department of Economics, Wayne State University

Reroot Pontiac, is a community organization centralized in a neglected neighborhood of Pontiac, Michigan. Over the last five years, Reroot developed projects to form an interconnected, urban sustainability greenspace. These projects include an organic farm, rain garden, chicken coop, beehives, bat colonies, and aquaponics. Recognized for its success, and for its ability to promote green workforce development, earlier this year Reroot was designated Michigan's only National Green Infrastructure Trainer. Ongoing projects in Pontiac include:

#### Henwash Farms

Covering  $\frac{3}{4}$  acre, the farm located on Henderson Street and Washington Street is a pesticide-free, fertilizer-free, self-contained plot with zero runoff that generates thousands of pounds of organic tomatoes, cucumbers, peppers, greens, herbs, root vegetables, and native plants. The planning of Henwash Farms included rainwater retention and sequestration to prevent nutrient run-off. The produce attracts pollinators and predatory insects and increases local flora diversity. Produce is sold, or used as feed for the chicken coop.

#### Chicken Coop

Purchased from Burger farms, the free-range chickens feed off of organic Henwash farms castaway. Housed in the coop, the chickens protect Reroot's baby peach trees from predatory species when they are grazing. The coop serves as both an attraction, and a stream of revenue for Reroot. For example, currently home to 90 chickens (60 egg-layers), the coop produces 3 dozen eggs a day. When fully grown, the chickens are sold for meat.

#### Aquaponics

The aquaponics is a closed system that loops native pan fish (perch, blue gill, and the like) with native plants in the Bio-interactive Orchard. Using a three-tier wetland filtration system, the system produces barley grass for chicken feed. A separate aquaponics system in the greenhouse is 12 times more efficient in terms of land use per production, utilizing only 5% of water amount used in conventional farming.

#### Bio-interactive Orchard

The center-piece of the ecological loop is the Bio-interactive Orchard. From the pollinator hotel wall made of cinderblocks, to the five beehives, alongside four 500 bat-breeding colonies, this hot-bed of activity helps the entire region with pollination. Here, visitors see first-hand the different ways nature coexists in symbiosis. For example, the orchard houses a large Black Walnut Groove tree—generally

known for its toxicity. However, Reroot paired the tree with vegetation and local plants that are instead protected by the roots of the Black Walnut Groove.

These are some of the aspects of urban sustainability Reroot can showcase and export to other urban regions.

### The Role of Grafting for Local Tomato Production in High Tunnels

*Cary Rivard*, Eleni Pliakoni, Lani Meyer, David Loewen

Department of Horticulture and Natural Resources, Kansas State University

Two of the primary goals of urban farmers is to stabilize production over the course of the season and maximize revenue on a limited growing space. High tunnels are utilized extensively in urban and peri-urban agriculture as they have been shown to extend the growing season and increase per square foot productivity. However, soilborne disease management can be challenging in these systems if crop rotation and soil health management are not adequate. Grafting tomatoes with inter-specific rootstock is common worldwide for protected crop production and is gaining popularity in the US. Research is being conducted at Kansas State University to help facilitate the successful implementation of grafting for high tunnel growers. Coordinated rootstock trials from urban and peri-urban farms in Kansas have indicated that yield can be significantly increased with the use of 'Arnold', 'Colosus', 'DRO141TX', and 'Maxifort' rootstocks ( $P < 0.05$ ) whereas others may show no significant benefits. Fruit quality studies showed that brix level in the fruit was similar across treatments, but titratable acidity was significantly affected by rootstock ( $P < 0.05$ ). An examination of the microbial community within and surrounding the root system suggest that vigorous rootstocks may provide for a higher diversity of bacteria in the rhizobiome. Rootstock/scion compatibility trials have also indicated that certain scions are affected differently by vigorous rootstock than others. When grafted with 'Maxifort' rootstock, the yield of 'Primo Red' was increased by 4% whereas the yield of 'Tasti Lee' was increased by 60%. As local food production continues to grow and evolve in and around urban communities, the role of high tunnel production and grafting will be important components in and around cities.

# Oral Session #5: Climate Change and Environmental Aspects of Urban Agriculture

Wednesday, October 14, 2020, 12:00-12:45 pm

Trends in Ecosystem Service Metrics of Urban Agriculture in Minneapolis/St. Paul, MN

<sup>1</sup>*Jennifer Nicklay*, <sup>1</sup>Nic Jelinski, <sup>1</sup>Kat LaBine, <sup>2</sup>Valentine Cadieux

<sup>1</sup>Department of Soil, Water, and Climate, University of Minnesota - Twin Cities

<sup>2</sup>Hamline University

Many urban growers in Minneapolis/St. Paul (MSP) have articulated that their ability to implement regenerative, multi-functional growing practices is restricted by inadequate information about how urban agriculture impacts the environment. This question is also complicated by the range of practices used – urban farms, community gardens, and home gardens use diverse growing strategies, which potentially have different environmental impacts. Thus, this research project seeks to quantify ecosystem service metrics for urban farms in MSP over a three-year on-farm study conducted in collaboration with four growers. Each partner is hosting replicated plots with treatments representing existing practices, including compost addition, brewer’s mash addition, intercropping with clover, mulching with comfrey, raised beds, and irrigation with alfalfa tea. We measure a range of metrics such as yield; soil chemical, physical, and biological properties; nutrients in water leachate; and plant/insect biodiversity. Having completed our second year, the findings indicate that urban agriculture activities improve hydraulic conductivity compared to lawns/turfgrass but also increase soil phosphorus concentrations significantly. These, and other, results indicate that there will be trade-offs associated with urban agriculture (as with any land use). Locally, elucidating the impacts and potential trade-offs of different urban agriculture management practices will ultimately guide not only grower decisions, but also hopefully city and county programs and policies that support urban agriculture activities.

Compost Production, Application and Assessment of Soil Health Impacts on Urban Agriculture Soils in Indiana

*Nathan Shoaf*, Brooke Alford, Alex Pettigrew, Anthony Van Gorp

Urban Agriculture Program, Purdue University Extension

Urban agriculture is being advocated by some local growers in Indiana to achieve innovative, sustainable food systems through increased interest in local food consumption and concern about food waste production. Urban sustainability initiatives often focus on closing nutrient loops through recovering, reusing and recycling resources in which urban waste is the output converted into input feedstocks for generating compost soil amendments to enhance soil quality. Compost applications to urban soils can reduce organic waste disposal in landfills and use of synthetic nutrient fertilizer applications needed to improve food production. An additional benefit of compost application to urban soils is risk reduction of contaminant exposure by reducing the bioavailability of heavy metals such as lead or by preventing direct contact exposure by applying compost as layers or mulches to contaminated soils. Quality, affordable compost is often inaccessible for urban farmers. Many are financially disadvantaged and

cannot afford enough compost to improve soil health, increase productivity and mitigate soil contaminants. Indiana urban farmers have an opportunity to improve farm profitability by producing compost on-site using locally-sourced feedstocks. Different compost feedstocks such as vegetable residues, food scraps, yard wastes and manures have been used on urban farms in Indiana. However, production and application of composts from those feedstocks can be a complex challenge for urban farmers requiring new knowledge of best management practices for monitoring and testing compost and soil characteristics. We have found that urban farmers are interested in learning how to test composts and soils and interpret results plant available nutrients. In addition, farmers are interested in test results for pH levels and lead concentrations because soil pH can impact lead bioavailability. Educational training and management recommendations are needed for farmers to learn skills to sustainably produce sufficient compost for urban farms and interpret results from testing and monitoring to enhance soil health and safety in urban farm soils.

### Evaluating the Sustainability of Urban Food Production

*Nicole Kennard*

Department of Chemistry / Department of Animal & Plant Sciences, University of Sheffield

With an estimated 68% of the global population living in urban areas by 2050, it is imperative that cities respond to this rapid urbanisation in ways that promote equity, sustainability, self-sufficiency, and efficient resource use. The limited land, water, and energy resources that are further stressed by climate change will challenge the world's ability to secure a stable and accessible supply of food for a global population of 9.7 billion by 2050. Thus, an increased strain will be placed on agricultural land to provide the necessary quantity and quality of food to support a rapidly urbanising world. In response to this, there has been a growing urban agriculture movement worldwide to improve local food access and increase the food self-sufficiency of cities, thus enabling resiliency in the face of climate change. However, the sustainability of urban farms, which may suffer from degraded or polluted soils and lack access to agricultural supplies and educational opportunities, is not fully understood. This study aims to compare the environmental impacts of conventional and organically managed urban, peri-urban, and rural fruit and vegetable farms. This study will thus provide information on how a farm's scale, distance to consumer, and management practices influence its overall sustainability. Using life cycle assessment (LCA), the inputs, energy, and infrastructure used to grow, process, package, store, and transport a fruit / vegetable crop to the consumer will be analysed for two to four specific crops on each farm. This data will be used to find associated environmental impacts, including: global warming potential (kg CO<sub>2</sub>-eq), acidification potential of soil and water (kg SO<sub>2</sub>-eq), eutrophication potential (kg PO<sub>4</sub><sup>3-</sup>-eq), energy use / fossil fuel depletion, and land use. The study will include approximately ten farms each in two case study sites, in the U.S. and the UK, focusing on farms which supply to Atlanta, GA, USA and Sheffield, UK. This will thus provide a representative view of the sustainability of horticulture farms in two developed countries with different agricultural policies and traditions. Each farm included in the study will be provided with a personal report highlighting their environmental impacts and describing target areas where sustainability could be improved. Farmers can also engage in the research by providing sustainability improvement suggestions that can be tested in the LCA software. The project is currently in the data collection phase and will be completed by March 2020.

## Vertical Farming: Using Climate Design Solutions to Improve Access and Drive Economic Development

*Suvrajit Saha*, Michele Bandecchi

Klimazone Labs

A shift to high-yielding crops have resulted in just four crops providing more than half of the world's food. Coupled with climate change and population growth, the world is confronted with a food security problem and a societal emergency. Could vertical farming provide a solution? Touted as the future of agriculture in the urban farming context, vertical farming remains highly exclusive, expensive, and limited in scope. One of the major cost factors of vertical farming involves designing climates conducive to plant growth in enclosed environments. The development of climates for indoor agriculture is time-consuming, resource-intensive, and complex, thus limiting the appeal of indoor vertical farming to VC-funded companies. This has resulted in duplication of research without any substantial benefits as far as spread, accessibility, and choice of crops are concerned.

Klimazone Labs is focusing on standardising climate design for indoor agriculture. This involves creating plant-specific climate datasets: Datasets that store essential climatic and nutritional parameters and their operating window in digital form. These climate datasets would control farm equipment such as lighting, HVAC systems, nutrition release setups, etc. in a plant-growth-phase-dependent manner: Regulating and synchronising the operation of various systems for each unique growth phase of a plant. Climate datasets would thus make specialised knowledge available in a distilled and portable format while eliminating the need for expensive and duplicate research. This would reduce developmental expense associated with indoor vertical farming and lower currently high barriers to entry. The easy availability of climates for indoor agriculture would enable individuals and groups to start their own vertical farming businesses, sustain themselves economically, while offering consumers with greater choice. Using technology to make vertical farming accessible and simple would thus lead to broader wealth creation and result in social empowerment of weaker sections of society. Besides, it would also help bring back lost varieties and provide populations – both urban and non-urban – access to healthy and tasty food. At the same time, a broader and deeper spread of farms would acquaint urban populations with agriculture and introduce them to the rich diversity of food crops and plants, that have vanished from a large part of the world.

## Oral Session #6: Challenges of Growing in Urban Areas

Wednesday, October 14, 2020, 1:00-1:45 pm

Growing Crops on Urban Brownfields: How Safe is it?

<sup>1</sup>*Ganga Hettiarachchi*, <sup>1</sup>Sabine Martin, <sup>2</sup>Ann Carroll,

<sup>1</sup>Department of Agronomy, Kansas State University

<sup>2</sup>US EPA

More and more community gardens are being established on brownfield sites and in brownfield areas, especially in food deserts in urban cores. While community gardens help to beautify neighborhoods and bring blighted properties back to productive use, a previous survey conducted by Kansas State University indicated that the potential of soil contamination associated with these sites, how to deal with it, and where to get assistance, is often not known. The majority of respondents reported no confidence in their ability to manage soil to mitigate human health risks associated with lead and/or other contaminants. While not all brownfield sites are suitable for growing crops, the majority of sites could be used as gardens after appropriate evaluation and by applying best management practices. In this presentation we will provide information on steps to safely garden on an urban brownfield site, including how to get site history information; where, how and what to sample for; resources for soil analyses; understanding soil test results; what to grow in order to avoid uptake of potential contaminants by food crops; and best management practices focusing on reduction of both direct (soil-human) and indirect (soil-plant-human) exposure. We also will discuss 2018 Farm Bill provisions that include site soil assessment and soil remediation as activities eligible for some USDA grants funds.

### Characterizing Exposures to Heavy Metals in Urban-grown Produce from Baltimore City's Urban Farms and Gardens

*Sara Lupolt*, Raychel Santo, Ghassan Hamra, Keeve Nachman

Environmental Health and Engineering, Johns Hopkins Bloomberg School of Public Health

Emerging evidence suggests significant social, economic, health, and environmental benefits of urban agriculture. However, limited work has characterized the risks from contaminant exposures faced by those engaging in urban agriculture. The Safe Urban Harvests Study is a community driven study that aims to characterize potential health risks of exposure to heavy metals in the soil, irrigation water, and urban-grown vegetables among urban farmers and gardeners growing edible plants in Baltimore City. This study was conducted in partnership with the Community Greening Resource Network (CGRN), the Farm Alliance of Baltimore (FABC), the Baltimore City Office of Sustainability, and the University of Maryland Extension – Baltimore City.

We recruited, surveyed, and collected samples from 104 (77% of eligible) farms and community gardens growing food in Baltimore City. A representative from each farm/garden site completed a survey providing: site history, plants grown, growing practices, the number of engaged participants and volunteers, and activities occurring on site. At every recruited site over the 2017 growing season, we collected samples of irrigation water and growing area soil, as well as two additional samples

representing non-growing soils. At 72 farm and garden sites, we collected at least one of the thirteen most commonly grown fruits/vegetables, including: kale, collards, lettuce, carrots, potatoes, sweet potatoes, tomatoes, peppers, cucumbers, eggplant, squash, beets, and beans. For each urban-grown item harvested, we collected a sample of growing-area soil immediately adjacent to each plant. For purposes of comparison to urban-grown produce, we purchased at least thirty samples of each item from local grocery stores (representing both conventionally produced and USDA-certified Organic) and farmers markets (representing peri-urban production).

The total concentrations of 5 metals (As, Ba, Cd, Ni, Pb) were measured in produce using Inductively coupled plasma atomic emission spectroscopy (ICP-AES). Concentrations of arsenic and lead measured in fruit and vegetables were similar across all groups (e.g., urban-grown, conventional, organic, peri-urban).

Preliminary analyses suggest weak correlations between soil and produce metals concentrations. Each participating farm/garden received a confidential site report summarizing results for samples collected at their site, and interpretation containing the amount of each metal present in one cup, compared to a daily recommended limit for that metal. Soil and irrigation water results were presented previously, a summary of aggregate produce concentrations and produce risk estimates for consumers will be presented.

#### 48 Ways to Secure the Promise of Commercial Urban Farming

<sup>1</sup>Anu Rangarajan, <sup>2</sup>Samantha Schaffstall, <sup>3</sup>Joseph Heller

<sup>1</sup>Horticulture, Cornell University

<sup>2</sup>USDA Agricultural Marketing Service

<sup>3</sup>United States Department of Agriculture

As urban farms have proliferated around the United States in the past decades, much attention has been paid to their youth engagement, community development, educational and other social impacts. Commercial-focused urban farmers may have many social and community goals as part of their mission but they seek to primarily support their farms through sales of agricultural products. Yet there have been few assessments of how commercial urban farms, which face the narrow margins and high risks of growing produce in small spaces, can thrive based on primarily sales of their products. While there are some emerging sectors in commercial urban farming that are highly capitalized (e.g. controlled environment agriculture, vertical farming), most soil-based urban farms face many of the same challenges as rural small farms. A recent publication, “The Promise of Urban Agriculture,” summarizes the journey of 14 urban farmers and insights from over 150 policy-makers, urban planners, funders, and nonprofit and community organizers engaged in local food systems and urban farming to uncover the policies, resources, and future research and development needed to support the development of commercial urban farms. The summary recommendations outline 48 strategies for urban farmers, federal policy, local policy and planning, urban agriculture programs and research and extension communities to support continued development of commercial urban farming. We will present the recommendations gleaned through these case studies and interviews and suggest priorities for further discussion.

Factors Affecting the Profitability, Productivity, and Sustainability of Socially Disadvantaged Urban  
Agriculture Operations in Pittsburgh, Pennsylvania

*Hannah Whitley*

Department of Agricultural Economics, Sociology, and Education, The Pennsylvania State University

Over the past twenty years, various initiatives and policy updates have encouraged sustainable agriculture production in cities across the United States, yet farmers and growers still face multiple environmental, economic, and social challenges unique to their urban context. From January to June 2019, I used a mixed-method qualitative design to identify factors that affect the profitability, productivity, and sustainability of socially disadvantaged urban agriculture operations in Pittsburgh, Pennsylvania. Utilizing a unique research method called “photovoice” in combination with 30 semi-structured interviews and 15 weeks of participant observation, my findings reveal nine factors that constrain sustainable agriculture production for socially disadvantaged growers in the city: bureaucratic red tape, communication, community support, finances, inconsistent volunteers, isolation, lack of mentorship, lack of (relevant) information, and land access and/or tenure. Comparisons of participant demographic characteristics show that women growers ages 18-34, regardless of race, are more likely to struggle with navigating bureaucracy, finding mentors, accessing relevant information, and experience feelings of isolation. This finding suggests that new and beginning urban growers struggle to navigate the complex systems of non-profit, extension, and federal support programs and organizations in place to support Pittsburgh’s agriculturalists. In addition, this study has identified the need for citywide education and extension programming that meets the unique circumstances of urban growers, such as workshops and trainings that describe best practices for soil remediation, marketing, and distribution strategies for small-scale farms and gardens. This research provides important insight to critical urban agriculture scholarship and encourages discussion concerning the strengths and shortcomings of existing urban agriculture support services and opportunities for improvement among existing non-profit organizations, government agencies, research institutions, and extension services.

## Oral Session #7: Training for Urban Farmers

Wednesday, October 21, 2020, 11:00 am

Outreach, Training and Technical Assistance (T&TA) Resources for Limited Literacy Farmers

<sup>1</sup>Hugh Joseph, <sup>2</sup>Katie Painter, <sup>3</sup>Lauren Bailey

<sup>1</sup>Friedman School - Ag, Food & Environment Program

<sup>2</sup>ISED Solutions

<sup>3</sup>Nashville Food Project

Existing outreach and technical assistance resources (books, manuals, websites, forms, flyers, etc.) are accessible to most U.S. farmers but are not suitable for immigrant and refugee farmers who have limited literacy, education and English language abilities. In place of these, providers or instructors use images, visual props or tools, oral presentations (with interpreters), audience discussions, and field demonstrations. However, resources that integrate such approaches are scarce, and 50+ projects nationwide that work with thousands of aspiring and beginning immigrant and refugee farmers have had little to work with.

ISED Solutions, a national refugee- and immigrant-serving organization, collaborated with 18 refugee-serving projects over three years to produce over 60 'modules' on a variety of farming topics, to be used by these and other programs serving new American producers (available at <https://nesfp.org/new-american-resources>). We also developed a companion Teaching Handbook (<https://nesfp.org/resources/refugee-farmer-teaching-handbook>). The work was supported via USDA Beginning Farmer funding. We have continued this work, producing another 18 modules, via support from USDA Risk Management Agency

This presentation will provide an overview of these resources and related adult education strategies, with examples from two partner projects that developed them – International Rescue Committee (Charlottesville, VA), and The Nashville Food Project. With over 6,000 downloads, these resources clearly are useful to any beginning and small farm initiatives, in that they uniquely cover many of the basics for developing such enterprises.

### Hydroponics in Jail

Hannah Wooten

UF/IFAS Extension, University of Florida

According to a study by the Bureau of Justice Statistics, 83% of state prisoners were arrested at least once within nine years following their release. Reducing recidivism rates by providing educational training is one method to reduce the tendency of a criminal to re-offend. Only 7% of local correctional facilities provide vocational training for the incarcerated population. Correctional facilities in urban areas have the capacity to provide vocational training to inmates in urban agricultural techniques. The John E. Polk Correctional Facility in Seminole County, Florida maintains a partnership with University of Florida/ Institute of Food and Agricultural Sciences Extension to provide vocational training to female

inmates in greenhouse production of hydroponic fruits and vegetables. The partnership consists of a 5-day, 26 hour, intensive classroom and hands on training in the hydroponic greenhouse. Since the first pilot program in August of 2017, 89 women have earned a Certificate of Completion in Hydroponic Production of Fruits and Vegetables. End of program evaluations (n= 64) indicate 100% increased knowledge on hydroponic growing, systems, and IPM, 98% received the Certificate of Completion, 92% would consider a career working with plants. Participant follow up indicates at least one participant has accepted a job as Assistant Grower, and another participant has started her own microgreens business. Here is a video capturing the program impacts (<https://www.youtube.com/watch?v=XAR6Jr77p7Q>). Deputies provide anecdotal evidence of reduced recidivism saying they do not see the women that participate in the hydroponics program return in as great of frequency as other inmates. Qualitative data indicates that the training program increases morale, boosts self- confidence, and prompts interest in learning. The correctional facility greenhouse sells \$9000 in produce annually to the cafeteria increasing the amount of fresh produce being served to both the deputies and the inmates. Partnering with correctional facilities has beneficial teaching, learning, and revenue enhancing opportunities. The program is on-going with future goals to collect long term data on recidivism rates, while increasing the productivity of the hydroponic greenhouse.

### Refugee Farmer Development at Juniper Gardens Training Farm

*Semra Fetahovic*

Juniper Gardens Training Farm, Cultivate KC

The Juniper Gardens Training Farm is a partnership with Cultivate Kansas City, Catholic Charities of Northeast Kansas and the Kansas City, KS Housing Authority. It is located in northeast Kansas City, KS in the middle of Kansas' oldest and largest public housing project. The 9-acre site is home to a dozen community gardeners, 15 farmer trainees, and three program graduates who lease plots and farm infrastructure for the growing season. The four-year farm incubation program (New Roots for Refugees), started in 2008, assists re-settled refugees in starting independent farm businesses on ¼ acre plots and provides four years of production, marketing, and business management skills through farm classes and one-on-one training from trained staff. As of 2019 we have graduated 32 farmers from the program, and over 80% of them are still growing and selling in the Kansas City Metro. Farmers in the program come from extremely different backgrounds, with varying levels of education, language and farming skills; thus program training must remain dynamic to meet both farmer needs and the ever-changing agricultural environment they are growing in. We will present on our educational model, which has been developed to suit our refugee farmers, but can also be adapted to other non-English speakers and audiences with different educational levels. Training at Juniper Gardens starts in the winter with English classes, transitions into the spring with production planning and farm classes, and continues throughout the growing season with one-on-one field walks. Program funding is scaffolded in that trainees receive more financial assistance in the first year and this slowly decreases during their time in the program, so that by the fourth year they are prepared to incur these expenses once they are on their own. In the past year, more efforts have been made to scaffold the educational components of the program as well. English classes are offered at different levels based on skill level, frequency of field walks are based on years in the program and farmer preference, and farm classes vary in content based on skill and years in the program. One of the largest challenges is synchronizing all of the materials and data collection across different teaching methods (i.e. field walks, English classes, and farm classes). Throughout the

years, our teaching methods have been altered and adapted, this presentation will focus on current best practices, but will also reflect on challenges and adaptation needs.

## Denver Botanic Gardens: Expanding the Role of Public Gardens in Urban Food Systems

*Brien Darby, Josie Hart*

Horticulture, Denver Botanic Gardens

Historically, the role of the public garden has been to showcase living plant collections through innovative and highly maintained horticultural displays. More recently, several public gardens, including the Denver Botanic Gardens, have endeavored to reach the public through different means: urban agriculture (UA). Programs showcasing UA outreach include community gardens, urban farms, farmer-in-training programs, incubator farms, urban farm stands and community supported agriculture (CSA). Urban agriculture offers many opportunities for partnership including land tenure, audience and point-of-sale connections.

The mission statement of the Denver Botanic Gardens is to connect people with plants. Through a collection of urban food initiatives, the Gardens fulfills the mission by providing opportunities for farming, education and food access to the metro-Denver area. The Gardens' original site is situated in a densely-populated neighborhood near downtown Denver; beyond an on-site demonstration kitchen garden and nearby community garden, there is limited space for UA programming. The Gardens' larger, peri-urban site, Chatfield Farms, offers a unique public garden opportunity. Visitors to Chatfield can observe a working farm with roughly 10 acres of production agriculture. Most of the output is diverted to a CSA program with a portion being reserved for use at farm stands operated by the Gardens in low-income neighborhoods around Denver. These farm stands are in part a vehicle for Colorado's Double Up Bucks program, which seeks to increase purchases by recipients of the federal Supplemental Nutrition Assistance Program (SNAP). A veteran farm training program operates at Chatfield using the same fields for training. Students in the program receive stipends to participate in land-based farm education with opportunities for further engagement beyond the bounds of the curriculum.

A partnership with the Denver Housing Authority (DHA) affords offsite opportunities for farming, education and food access. In addition to participating and/or observing in farm activities at urban farms on DHA properties, resident feedback influences crop choices and educational sessions. Lastly, in partnership with Colorado State University Extension, the Gardens offers a Beginning Market Farmer certificate course for anyone interested in minimally mechanized farming on five acres or less. Students attend lectures and workshops at metro-area farms and staff from the Gardens and Extension provide technical assistance and/or one-on-one mentorship.

## Oral Session #8: Urban Planning and Development

Wednesday, October 28, 2020, 11:00 am

### Changing Zoning Codes to Incentivize Urban Agriculture and Increase Food Access

<sup>1</sup>Whitney Shields, <sup>2</sup>Amanda Karls, <sup>1</sup>Lihlani Nelson

<sup>1</sup>Center for Agriculture and Food Systems, Vermont Law School

<sup>2</sup>Public Health Law Center at Mitchell Hamline School of Law

The Healthy Food Policy Project focuses on local laws that promote access to healthy foods with an emphasis on socially disadvantaged and marginalized groups. Urban agriculture can help improve food security by producing fresh fruits, vegetables, and some animal products close to or in residential areas. Cities can encourage urban food production through different policies and programs such as allowing community gardens on city property, encouraging the use of vacant lots for urban farms, or supporting farmers' markets and local produce sales. One key policy lever that cities can use to encourage urban food production is the zoning code. By studying local zoning codes across the country, the Healthy Food Policy Project found that specifying permissible uses related to urban agriculture in the zoning code is a crucial aspect of encouraging urban food production and increasing access to fresh food for residents.

In order to understand how cities have been using the zoning code to support urban agriculture and food access, this study looked at code amendments or updates passed in the last ten years. Code changes were evaluated on whether inclusions were made that could potentially increase food access for residents or encourage urban agriculture production. From this evaluation process, 13 cities were selected for further analysis and interviews.

Several commonalities and best practices emerged from this in-depth analysis. Many of the cities studied included: specific definitions of urban agriculture, established where urban agriculture was allowed as a land use, permitted on-site sale of agricultural products, removed some restrictions on animal husbandry, authorized the use of public land for non-commercial growing, and allowed accessory structures to be built. These changes or inclusions encourage urban food production by providing protection for growers through clear regulations and allowances while permitting food to be grown or purchased in urban areas. Additional inclusions that could further increase food security were specific equity language that referenced underserved communities, and city programs that ensured access to land for those who may struggle with the financial aspect of purchasing land for urban agriculture.

This study provides information for city officials or food policy advocates who are interested in proposing zoning code changes in their own city to both encourage urban food production and increase food security in underserved communities. Understanding the best practices of zoning for urban agriculture can encourage other cities to make similar changes through amending or updating their zoning codes.

## Collaborating to Thrive: How Partnerships and Collective Planning have Accelerated Urban Food Production and Engagement in Lansing, Michigan

<sup>1</sup>Abigail Harper, <sup>2</sup>John Krohn, <sup>3</sup>Vanessa Garcia Polanco, <sup>4</sup>Aliza Ghaffari

<sup>1</sup>Extension, Michigan State University

<sup>2</sup>Ingham County Land Bank

<sup>3</sup>Michigan State University Community Sustainability Department

<sup>4</sup>Magnolia Farms and Northwest Initiatives

Lansing is host to a thriving urban agriculture scene – from community and backyard gardeners producing food for their family and neighbors, to farm businesses exploring season extension and profitable enterprises, and education at all scales, urban agriculture has become an integral component to many neighborhoods and communities throughout the city.

While Lansing is one of many cities turning to urban agriculture to support placemaking and address food security, it is the collaboration across sectors and organizations that makes Lansing agriculture unique and helps build its resiliency through economic and population fluctuations. While each organization approaches urban agriculture with a different vision and goal in mind, their cross organizational programming, infrastructure to support communication, and commitment to relationships has helped create this thriving urban agriculture sphere that has support across many diverse organizations.

This panel will highlight the variety of organizations and policies that have helped create a collaborative, educational, and productive urban food system. We will highlight the keys to success that have helped grow these efforts thus far, along with exploring the various social, political, and economic challenges that face Lansing agriculture. Panelists will explore strategies to help ensure the resiliency of this ecosystem in a changing economic and environmental climate. We hope to show the impact this collective effort can have by bringing together stakeholders with distinct visions and communicating across differences to create a unified vision that has greater impact than any individual initiative could alone.

Organizations, initiatives, and policies that will be highlighted include:

- Ingham County Land Bank, which provides affordable land access, resources and services for community gardens and small agriculture businesses;
- Greater Lansing Food Bank Garden Project, supporting growers through horticulture education and providing seeds, plants, and tools to support new and low-income gardeners;
- The Lansing Grown Label - a marketing and branding initiative to help urban farmers gain market recognition in area restaurants and grocers;
- Capital Area Food Council and policies supported to make season extension more viable on city owned land; and
- MSU Extension, providing nutrition education, Junior Master Gardening programs, agriculture education and networking support to grow the local food system.
- MSU Department of Community Sustainability, supporting research about planning, urban food resilience, biological and cultural diversity in the urban food system.

## Healthy Food Access is More About its Affordability Than its Proximity

*Aurora Buffington*, Millicent Braxton

Health & Nutrition, University of Nevada Reno Extension

Healthy food purchasing and consumption behaviors among low-income, low-access consumers are often attributed to the availability of healthy food retail outlets in their neighborhoods. However, studies suggest that the adage “if you build it they will come” may not result in improved dietary intake and access because drivers of behavior are multi-faceted and not confined to the factor of proximity. A local food policy council subcommittee, with the guidance of Extension professionals, explored perceptions of food access among patrons of service providers located in low-income census tracts in Henderson, NV. The council prepared a report based on their findings to help city planners assess the needs and desires of residents living in and around identified food deserts as part of a REACH (Racial and Ethnic Approaches to Community Health) grant deliverable through a sponsorship with the local health department. Qualitative and quantitative data were obtained during three focus group sessions from 28 participants which were mostly low-income, including two groups of seniors and one group of Hispanic mothers of young children. Participants filled out a 15-item pre-survey, and a 10-item open-ended discussion guide was used to facilitate the focus group discussions. The principal factor influencing food shopping was price/cost, with quality and location/convenience following correspondingly. Seventy-eight percent used neighborhood grocery stores as their primary place to get food; however, 75% stated they also used farmers markets, and 60% also used food pantries. Qualitative data showed that most participants had a good base of existing nutrition knowledge and desired what most consumers desire: affordability, quality, selection, convenience, and safe, wholesome food. Themes emerging from the qualitative data analysis included health (current and future), planning, availability, influences on behavior, foods considered healthy or unhealthy, federal nutrition programs, and putting others’ needs before their own. Preliminary findings show that these urban low-income, low-access consumers perceive their most significant barrier to obtaining healthy food is lack of money, not living in a food desert or lack of nutrition knowledge. Ensuring residents in a food desert have employment opportunities created by the addition of a healthy food retail outlet in their neighborhood may be more meaningful than bringing in a business run by outsiders. City planners are challenged to explore ways to help low-income residents get a “leg-up” in their community through job creation and other forms of community development that create economic opportunity as well as increase access to good quality healthy food.

### Community Gardens: Food Insecurity, Site Suitability, and the Masterminds Behind It All

<sup>1</sup>*Michelle Nelson*, <sup>2</sup>Susanne Paul

<sup>1</sup>Montgomery Parks - Horticulture, Forestry, and Environmental Education

<sup>2</sup>Maryland National Capital Park and Planning Commission

The Community Garden Program has been in existence for 10 years. In the past the program has been very opportunistic in its approach to expansion and securing new locations. According to the PROS Plan 2017, 18 additional Community Gardens are needed in the county by 2030. The site suitability study helps to create a more formalized process, structure, and timeline for community garden development. In this session, attendees will learn how park managers, park planners, and horticulturalists come

together to plan and design new community gardens utilizing community input, food security data, GIS, and creativity.

The Horticulture, Forestry, and Environmental Education (HFEE) and Park Planning and Stewardship (PPSD) Divisions collaborated to develop community garden site suitability criteria and conduct a site suitability study for parkland in the county. There are over 400 parks in Montgomery County but there are many amenities competing for open, flat, sunny space. The previous criteria for community gardens included an open flat area of at least 10,000 square feet. To explore new sites and expand our creativity for programming, the area criteria was modified to 4000 square feet\* to explore different typologies for a more inclusive program offering within Parks.

Other criteria included adequate sunlight (6 – 8 hours of sunlight during May – September), access to water (proximity to a hydrant or water fountain), available parking, and CPTED considerations (crime prevention through environmental design). In the study, additional criteria were included, Montgomery County FOODSTAT Data and Wait List Area recommendations made by the Program Manager. FoodStat is an online platform created in partnership with the Montgomery County Food Council, Manna Food Center, the Capital Area Food Bank, Montgomery County Department of Health and Human Services, and CountyStat that brings together 60 data indicators of need, vulnerability, and food insecurity. This information informs the strategy of program expansion to include an equity lens and a food security lens. Community gardens can be planned more strategically in communities of higher need and higher food insecurity.

This study is ongoing and has lots of potential to bring something new to Montgomery County and continue the sustainability of the program!

\*The smallest community garden is 10 – 400 square foot plots, which is roughly 4000 square feet of planting space. In addition, Nolte Park Activity Building is roughly 4000 square feet which allows for a different garden typology

## Oral Session #9: Urban Food Distribution Systems

Wednesday, October 28, 2020, 12:00 pm

Using Participatory Research to Expand the Customer Base of Farmers' Market Shoppers

<sup>1</sup>*Gail Feenstra*, <sup>2</sup>Julia Van Soelen Kim, <sup>3</sup>Suzanne Grady, <sup>4</sup>Susan Garcia

<sup>1</sup>UC Sustainable Agriculture Research & Education Program, University of California, Davis

<sup>2</sup>UC Cooperative Extension, Marin/Sonoma

<sup>3</sup>Petaluma Bounty

<sup>4</sup>Center for Well-Being

Direct-to-consumer sales (DTC) through farmers markets, CSAs, and urban farm stands has become an important venue for bringing fresh, nutritious, regional food to urban consumers and creating economic and social linkages between urban and peri-urban farms. However, the growth in direct-to-consumer sales has begun to plateau for many local food producers nationwide. In addition, many urban consumers, particularly those using government food programs (SNAP, WIC, Senior Nutrition Program), have limited access to DTC sales opportunities. Farmers Market LIFE (Local Incentives for Food and Economy) seeks to address these needs by expanding the customer base of farmers market shoppers in Sonoma and Marin counties, making farmers markets more inclusive and increasing overall sales for farmers market vendors.

This project is now engaged in a community-based participatory research phase (phase 1) of a multi-year USDA funded project. In addition to a comprehensive literature review of barriers and actions that other farmers markets across the country have taken to achieve similar goals (completed), this project engages community partners to gather baseline data to identify social, cultural, linguistic, behavioral and economic obstacles and opportunities for SNAP (CalFresh in California) and other users to shop at farmers markets. Community partners helped design and are now gathering data about selected markets through an “environmental scan.” This tool has proved highly effective at providing insights into market dynamics including potential barriers and solutions that already exist at some markets to make them more inviting to CalFresh customers. In this presentation, we will share results of this tool to highlight its methodological potential for other participatory research projects and to elaborate on our experience utilizing it at farmers markets.

By the conference, we will also be finishing our data analysis from three other community designed tools: 1) a consumer intercept survey at farmers markets, 2) a consumer intercept survey at nearby grocery stores and 3) a vendor survey. These data will further illuminate barriers affecting market inclusivity for CalFresh-eligible shoppers, which in turn, will inform the community designed market interventions aimed at addressing the identified market accessibility issues.

Finally, we plan to have results from at least three focus groups in which initial data from the environmental scans and surveys will be “ground-truthed” to find out how it resonates with farmers market shoppers and what opportunities they see to improve farmers market access.

## The Kansas City Food Hub: Farmer-Owned, Farmer-Run

<sup>1</sup>*Katie Nixon*, <sup>2</sup>Alicia Ellingsworth

<sup>1</sup>The Kansas City Food Hub

<sup>2</sup>KC Farm School at Gibbs Road

Founded in 2015 by the farmers who own, run and supply it, the Kansas City Food Hub has 250 years of collective growing experience and embodies the deeply held beliefs that have sustained American farmers for generations: a commitment to land stewardship; the production of wholesome food; the education of the next generation of farmers; a commitment to community; a dedication to food sovereignty; and honest wages for honest work. Sixteen small and medium-sized, family and not-for-profit, rural and urban farms work together to aggregate produce, protein and value-added goods meeting the demands of the middle market including school and corporate cafeterias, restaurants, and locally-owned grocery stores. Growing our share of this market, we are improving the economic viability of sustainable local agriculture. We are organized in a web of sub-hub aggregation points; no farmer is asked to drive more than 45 miles one-way to drop off clean, sale-ready product. Our sub-hub facilities have walk-in coolers, freezers, and processing equipment and each farm is in compliance with the FDA's Food Safety Modernization Act and four farms have USDA GAP certification. Food travels to our urban sub-hub location and out to buyers in a farmer-owned Sprinter van driven by a young farmer. Our sales director is a member farmer. In 2019, we launched a veggie subscription service to corporate customers, developed an online ordering system, and gained an urban farm and aggregation site to be more responsive to our buyers as well as more convenient for our farmer members. We coordinate year-round growing in our collected twenty-five high tunnels and six greenhouses to reduce glut, we source supplies together to get a more reasonable price, and we support each other with mentorship. We write grants to fund individual farmers in scaling up and in addressing climate change. Our off-farm work with organizations such as West Central Community Action Agency and Kansas State University's Douglas County Extension supports efforts to grow the market for all farms and draws down into the local community more funds for training, organizing and scaling-up of production. Working together and supporting the agricultural community both on and off-farm, the members of the Kansas City Food Hub are creating a more food secure region by growing the web of connection between our members and among the farming community beyond our members. As demand grows, so does the Food Hub, and so does our food security.

### Willingness-to-Pay for Lettuce Labeled as: Local, Organic, Pesticide-Free, Indoor-Grown, Outdoor-Grown

*Maya Ezzeddine*

Horticulture, Cornell University

Consumer demand for locally-sourced food has been growing. While consumers are requesting a wider array of locally-grown produce options, it is unknown whether an increased availability of locally-grown options would also signify increased instances where consumers elect to purchase locally-grown products as opposed to their non-locally-grown counterparts. Does local production act as the driving force in consumer purchase decisions, or are there other major contributing factors, such as price? A discrete consumer choice experiment was conducted for a sample population of over 200 New York City residents across 12 sites in the five boroughs of NYC in July 2019. Survey sites were selected based on

demographic data of NYC residents including percent of households below poverty, whether English was the main language spoken at home, and proximity to fresh markets. Additional consideration was given to cultural demographics of the neighborhoods. The survey was made available in English and Spanish, and additional assistance was available as needed. Individuals were presented with eight hypothetical scenarios. In each scenario, they were asked to choose whether they'd prefer to buy lettuce package A, B, or neither. Each lettuce package was identical save for the label language. The package labels each had four attributes, selected based on an examination of prices and product labels across NYC markets, and validated based on survey review with urban farmers based on their own marketing strategies. The four attributes are: 1) price (from the options: \$3.50, \$4.50, \$5.50), 2) production location (NYC, New York State, or USA), 3) growing method (indoor-grown, or field-grown), and 4) treatment (organic, pesticide-free, or no language describing treatment). Based on the most frequently selected attribute combinations, a discrete choice analysis was conducted to understand what most consistently drove the consumer to purchase lettuce A or lettuce B. Analysis results indicated that price was the most consistent driving force. While other factors such as locality may influence consumer behaviors or desires, they were statistically secondary to price. Consumer purchase behaviors were further analyzed in relation to secondary factors, including age, household income, education level completed, ethnicity, and household size. Consumer selections were also compared to their own self-reported ranking of what is most important to them when purchasing groceries: price, convenience, organic, or local. The insights offered by a consumer willingness to pay study can suggest strategies which may be used when introducing new local products into the marketplace.

#### Maintaining the Quality of Locally Grown Spinach with the Implementation of Passive Modified Atmosphere Packaging

<sup>1</sup>*Konstantinos Batziakas*, <sup>2</sup>Singh Sehbaz, <sup>1</sup>Eleni Pliakoni, <sup>3</sup>Jeffrey Brecht

<sup>1</sup>Department of Horticulture and Natural Resources, Kansas State University

<sup>2</sup>Curation Foods

<sup>3</sup>University of Florida

Local fruit and vegetable small acreage production has been steadily expanding in the U.S. Fresh produce is highly perishable and will deteriorate rapidly if appropriate postharvest handling is not practiced. Postharvest handling is a particular challenge for small acreage producers, who frequently have limited access to postharvest handling resources like optimum refrigeration conditions. Passive MAP is a relatively inexpensive intervention that does not require specialized equipment and has demonstrated some potential for maintaining the quality and extending the shelf life of fresh produce stored in non-optimum temperatures. Our objective was to determine the effect of passive MAP on the quality and storage life of locally grown spinach (*Spinacia oleracea* cv. Corvair) when stored in non-optimum temperatures. Mature spinach leaves (~320 g) were packaged in passive MAP bags, developed using the BreatheWay® technology, and non-MAP produce bags and subsequently stored at 13 °C or 21 °C. Spinach physical and nutritional quality was evaluated throughout its storage life in terms of overall visual quality, water loss, leaf tenderness, surface color, chlorophyll content, electrolyte leakage, chlorophyll fluorescence, antioxidant capacity, total phenolic content and vitamin C content. Spinach that was stored in MAP bags reached headspace equilibrium at approximately 6% O<sub>2</sub> and 11% CO<sub>2</sub> at 13 °C and approximately 4% O<sub>2</sub> and 8% CO<sub>2</sub> at 21°C after 2 days of storage for both temperatures. The

spinach stored in passive MAP at 13 or 21 °C demonstrated significantly higher visual quality during storage and 2 and 1 day longer storage life, respectively, when compared to the control. The spinach in passive MAP demonstrated a slower rate of yellowing and water loss during storage. The limiting factor for the spinach stored in MAP was decay due to condensation at 13 °C and yellowing at 21 °C. There were no statistical differences in the examined nutritional quality parameters between the spinach stored in MAP and produce bags. This study shows that passive MAP can be a valuable tool for reducing the food losses occurring in small acreage fruit and vegetable operations that have limited access to cooling and refrigerated storage.

## Oral Session #10: Nutrition and Food Security

Wednesday, October 28, 2020, 1:00 pm

### Investigating New Orleans Food Deserts: Causes and Best Practices

*Lexi Mestas*

Department of Food Studies, American University of Rome

The imbalance between wealth and poverty, food security and insecurity among New Orleans' residents arose from the city's foundation. Exacerbated throughout its history and propelled by crippling natural disasters, food deserts have remained a core health concern faced by the city and its residents. Today, a multitude of factors including gaps in accessibility, competitive relationships between programs, and limited attention to local culture, traditions, and history contribute to the most pressing hurdles in solidifying food access to New Orleans' most in-need residents. Analyzing the city's historical ethnic geography, post-Katrina social and political climate, local forms of agency, and residents' spirit of resilience, this study follows New Orleans' food deserts from conception until today, seeking to grasp the particular needs of residents in food deserts and the significance of refining an understanding of socio-cultural determinants in proposing solutions. The research analyzes three New Orleans food deserts: Hollygrove, St. Roch, and the Lower Ninth Ward in addition to programs in each. The approach to the research study follows a pragmatic worldview and qualitative design which accommodates an inductive style, allowing for emerging questions and adaptability. The study makes use of existing literature while gathering data in the natural environment from semi-structured interviews and maintaining an observational journal. Questioning and research progress from general to specific while recurring themes help formulate probable theories and conclusions. The following research questions act as a guide: (1.) What are the causes (historical, social, and political) of New Orleans' food deserts? (2.) How, if at all, are current solutions and projects contributing to establishing food security among New Orleans' residents living in food deserts? What issues surround their approach? (3.) In what ways is the food sovereignty model appropriate for New Orleans' food desert challenge? Collected data gave way to cross-cutting themes of accessibility, the elite culture of health, and the nature of competition. Analyzing the data against the six pillars of food sovereignty, gaps and shortcomings were highlighted. The findings that have emerged from the research suggest that: (1.) The residents' needs and voices, as well as the city's rich culinary history and traditions, must be taken into account. (2.) There should be a promotion of local forms of agency, putting control at the local level. (3.) Autonomy, independence, and power for residents should be fostered through the promotion of knowledge and skills. (4.) Projects and residents should take New Orleans' unique topography into account.

### Addressing Food Security through Cooperative Urban Farming

*Tim McDermott, Dana Hilfinger, Angela Blatt*

Initiative for Food and AgriCultural Transformation (InFACT), The Ohio State University

Ohio ranks well above the national average in the prevalence of food insecurity. According to the USDA-ERS, 1 in 7 households are considered food insecure. In Franklin County alone (Columbus and metro

area), 1 in 5 children are food insecure. Urban agriculture is positioned to potentially address this issue by increasing availability of fresh produce and economic opportunities in disadvantaged areas, but challenges for urban growers abound - high cost of entry, land tenure, lack of skills and knowledge, access to and consistency of markets, to name a few. The Ohio State University (OSU) is investing in a systems approach to addressing neighborhood food insecurity and the challenges faced by urban growers through the Initiative for Food and AgriCultural Transformation's (InFACT) Institution-Supported Agriculture (Buckeye ISA) and Ohio Microfarm Projects.

Buckeye ISA is embedded in the five Franklin County neighborhoods identified by the joint City-County Local Food Action Plan as critically economically challenged. Too many of these neighborhood residents are classified as food insecure with poor access to fresh nutritious food, and must rely on the emergency food system. The project engages households with children 8 years and under in these neighborhoods and leverages local resources from government agencies, business, non-profit and institutional partners. By providing education, materials support and mentorship around local food production, the Buckeye ISA increases families' ability to provide for their personal and family food security.

Building on this work, OSU is piloting a cooperative small-plot intensive growing system for beginning farmers in Mansfield, Ohio, called The Ohio Microfarm Project, as a further step to increase urban grower sustainability. This system emphasizes a coordinated network of intensive small-scale plots managed by individual farmers, but marketed collectively, providing smaller, urban growers with the leverage and scale to be able to compete for more and larger markets.

Growing food in urban areas and connecting urban consumers with agriculture requires systemic solutions to challenges such as knowledge gaps, materials support and lack of access to productive land. By leveraging existing partnerships, innovative programming and grower network development, we aim to develop an alternative path for urban farmers and communities that is both sustainable and resilient.

#### A City Food Security Audit Tool

<sup>1</sup>*Eleni Pliakoni*, <sup>1</sup>Cary Rivard, <sup>1</sup>Jeremy Cowan, <sup>2</sup>Candice Shoemaker

<sup>1</sup>Department of Horticulture and Natural Resources, Kansas State University

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Food security, as defined by the United Nations' Committee on World Food Security, means that all people, at all time, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs for an active and healthy life. Accessibility, affordability and availability of food are the three core aspects of food security that are often at risk in urban communities. A food security audit was part of an urban food systems study tour course to help students identify how each site that we visited (urban production farms, community gardens, institutional and training farms, farmers markets, food processing facilities, distributors, grocers and other entities) contributes to food security. The audit was adapted from a similar tool that was used by a local non-for-profit, Cultivate Kansas City, to evaluate programs within their organization. A 10-point Likert-type scale was used to evaluate 10 factors that were identified as contributing to an urban areas food security: produce and process or distribute food; advocate for policy; innovate the food system; grow community around food; grow/support new and establish farmers/ processors and distributors; increase environmental sustainability; educate the public about the production and/or value of food;

facilitate (multi-institutional) research; increase food access for high risk communities; and facilitate healthy eating habits. The food security audit was utilized from 2016 to 2019 in four cities: Seattle, Honolulu, St. Louis, and Detroit, while visiting 15 to 20 sites during each 5-day study tour. The audit can be utilized to compare sites within a specific city and to compare the activities of each city based on the sites that were visited. For example, during the visit to Seattle, we identified that based on the sites we visited the city had strengths in the areas of grow community around food (5.7) whereas Honolulu had strengths in production or distribution of food (4.2). Overall, the total audit scores in Detroit and Seattle were 41.9 and 45.7 whereas the total scores in St. Louis and Honolulu were 35.2 and 33.4, indicating that the programs in place in Detroit and Seattle may be having more impact compared to St. Louis and Honolulu. Future research should include an evaluation of how city leaders and urban agriculture professionals can adopt the audit instrument in order to identify the strengths and weaknesses of their urban food systems as it contributes to their food security.

#### Homeless Shelter Food Production: Positive Implications for Clients and Volunteers

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<sup>1</sup>The Ohio State University Extension

<sup>2</sup>University of Dayton

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Homeless shelters are sometimes viewed as the last resort for those seeking a safe place out of the elements. Some have aesthetic issues. For example, the Men's Shelter affiliated with St. Vincent DePaul in Dayton, Ohio was previously a prison workhouse. Hence, residents may perceive shelters as places of despair and defeat. So, is there a way to overcome these obstacles and improve outcomes? Could growing food on-site make a positive impact for both clients and volunteers?

This project provides an overview of work conducted at the above-mentioned shelter which serves three meals a day for over 400 residents. This presents a challenge, especially for sourcing fresh produce in a food desert. In 2017, the University of Dayton's (UD's) Behavioral Activation Research Project, an ongoing project that strives to enhance psychosocial functioning of residents and provide them with opportunities to overcome homelessness, requested collaboration with Ohio State University Extension Montgomery County Agriculture and Natural Resources program to establish the Shelter Farm. The farm's objectives were to implement sustainable agriculture principles of economic viability, environmental sustainability, and social responsibility. Providing fresh produce to the shelter kitchens and thereby enhancing nutrition of shelter residents without negatively affecting the shelter food budget was the economic viability component. Overall, the team harvested over 1800 pounds of fresh produce for the kitchens of the shelters in 2018 and over 1700 pounds in 2019. They re-purposed an unused soccer field enhancing urban soils productivity, conserving water, and providing a landscape focal point in 2018. The social component was an opportunity for shelter residents to obtain job skills, social skills and support, and stress-management. E.g., The flower and rock gardens leading to the production area were designed by shelter residents. In 2018 psychological research showed that, when shelter guests work alongside UD service-learning students on the farm, they perceived a decrease in anxiety and an improved sense of wellness. UD service-learning students who assist with the Behavioral Activation Project show reductions in social stigma, increased self-efficacy for community service, and awareness of self-privilege. In 2020 service learning students' environmental attitude changes will be

assessed. The research provides a template for other homeless shelters across Ohio. Research on outcomes for shelter residents and service-learning students has implications for the homeless shelter system and educational pedagogy. Findings are considered within the context of the Behavioral Activation Project.

# Poster Session 1: Community and Economic Development in Urban Communities

October 7<sup>th</sup>, 2:00-2:45 pm

## Lessons for Leaders from Farm to Table

*Hannah Wooten*, Liz Felter

UF/ IFAS Extension, FL

Florida produces the second highest vegetable value in the United States, and agriculture is the state's second largest industry. Despite Florida's agricultural productivity, USDA- ERS estimates 12% of Florida's households are food insecure lacking available and affordable options for nutritious food. Farms in urbanizing counties face special challenges making it difficult to find sustainable long term solutions. Analysis and awareness of challenges and opportunities in the entire local food system can help initiate solutions. UF/IFAS Extension and the local food policy council, Good Food Central Florida, targeted an audience of community leaders and elected officials including Congressman and Commissioners to participate in the 2018 Central Florida Food Systems Tour. The all- day tour hosted 40 participants on a charter bus. The tour featured farmers and food system experts at large rural farms, smaller urban operations, processors, distributors, educational facilities, and a striking display of food waste. The event was guided experiential learning including an educational binder with "A Planners Guide to Community and Regional Food Planning" published by the American Planning Association. The purposeful mix of participants and presenters created a lively learning environment. Day of, post tour evaluations (n= 40) indicated 100% of participants increased knowledge about the local food system, 98% identified barriers in the local food system, and 80% identified economic development opportunities related to the local food system. Follow up evaluations seven months later (n= 16) indicate: 81% increased knowledge about resources for community food production, 81% expanded network of community partners involved in food systems, 56% consider food systems when planning and decision making, 56% are aware of the local food policy council, and at least 55% reported increased purchases of local agricultural products and adopting more self-reliant food system practices in their personal lives. Furthermore, participants reported the public school system purchased 10,000 lbs of cucumbers from a local farm for lunches, new community garden projects, commissioner hosted farm tours, new project partners for food forests and apiaries, applications of community and building design for sustainability, academic food system research, and concern for food waste. Touring the local food system and targeting community leaders is an effective educational approach that resulted in new opportunities within the Central Florida Food System. Exposing challenges and successes from production, processing, distribution, and waste management creates prospects for real solutions, small to large scale, urban to rural.

## Orange County Florida Makes Strides to Encourage Local Foods Production

*Liz Felter*, Caitlyn Glatting, Richard Tyson,  
Extension, University of Florida

Local food production, also known as urban agriculture production, is versatile but generally involves producing and marketing local food in or near urban areas. These areas are usually not zoned for agricultural production. Seeking opportunities to enhance community revitalization, economic development, food security and greenspace, as well as wanting to help residents, many local governments and food entrepreneurs in Orange County, Florida, are focusing resources and planning initiatives around local food production. These changes support healthier lifestyle choices for local citizens. Having healthy, nutritious food growing in our neighborhoods nourishes healthy lifestyles, which reduces long term health care costs, as well as our economies, as the local food economic multiplier effect contributes to community development. Orange County successes include adoption of the Florida cottage food law, backyard chicken ordinances, legalizing front yard vegetable gardens and recognizing residential market gardens. Significant expansions of community gardens are underway in parks, community centers, schools, and other non-profit sites while a farm-to-school public/private partnership is expanding. Several private entrepreneurs were able to establish a commercial food hub, rooftop greenhouses, and indoor vertical hydroponics production. Opportunities as well as challenges of local food production will be discussed using the mentioned examples with the potential for replicating them nationwide.

## Ecogentrification: Rethinking the Effects of Urban Agriculture on Food Insecure Neighborhoods in Brooklyn, NY

*Storm Lewis*

Department of Environmental Science and Policy, Smith College

In recent years, national reports deemed New York City (NYC) to be one of the most food insecure locations in the U.S. Although hunger decreased in the last six years, food insecurity in NYC still remains higher than it was during the 2009 recession following the financial crisis. In response, NYC supports over a hundred food initiatives making nutritious foods more financially accessible. Despite the presence of programming, such as the Supplemental Nutrition Assistance Program (SNAP), neighborhoods in Brooklyn still report high rates of hunger and poor diets. Hunger Free America's latest study on food systems indicated that from 2015-2017, Brooklyn contained the highest number of individuals living within food insecure households in NYC. In Brooklyn, some of the subsidized farm shares programs offer food at lower costs and/or accept EBT and SNAP payments. Yet, these programs go underutilized by food insecure residents for reasons outside of food cost. Few researchers evaluate the sociocultural barriers to food security that could explain this dynamic, such as perceived access to fresh produce. To fill this gap, my research will use political ecology and the Food Choice Process Model to explore how gentrification can influence peoples' perceptions of urban agriculture. Using a community-based approach, I will conduct interviews and surveys at farm share sites and public spaces in Brooklyn to document members' and non-members' experiences with food. I will also collect data on rising levels of neighborhood development to compare low-income residents' participation in farm share programs relative to gentrification in Brooklyn. Therefore, understanding the factors that promote and prevent

access to farm shares can inform other urban agriculture models and food policy across the country by contributing to scholarly discourse about the intersection of gentrification and food access.

Key words: Environmental Gentrification, Perception, Urban Agriculture, Community-Based Participatory Research, Just Food, Corbin Hill Food Project

### Helping Others Learn to Grow: Volunteer Gardening Experts as Valuable Community Resources

<sup>1</sup>*Tamra Reall*, <sup>2</sup>Catherine Bylinowski

<sup>1</sup>Division of Plant, Insect, and Microbial Sciences, University of Missouri Extension

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Extension Master Gardener volunteers and corporate volunteers at food pantry and demonstration gardens in Kansas City metro area successfully grow vegetables for distribution to local food pantries and community kitchens. While some gardens are dedicated food pantry gardens, vegetable crops are also grown at several long-standing demonstration, community, and historic gardens. Vegetable production by volunteers increases the amount of fresh produce available for distribution at local pantries and community kitchens, as well as increasing volunteers' gardening skills. In addition to the typical gardening challenges of diseases, insects, and abiotic issues, historic gardens have cultural landscape regulations requiring heirloom plants that may lack the genetic resistance of modern crops. Volunteer vegetable production increases participants' sense of contributing to a larger community need for access to healthy food. Volunteers with knowledge and experience of vegetable production also become valued community resources who work to fulfill the Missouri Master Gardeners' Motto "helping others learn to grow".

### Increasing Accessibility to Fresh Produce in Urban Food Deserts in Volusia County, Florida

*Joseph Sowards*

Volusia County Extension, Urban Horticulture, University of Florida/IFAS

As defined by USDA, a food desert is an area or community "with limited access to supermarkets, supercenters, grocery stores, or other sources of healthy and affordable food may make it harder for some Americans to eat a healthy diet." There are many ways to measure food store access for individuals and for neighborhoods, and many ways to define which areas are food deserts—neighborhoods that lack healthy food sources. Many communities are searching for ways to increase access to fresh produce as a way to improve overall health outcomes as well as build a sense of community. The Derbyshire community in Volusia County, (the 32117 Daytona Beach zip code area) has a median household income of \$25,571 which is 48% below the median income of Florida and large grocery stores are more than one mile away. Another community, Spring Hill (DeLand, FL) has a poverty rate of 37.4% and a median income of \$21,633 which is below even Derbyshire Place. Similarly, there are no grocery stores within one mile where residents can buy fresh produce. UF/IFAS (Institute of Food and Agricultural Sciences) Extension, Volusia County is partnering with both communities to help overcome the lack of access to produce by providing education and guidance in creating community gardens. Derbyshire Place Community Center offers an ideal situation to reach the community with a variety of programs from cooking to gardening to sewing that provide multiple motivations to visit

there. As a consequence residents are more likely to rent a garden plot and raise at least some of their own produce. A collaboration among UF/IFAS Extension, leadership at Derbyshire Place and ten community partners, built thirty-six 48-square foot beds and 10 vertical hydroponic towers. Over \$41,000 was raised to complete the garden in 11 months. At Spring Hill, over \$31,000 was raised in cash and in-kind contributions to create thirty-six 32-square foot beds. These two community gardens represent effective public/private collaborations involving county and city governments, public and private universities and private donors from throughout Volusia County. Creating urban food systems requires such partnerships in order to build capacity; foster community and economic development; and address food security, nutrition and human health issues in under-served communities.

### Urban Agriculture: Local Government Stakeholders' Perspectives and Informational Needs

<sup>1</sup>*Catherine Campbell*, <sup>2</sup>Shelli Rampold, <sup>3</sup>Liz Felter, <sup>4</sup>Ricky Telg

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Increasing numbers of urban residents are seeking permission from local governments to implement urban agriculture (UA) initiatives in their municipalities. UA has myriad benefits, such as increasing food security and community resilience, improving social capital, and enhancing community engagement. However, some local governments have been slow to adopt policies or ordinances to foster food production in urban areas or have actively sought to limit UA in their municipalities. University of Florida Institute of Food and Agricultural Sciences Extension conducted a statewide survey of local government stakeholders (LGS) with a valid email address at the time of the study (N = 2,387). Useable responses were obtained from 221 LGS for a 10 percent response rate. An online questionnaire was developed to assess LGS' attitudes toward UA, subjective knowledge of UA, perceived benefits of and barriers to the implementation of UA, and educational needs. Responses were collected using 5-point semantic differential and Likert-type scales. Overall, respondents displayed positive attitudes (M = 4.22) and moderate knowledge of UA (M = 3.15). Respondents were most knowledgeable about the impact of zoning ordinances on UA (M = 4.00) and least knowledgeable about how the Florida Right to Farm Act impacts their abilities to regulate UA (M = 2.62). Regarding benefits, respondents agreed most that UA provides opportunities for youth development programs (M = 4.35) and educational opportunities for community members (M = 4.25). Respondents perceived lack of agricultural knowledge in urban areas (M = 3.42) as the barrier hindering UA to the greatest extent. The informational topics identified as most useful included environmental best management practices associated with UA (M = 4.05) and models other communities have used to enhance UA (M = 4.04). The most preferred methods for receiving such information were downloadable guides (M = 3.94) and face-to-face workshops or presentations (M = 3.54). The findings of this study support the hypothesis that lack of basic knowledge about UA is one difficulty in fostering UA in Florida. Despite being positively disposed toward UA, LGS in this study may not fully understand the details required to effectively develop and implement policies to foster UA. This finding may also help explain reluctance to adopt local government policies to support UA. In future

practice, efforts should be made to provide LGS key information and enhance their knowledge of UA using downloadable print materials and face-to-face training programs

## Poster Session 2: Food Security in Cities

October 7<sup>th</sup>, 2:00 – 2:45 PM

### Mapping the Food Landscape: Tools for Increasing Food Security

Laura Ryser

Extension, Washington State University

The connection between an individual's health and the place in which they live is deeply rooted in how communities are built and the socio-economic conditions in which they live, also called the social determinants of health. Environmental factors, such as ability to walk to work or school, or the ability to access fresh food, can over time contribute to a lack of physical activity and poor nutrition. Addressing determinants of health that communities face by changing the policies, systems and environments in which they live, work and play will influence brain development, epigenetics and result in improved health and social outcomes.

The need to understand the food landscape before policy is written or strategies are identified was the basis for a research project in a community located in the metropolitan region of Seattle. Since food and health are so closely related, knowing where food is available in the community is a first step in knowing what policies and strategies are needed to ensure all residents have access to healthy food.

Key questions guiding this project include;

On average, how far do residents have to walk to get to supermarkets or grocery stores that sell healthier food options, such as fruits and vegetables, whole grains, and low-fat dairy?

On average, how far do residents have to walk to be able to use their food benefits, such as SNAP or WIC?

What is the ratio of healthy to unhealthy food options throughout the County?

Geo-referenced data, such as location of food retailers and zip codes of SNAP clients, were used to map environmental and socio-economic factors to identify communities of low food access using the modified Retail Food Environment Index (mRFE), developed by the Centers for Disease Control and Prevention. This index is being used to prioritize project implementation for a collective impact initiative working to improve community health outcomes. This session will provide an overview of this project, along with specific information on how to get started to map a community's food landscape.

Nebraska Extension's Nutrition Education Program Partnership Strategies for Equitable Food Access

<sup>1</sup>Kristen Houska, <sup>2</sup>Courtney Eitzmann, <sup>1</sup>Meredith Kuca, <sup>1</sup>Brie Frickenstein

<sup>1</sup>Nebraska Extension

<sup>2</sup>University of Nebraska-Lincoln

Nebraska Extension's Nutrition Education Program (NEP) focuses on teaching nutrition education and physical activity to a limited resource or SNAP eligible population in Lincoln, NE. Our program funding

from USDA focuses on obesity prevention strategies. In 2014 NEP adopted a Policy, System and Environmental (PSE) approach to broaden our reach in the community. Our work now focuses on food access and we have been able to partner with community organizations to make strategic change in the neighborhoods and businesses where our program participants live and visit. The best practice PSE strategies we have implemented include the Choose Healthy Here program to increase access to affordable, nutritious and safe foods in high-need areas. In 2017 and 2019, in partnership with Community Health Endowment (CHE), we utilized a NEMS-S assessment to assess 256 stores and give scores based on healthy foods in stock. These NEMS-S scores allowed CHE to create a map of the city showing areas of food insecurity. In partnership with three farmer's markets and two grocery stores we have implemented Double Up Food Bucks (DUFb) since 2016. We provide seasonal healthy food samples at the markets and offer recipes with selection and preparation suggestions included. Our partnership with the Food Bank of Lincoln has allowed us to provide nutrition education via their Lincoln Fresh mobile food distribution truck. NEP shares samples of produce and corresponding recipes to visitors of the food truck. In 2019 we built raised beds at our county office and partnered with two food distribution sites to donate produce harvested and provide nutrition education through our Growing Together Nebraska initiative. We harvested and donated 366 lbs of produce. Lastly, in 2019, we partnered with the district health curriculum specialist to provide seven teacher trainings around our joint health curriculum. Over 70 teachers participated and provided feedback that food access was the most interesting area of the training. From this, we developed a handout providing information about food access programs that families in the district can visit for services. Extension has the capacity to partner in the community and make changes in the areas of food access and health behavior while utilizing research-based strategies and best practice approaches. We will present on how others could adopt the same strategies, share results from these strategies and inform others how their own communities can partner to address food access with Extension's help.

#### Voices For Food: Considerations for Urban Settings

<sup>1</sup>*Estrella Carmona*, <sup>2</sup>Allene Gremaud, <sup>2</sup>Jenni Nevatt, <sup>3</sup>William McKelvey Jr

<sup>1</sup>Human Environmental Sciences, University of Missouri Extension

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<sup>3</sup>Program/Project Support Coordinator, University of Missouri Extension

Voices for Food is a multi-level socio-ecological intervention designed to improve food security in rural communities, by using food policy councils. The Voices for Food project is a U.S. Department of Agriculture (U.S.D.A) funded initiative, carried out by a multi-state collaborative team, which includes members from Indiana, Michigan, Missouri, Nebraska, Ohio, and South Dakota. The goal of the project is to enable dialogue, build connections that promote health, and improve food security within the food system, mainly among low-income and food insecure populations. There are three components of this project, which includes community coaching by an Extension professional, the food policy development guide, and the development of a MyChoice food pantry model of food distribution.

The Voices for Food provides food system strategies that address social-ecological influences on health behaviors and food security. The Food Council Creation Guide focuses on engaging community stakeholders by organizing a food council. Stakeholders who may want to serve on the food council may include representatives from healthcare services, religious groups, the food production or selling

sectors, public officials, school staff, emergency food organizations, agencies helping low-income audiences, and common citizens. Gathering a diverse group of council members from the different sectors of a community improves the odds the work that food policy councils provide is more diverse, inclusive, and is thoroughly addressing the needs of their community.

A notable strength in the use of a community based approach the project team to meets each community where they are in terms of readiness, and recognizes the individual strengths and weaknesses of each individual community and pantry. Each community is unique in where they are beginning and what they need to make progress in. Allowing coaches to meet communities where they are at ensures that solutions are community based and relevant.

It is reasonable to expect for this project to work in urban settings. In urban settings there is need to carefully identify a defined area in which to focus on. The development of the food council could focus on a neighborhood because they are social communities with frequent face-to-face interactions among its population. Neighborhoods also tend to share common values, socioeconomic position, and demographic features. The purpose of the Voices for Food project is to engage as many food system stakeholders and champions as possible within an area, to share common concerns and develop solutions specific to the needs in their communities.

#### Farmers Market Flash: Strategies for Engagment to Promote Customers using SNAP Benefits to Shop at Farmers Market

Diane Smith, Bachtel Shannon

WSU Dept of Youth and Family, College of Agricultural, Human, and Natural Resource Sciences

Farmers Markets (FM) are often viewed as a venue for high priced produce and catering to high income shoppers. A welcoming environment for all shoppers at FM was established through the WSU Farmers Market Flash (FMF) program. A variety of strategies were initiated to encourage families with limited incomes and receiving SNAP-benefits to shop at local farmers markets to increase access to locally grown, fresh foods, build community relationships, and support the local economy.

This project describes a partnership with the Museum of Northwest Art (MoNA) and the FMF staff, to offer a youth art program at summer meal sites, after school programs, and youth camps. Letters to parents were sent home inviting families to shop at the Farmers Market and view their children's art work. Other farmers market activities included cooking demonstrations, scavenger hunts and art activities with Museum of Northwest Art.

A Farmers Market toolkit was created that describes the successful strategies that made the Farmers Market more welcoming for all shoppers and can guide urban Farmers Market as they expand their reach to limited income shoppers.

An increase in SNAP EBT redemption at the farmers market was documented, suggesting that FMs are a venue SNAP shoppers will frequent, contributing to access to healthy, local produce for consumers and economic vitality for farmers

## CHOW: An innovative public private partnership to Cutting Hunger on Weekends

*Diane Smith*, Rebecca Larsen, Debra Lancaster

College of Agricultural, Human, and Natural Resource Sciences, Washington State University

The Washington State Office of Public Instruction reports that more 50% of the school children in Skagit County qualify for Free or Reduced Lunch. School personnel share stories of children arriving at school on Monday mornings too hungry to learn. Parents interviewed at “Back to School” events and in line at food banks, described how many children were too embarrassed to carry a bag of food home because other children make fun of them. Many children need additional food on the weekends, but families didn’t want to be “singled out” by the school and children didn’t want to be bullied on the bus. The parents reported feeling demoralized or angry when school personnel called to offer bags to be sent from school.

With support from the Skagit County child nutrition coalition, an innovative partnership was established between the food bank and local newspaper publisher. Local newspaper delivery personnel augmented their home newspaper delivery to include delivery of weekend food bag on Friday afternoons to families who signed up through the publishing company website. The food bank recruited volunteers to pack the bags for pick-up by the newspaper deliver staff. Each Chow bag provided approximately 5 meals (two breakfasts, two lunches & a snack) for the weekend.

Currently more than 600 children from two school districts are participating in this program. United Way of Skagit County is supporting this efforts through funding, volunteer recruitment, and outreach. In focus groups, parents who self-registered children for CHOW deliveries reported feeling dignity and respect for themselves. They reported their children enjoyed and consumed all the food.

This public private partnership model for an alternative deliver of weekend food is done with dignity and respect for families while providing for a little extra nutrition each weekend for children. This means they are better able to learn on Monday mornings. Another success is that their physical health is maintained. The CHOW bag also reduces some financial stress on the family – stress that takes a toll on children in the form of Adverse Childhood Experiences (ACEs). CHOW is a stop-gap until families have higher income (and/or costs are reduced) to cover housing, childcare, and other basic needs.

## Exploring the Connection between Household Resilience and Food Security in a Post-Industrial City

*Eboni Adderley*, Mary Rodriguez, Glennon Sweeney, Kip Curtis

Department of Agricultural Communication, Education, and Leadership, The Ohio State University

In recent decades, hunger and food security have reached significant levels of severity in many postindustrial U.S. cities due to policy and societal changes (Gatrell & Ross, 2016). Federal policies aimed at suburbanization, redlining, urban disinvestment, and white flight have critically perpetuated the decline of numerous older cities in the U.S. Moreland et al. (2006), (as cited by Meernar et al., 2012), argue that low income, urban communities have insufficient access to healthy and fresh foods resulting in negative social, health, and environmental outcomes. The challenging dynamics present in many postindustrial cities have resulted in a reduction of effective revitalization efforts (Meenar et al., 2012).

For this reason, innovative and collaborative efforts must be taken to address the issue of food insecurity.

Resilience is a dynamic measurement of a system's ability to absorb and transform in the face of stressors and shocks (Constas et al., 2014). Exploring this dynamic at the household level using indicators of social safety nets, access to public services, assets, income and food access, and adaptive capacity, determine the capacity to adapt and continue to thrive in times of hardship (Alinovi, Mane, & Romano, 2010). To address pervasive food insecurity, researchers and practitioners should address resiliency on multiple dimensions including the macro (city-wide) and micro (household) levels (Béné, 2013). This work, however, focuses its investigation at the household level. Ruel (2019) states that exploring resilience must be done by gaining multi-dimensional, real-time depictions of livelihood susceptibilities at this micro-level. By investigating resilience at the household level, researchers can understand consumption patterns, how food is sourced, household structures, informal/ formal food access networks, personal preferences, gender influences, and knowledge gaps of the urban poor (Ruel, 2019).

The concept of resilience has recently been introduced into the social sciences and food security literature, primarily used to assess household susceptibility in food-insecure areas (Alinovi et al., 2010). This research is part of an innovative urban agriculture approach to build capacity around community-lead solutions through the implementation of a microfarm project. As a component of this work, the ongoing project seeks to further explore the interconnection of food security and household resilience in a postindustrial city. We implemented a household questionnaire and conducted a participatory mapping exercise in the target community at the beginning of the project to investigate food security (access and availability) and household resilience. Data is currently being collected and will be analyzed by the conference date.

## Poster Session 3: Urban Food Production Systems

October 14<sup>th</sup>, 2:00-2:45 pm

### Rootstock Effect on Fruit Quality and Yield of 'Tasti Lee' Tomatoes Produced in a High Tunnel System

*Tricia Jenkins*, Cary Rivard, Eleni Pliakoni

Department of Horticulture and Natural Resources, Kansas State University

Tomatoes are a high-value crop commonly grown in high tunnel systems in the Central United States. Grafting is an important tool for mitigation of soil borne disease pressure and abiotic stresses in tomato production and is used world-wide in protected growing systems such as high tunnels. Previous high tunnel trials in Kansas have reported that grafting with inter-specific rootstocks can increase marketable yield in select scion varieties when no disease pressure is present. However, there is evidence suggesting that the use of vigorous rootstocks and growing in protected environments can compromise fruit quality attributes and accumulation of secondary metabolites. To investigate this relationship, 'Tasti Lee' tomatoes were grafted to 'Maxifort,' 'DRO 141 TX,' 'Fortamino,' 'Estamino,' and 'RST-04-106' rootstocks and grown in a high tunnel system in Kansas for two years. 'Tasti Lee,' is a hybrid tomato that is bred to have superior eating quality and higher lycopene content. The variety has also been shown to have enhanced yields when grafted to 'Maxifort' in high tunnel systems. To determine the effect of grafting on fruit quality for 'Tasti Lee,' soluble solids content (SSC), titratable acidity, vitamin C, and lycopene content were assessed. Performance of each rootstock treatment was also evaluated by collecting total yield, marketable yield, and average fruit size for the whole season on a per plant basis. Results will help to shed light on the complex interactions involved in fruit quality and nutrient accumulation such as rootstock/scion interaction, cultural practices, total yield, and scion genetics.

### The Impact of Different High Tunnel Covering on Microclimate, Yield, and Phenolic Accumulation of Red and Green Leaf lettuce

*Kelly Gude*, Eleni Pliakoni, Cary Rivard, C.B. Rajashekar

Department of Horticulture and Natural Resources, Kansas State University

High tunnels have shown to improve productivity and maintain quality of a number of fruit and vegetable crops. However, the effect of this production system on nutritional quality is still under investigation. Light intensity and spectral quality impacts accumulation of several phytochemicals. The typical UV-stabilized polyethylene (poly), commonly used on high tunnels, blocks UV-B and reduces light intensity by 15-20%. The objective of this study is to evaluate the impact of altering ambient light on crop quality using 6 different poly films (standard polyethylene (SP), diffuse poly (DP), clear poly (CP), UVA/B blocking poly (-UVA/B), 55% shade cloth on standard poly (SCSP), and a removal treatment where standard poly was removed two weeks prior to the initial harvest (RP)). The quality was determined regarding photosynthesis, soil temperature near the root system, crop yield, storage life, and phytochemical accumulation. Cultivars 'New Red Fire', red leaf lettuce, and 'Two Star', green leaf lettuce, were planted at Kansas State University's Olathe Horticulture Research and Extension Center (OHREC) fall 2017 and 2018. Trials were arranged in a RCBD and four individual "caterpillar" high tunnels

(39 m x 3.7 m x 2 m) served as replications. For phytochemical content, phenolic acid compounds (chicoric acid, chlorogenic acid, caffeic acid, and ferulic acid), flavonoid compounds (rutin, kaempferol, naringenin, quercetin, and isoquercetin) and coumarin were measured at harvest and at day 5 after storage in 1.5 °C with the use of the UPLC-MS. Higher soil temperatures were measured for the DP and CP in comparison to SP, RP, and SCSP ( $P < .001$ ) while both cultivars grown under SP, RP, and DP produced larger lettuce (g/head) ( $P < 0.01$ ). The RP and CP produced red leaf lettuce with darker red pigmentation ( $P < 0.01$ ) in comparison to other treatments. Finding a balance between production and phytochemical content when growing within a high tunnel, will help to improve the system.

### Hügelkultur for Season Extension and Intercropped Mushroom Production

*Sara Hazan*, Jeremy Cowan

Department of Horticulture and Natural Resources, Kansas State University

In lower Midwestern states, extreme summer temperatures influence crop selection, and with temperatures expected to increase steadily over the next several decades, farmers will see a reduction in the length of cool-season production cycles and an increasingly limited variety of specialty crops available to grow. High-value, cool-season crops, like strawberries, are extremely vulnerable to increased summer temperatures. Hügelkultur may offer a novel approach to season extension for urban growers. Hügelkultur, German for “hill culture”, is a system of raised beds comprising layers of wood, soil, and compost formed into a windrow. Hügel beds offer increased planting area (as much as 60%) compared to traditional flat- or raised-bed cropping systems. This land-use efficiency could have substantial positive impacts for urban growers who farm small parcels of land. Hügelkultur may be able to extend the growing season of specialty crops, due to having both a shaded and sunny aspect, and could facilitate intercropping culinary mushrooms with primary fruit and/or vegetable crops. This may provide an additional revenue for urban growers. Culinary mushroom production via log culture has disadvantages that hügelkultur may mitigate. Among these disadvantages is the time delay between inoculation and first harvest. Intercropping mushroom logs within a specialty crop system may provide growers economic returns while waiting for mushroom logs to come into production. Considering culinary mushrooms’ relatively high retail value, intercropping with other specialty crops like strawberries could enhance an urban growers’ revenue. No academic research on hügelkultur exists in the literature; thus, this project will be first of its kind. This project is evaluating hügelkultur’s potential for season extension and mushroom intercropping. Four hügel beds, oriented east-west, creating sunny and shady aspects, and corresponding flat beds (control) have been installed. Strawberries, kale (cool-season crops), and beans (warm-season crop) are being evaluated for productivity and season extension. Since hügel beds incorporate buried wood (a substrate for some culinary mushrooms), the experiment will also evaluate whether mushrooms can be successfully intercropped with fruits and vegetables in a hügelkultur system. Data collection will include measurements of soil temperature and canopy-level air temperatures on sunny and shady aspects. Horticultural performance will be measured using planting dates, crop-development milestones (e.g. days to harvest), length of harvest, and total and marketable yields. Similarly, mushroom cultivation will be evaluated based on time to harvest and total and marketable yields. Hügel beds were installed fall 2019 and horticultural data collection began in spring 2020.

## Poster Session 4: Challenges of Growing in Urban Areas and Urban Food Distribution Systems

October 14<sup>th</sup>, 2:00 – 2:45 pm

### Survey of Agricultural Water Microbial Quality in Kansas and Missouri

<sup>1</sup>Joshua Maher, <sup>2</sup>Londa Nwadike, <sup>1</sup>Sara Gragg, <sup>3</sup>*Manreet Bhullar*

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<sup>3</sup>Department of Horticulture and Natural Resources and Food Science Institute, Kansas State University

**Introduction:** Agricultural water represents a significant risk for microbial contamination of fresh produce. The Food Safety Modernization Act (FSMA) Produce Safety Rule (PSR) requires growers to develop a microbial water quality profile (MWQP) of their water source(s) helping to minimize this risk. The study surveyed the microbial quality of agricultural water used on Kansas and Missouri produce farms, thus removing barriers to PSR compliance and supporting national produce safety efforts.

**Methods:** A convenience sample (n= 369) of agricultural water sources (surface, ground, or other) were collected from urban, peri-urban, and other locations by produce growers and some Extension personnel. The 100 mL samples were tested using the Environmental Protection Agency (EPA) method 9223 B, Colilert Quanti-Tray/2000 (IDEXX Laboratories, Westbrook, ME) to quantify generic *Escherichia coli*, and reported as MPN/100 mL.

**Results:** Per PSR guidelines, the generic *E. coli* population in an agricultural water source must not exceed a geometric mean (GM) of 126 CFU/100 mL and standard threshold value (STV) of 410 CFU/100 mL. Thirty-two samples (n=369, 8.67%) exceeded the GM, while 22 samples (5.96%) surpassed the STV. Seven (1.90%) samples exceeded 2419.6 CFU/100 mL, the maximum reportable value of the Colilert test. Surface water samples (n=181) contained the highest number of positive generic *E. coli* tests (153, 84.53%).

**Significance:** Overall, microbial water surveillance indicated the majority (91.33%) of produce agricultural water sampled in Kansas and Missouri did not exceed the FSMA PSR generic *E. coli* GM guideline (126 CFU/100 mL).

### Growing Together: Master Gardeners, Food Aid, and Social Stigma in Iowa's Urban Counties

*Moses Wanyakha*, Susan DeBlieck, Christine Hradek,  
Agriculture Education and Studies, Iowa State University

The United States is the wealthiest country on earth, yet in 2017 an estimated 1 in 8 Americans experienced food insecurity. Forty million Americans went hungry, including more than 12 million children. Nearly 12% of households were food insecure at some point during the year. In Iowa, according to 2016 data, nearly a fifth of urban households experienced food insecurity. Food insecure children tend to experience negative psychological and behavioral outcomes. Prior studies note health

problems associated with food insecurity, including repeated hospitalization, diabetes, hypertension and obesity. Access to fresh produce can reduce health problems linked to food insecurity. Fresh food can also potentially help ameliorate socioeconomic stigma associated with utilizing food banks and pantries. The provision of fresh, high quality produce at food banks and pantries potentially intervenes in the perception that such venues are dumping grounds for low-quality, processed foods near expiry. Growing Together, a program directed at Iowa State University, addresses food insecurity by connecting food pantries, the Iowa State University Extension and Outreach (ISUEO) Master Gardeners program, and local food banks to provide seasonal fresh produce to 67,000 people in 2018. Growing Together is funded by a grant from the USDA. The program supports Master Gardener volunteers who grow produce for local pantries and food banks. According to the program's 2018 data, 195 Master Gardeners and 146 volunteers participated. Master Gardeners across all six urban counties in Iowa donated a total of 47,820 pounds of produce to food pantries and food banks, serving 67,820 people. These figures help to illustrate not only the extent of those who consumed the food, but also the socioeconomic connection between the Master Gardeners — who are largely identified as middle to upper-middle income retirees — and the people who utilize the food banks and pantries — who are generally perceived as low-income. This poster describes programmatic elements of the Growing Together program and the way the program is distinct from many food pantry or Master Gardener initiatives. It will use the interactive model of program planning put forth by Caffarella and Daffron (2013) to show connections among the elements of the Growing Together program in order to demonstrate how it addresses urban food security in a novel manner. The poster will present analysis of two aspects of the program, focusing on how Growing Together, as a model, mitigates urban food insecurity and addresses the social stigma associated with food aid.

### Growing Health and Hope On-Farm, Hands-On

<sup>1</sup>*Alicia Ellingsworth*, <sup>2</sup>Jennifer Thomas

<sup>1</sup>The Farm School at Gibbs Road

<sup>2</sup>Turner School District

KC Farm School at Gibbs Road empowers individuals through on-farm hands-on experiences and vocational education connecting them to the land, food, themselves and their communities. On three acres, this urban farm generates an inspiring environment through community-wide, multi-generational, participatory, and collaborative food projects while it provides vocational job skills training and job opportunities, food, healing, and fun. Located in Wyandotte County, we demonstrate an alternative future from one many urban youth face- one of disease, joblessness, disconnection and hopelessness. Working closely with our neighboring Turner School District, The Historic Northeast Midtown Neighborhood Association's Learn to Earn program, and Cornerstones of Care, we've provided 1,800 hours of job skills training to young adults in 2019. We bring visitors onto the farm and engage them in daily farm work, provide an overview of growing fruits and vegetables, and the science behind it through our developing curriculum. We connect to our community through Community Supported Agriculture, a weekly on-farm market stand, day camps, field trips, workshops, gleanings with After The Harvest, and as the urban aggregation hub for farmer-owned cooperative, The Kansas City Food Hub. In our first year, we created a one-acre permaculture site with a wildland playground, erosion-controlling berms and swales with native plants, a corn maze and gourd tunnel; we planted fourteen new fruit trees, over 50

raspberry and blackberry bushes, twelve bush cherries, a 100 ft bed of asparagus; we designed a one-quarter acre no-till section; and grew and sold over \$30,000 in vegetables. We share our 6000 sf greenhouse with market growers and community groups for an early start to the season. Our work is made possible through committees of volunteering professionals. In 2019, we hosted 5,000 volunteer hours in all. The South 50 committee made the permaculture site happen, the Eco Team is developing an alternative energy plan for each of our existing and proposed buildings, our curriculum committee is writing lessons specific to each age group. Looking ahead to 2020, we're developing a wellness committee; we'll be a Growing Growers Kansas City host farm and introduce the next generation to farming in the city in a changing climate within a not-for-profit 501(c)3 organization; and we will bring hens, purple martins, bats, and bluebirds as part of our approach to integrated life (and pest management) within a vibrant, regenerative urban community. Inviting the community on-farm, hands-on we're growing food, health, hope, connection and a better future.

#### Farm Fresh Food Boxes: Increasing Food Access in Rural Communities through New Markets for Farmers and Retailers

*Diane Smith*, Jane Kolodinsky, WeiWei Wang

College of Agricultural, Human, and Natural Resource Sciences, Washington State University

Farm Fresh Food Boxes (F3B) is a multi-state integrated research and extension project that represents an innovative approach to addressing access to healthy, affordable food in food deserts by connecting farmers, retailers, and consumers.

The extension team was responsible for engaging farms and associated retail sites in three participating states: Vermont, Washington, and California, and promoting this innovative program to consumers in communities with limited access to fresh, local produce. The research team conducted mixed-methods research on the economic impacts of F3B on farmers, retailers, and consumers.

Farms offered weekly boxes of fresh produce at retail sites that provide convenient access to consumers. Retail sites posted flyers detailing the content and cost of F3B from participating area farms. Customers pre-order advertised boxes at the retail site or online on a week-to-week basis for later pick-up. Box contents and flyers change throughout the season to move produce that is most abundant.

Findings from mixed methods data collection reflects project outcomes which include: market potential, measure of economic impact, measure of acceptability, comparative use of F3B among consumer at Farmers Market and Community Supported Agriculture (CSA) shares, and benefits and barriers to farmers, retailers, and consumers.

F3B provides a low-risk strategy to address the complex supply, demand, and distribution challenges faced by producers and retailers of fresh local foods, while overcoming barriers that consumers face in accessing affordable, healthy food.

### Building a Mini-pack House for Small Scale Produce Growers

<sup>1</sup>*Eleni Pliakoni*, <sup>2</sup>Ramadhani Majubwa, <sup>2</sup>Theodosy Msogoya, <sup>1</sup>Cary Rivard

<sup>1</sup>Department of Horticulture and Natural Resources, Kansas State University

<sup>2</sup>Department of Crop Science and Horticulture, Sokoine University of Agriculture (SUA)

Access to cooling and packing facilities is a major limitation for many fresh fruit and vegetable farming enterprises in developing countries including Tanzania. Farmers in Tanzania experience a postharvest loss of 20% to 50% due to poor handling practices and limited availability of packing and cooling facilities. Improper handling practices increase postharvest losses and reduce compliance with quality and safety requirements. Sokoine University of Agriculture (SUA), Kansas State University (KSU) and the University of Florida (UF) collaborated with the Horticulture Innovation Lab (UC Davis) to build capacity in produce postharvest management in Tanzania. has designed and established an affordable mini pack house from used marine shipping containers.. The mini pack house unit at SUA consists of 3 shipping containers (2.43 m width (W) x 2.59 m height (H) x 12.2 m length (L), each with a specific function: receiving, packaging and cooling zone. The cooling zone is divided into two cold rooms (2.43 m (W) x 2.59 m (H) x 6.1 m (L), made by partitioning one of the containers using insulated panels (closed cell foam) with easily cleanable surfaces. Walls and ceiling of the cold rooms were insulated with panels and the floor in all containers installed with Tarazo. Access doors were installed for each cold room and an 18,000 BTU air conditioner fitted with a Coolbot system installed in each cold room. The two cold rooms can be set independently to facilitate the different temperature needs for the fresh commodities. The total estimated cost for the mini pack house unit was \$8,150, excluding the cost of purchasing the containers, plumbing work, and electricity installation. Since establishment (May, 2018), the unit has been used to train farmers, traders, and SUA undergraduate and graduate students on the best postharvest handling of fruits and vegetables. A total of 86 BSc. Horticulture students taking the postharvest physiology and management class, 60 trainers, and over 100 farmers have been trained. The unit has attracted a number of stakeholders and is now serving as model for dissemination of practical knowledge and skills on postharvest handling of fresh horticultural crops in the country.

## Poster Session 5: Training for Urban Farmers and Professional Development

October 21<sup>st</sup>, 1:15-2:15 pm

### Growing Young Minds and Healthy Communities with Aeroponic Tower Gardens

*Kristie Vogelsberg*

The presentation will begin by briefly looking at the startling trends in the health and well being of our children and families, including food insecurity mapping of our KC metro. We will discover that food is not merely fuel, but medicine. This will lead to discussion of benefits from not only a nutritional, but also an environmental standpoint of consuming, fresh, locally grown, vine ripened produce. Next, we will introduce an innovative way to “bridge the gardening gap” by growing produce outdoors, indoors, or in greenhouses, year-round via aeroponics, specifically with a Tower Garden growing system. Tower Gardens utilize aeroponics, an advanced form of hydroponics, to grow plants in an air or mist environment rather than soil. Research has found that – compared to traditional growing methods – aeroponics increases yield by an average of 30%, grows plants up to three times faster, uses as little as 2% of the water, and 90% less space, while providing produce that is equally nutritious, if not superior.

We will learn about Tower Garden’s birthplace, at Epcot center, where research was being conducted for NASA, by the head of horticulture, Tim Blank. The assembly, engineering and functionality will be explained, including a hands-on demonstration.

Next, we will see how creating healthier families and communities can start in the classroom. We will explore how Tower Gardens are being utilized with students around the globe. We will examine some examples of the 30+ free lesson plans that accompany Tower Gardens that are all Common Core and NGSS aligned. Each of the 30 Seton Hall University lessons are also designed around the Five Es Learning Cycle: Engage, Explore, Explain, Expand, and Evaluate.

Samples of lesson plans include: Seeds, Parts of a Plant, Pollination, Fertilization, Function of Leaves & Photosynthesis, Plant Research, Pigments, Mineral Nutrition, and Phytochemicals.

Next, we will see how schools across the country are utilizing Tower Gardens to create a sense of community, such as Tower Gardening Clubs, smoothie bars, and school salad bars. Many Boys and Girls Clubs, for example, sell produce, or make recipes, such as pesto, with crops from their Tower Gardens to sell at local farmers markets. We will also explore existing larger scale uses of Towers, such as urban crop production, feeding of homeless populations in food deserts, and Tower Farms. Finally, we will discuss budgets and implementation measures for Tower Gardens in the classroom or community.

## Competencies for Practitioners Working in Food Systems

<sup>1</sup>*Courtney Long*, <sup>2</sup>Lydia Kaume

<sup>1</sup>Community Economic Development, Iowa State University Extension and Outreach

<sup>2</sup>University of Missouri Extension

This presentation will connect aspects of food systems, economic health of communities, and its impacts on physical and nutritional wellbeing of community members. The presentation will go through three primary components, starting broad and then diving deeper into food access, nutrition and health.

First, presenters will provide an overview of a recent project that identified core competencies for practitioners working in food systems. The research was conducted in three main ways: two large group facilitated meetings, two national surveys, and coding of the results to hone in on foundational competencies. This presentation examines each of the core competencies suggested from the research. Three primary categories of competencies will be shared in depth: Community capacity, Food systems and Health and wellness. Community capacity and outreach will be discussed first, presenting specific skills and tools that are helpful when working with diverse community audiences. Food Systems categories will be discussed by Courtney Long and will dive into foundational concepts and areas of the food supply and value chain. Lydia Kaume will discuss how food systems are influenced by social, political and economic environments, and how this impacts access and health in communities. nutritional programming and connections to various food systems concepts.

Overall, this presentation seeks to be interactive and promote discussion amongst peers in the room as well as opportunities to hear about best practices from each other in regards to food systems and nutritional programming. Participants will walk away with new information about foundational competencies for practitioners working in food systems; understand where to find resources, trainings and certifications for their own professional development goals; identify ways that health, community, and food systems connect; and develop new connections and relationships with those in the room.

## Determination of Soft Skills Expected for Professionals in the Urban Food System Industry

<sup>1</sup>*Kenny Artavia*, <sup>2</sup>Candice Shoemaker, <sup>1</sup>Cary Rivard, <sup>3</sup>Judy Favor

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<sup>2</sup>College of Agriculture, Kansas State University

<sup>3</sup>Department of Educational Leadership, Kansas State University

The importance of soft skills in professional and life success is not a new concept but there is growing awareness of these non-cognitive skills as part of the higher education experience, including in agriculture. In 2011 researchers identified seven soft skills needed for successful employment in agriculture, natural resources, and related careers and suggested they should be considered in curriculum revitalization. Currently, many universities successfully teach agriculture students technical skills and theoretical knowledge. However, to be successful, there is a clear and urgent need for agricultural professionals to develop soft skills. The main objective of this study was to determine what soft skills are more important for professionals in the urban food systems industry. A national survey was distributed to a variety of national list serves (e.g. Comfood, North America Food System Network). Seven soft skills were examined: experiences, team skills, communication skills, leadership skills,

decision making/problem solving skills, self-management skills, and professionalism skills; and each soft skill was described through seven experiences. Respondents were asked to rank these descriptive characteristics from most important to least important. Respondents were also asked to rank the seven major soft skill categories from most important to least important. Most of the respondents were from not-for-profit organizations (49%) or Cooperative Extension (18%) and were involved in the hiring process (67%). Overall, communication skills and team skills were ranked most important and professionalism skills were ranked least important. “Effective oral communication” and “listen effectively” were the most important descriptors for communication skills. There were no differences across the descriptors for teamwork skills. Additionally, there were ranking differences across the seven descriptors for most of the soft skills, as well as by where the respondents worked and if they were involved in the hiring process, by gender and age. Results also showed a strong correlation between extension and communication skills, while non-profit organizations presented a correlation with experiences and self-management skills. These results provide a starting point for the implementation of the soft skills expected for professionals entering the urban food systems industry at a higher education level.

#### The Partnered Apprenticeship Model: Implications for Beginning Farmer Learning and Program Development

<sup>1</sup>*Jesse Gilmore*, <sup>2</sup>Candice Shoemaker, <sup>3</sup>Cary Rivard, <sup>1</sup>Zachary Hoppenstadt

<sup>1</sup>Kansas State Research and Extension

<sup>2</sup>College of Agriculture, Kansas State University

<sup>3</sup>Department of Horticulture and Natural Resources, Kansas State University

Growing Growers is an Extension-partnered apprenticeship program in Kansas City that offers participants sustainable agriculture training in three learning environments: workshops, host farm mentoring, and experiential, employment-based learning. This training and instructional format provides a unique opportunity to analyze the effectiveness of learning environments in an agricultural context. A survey was developed to understand the training methods of the program’s host farms and preferred learning environments of program participants across the 14 program learning objectives. The learning objectives covered: soil conservation, insect management, disease management, weed management, irrigation, production planning, small farm equipment, plant propagation, postharvest handling, business management, marketing, food safety, season extension, and fruit production. Survey results indicated that participants preferred formal environments for four learning objectives, mentoring for two learning objectives, field work for three learning objectives, and had no learning environment preference for five learning objectives. Additionally, participants indicated that nine learning objectives need formal educators, and eight need contextual application. Three learning objectives (production planning, small farm equipment, insect management) require both formal educators and contextual application. Respondents almost unanimously indicated that their business management training was lacking, confirming previous research that mentioned apprenticeship programs’ inability to connect participants to business start-up resources. In particular, participants were not comfortable with land acquisition and capital, which prevented many apprentices from pursuing commercial food production. Recommendations regarding future changes to the program concern business management education,

including adding project-based business plan development, providing locations for apprentices to contextually apply business management knowledge, and exploring alternatives to land acquisition.

### Beginning Farmer Wholesale Project

<sup>1</sup>*Megan McManus*, <sup>1</sup>Cary Rivard, <sup>1</sup>Katie Nixon, <sup>2</sup>Tom Buller

<sup>1</sup>Department of Horticulture and Natural Resources, Kansas State University

<sup>2</sup>Kansas State Research and Extension, Douglas County

Currently, a lack of support for farmers to transition into wholesale production exists in the Kansas City and central Missouri regions. Farms are often molded to serve either large commodity markets or small scale direct-to-consumer markets, with little middle-ground. Additionally, recent feasibility studies in the region show that there is approximately \$177 million in unmet demand for local food at the wholesale level. Clearly, more farmers are needed to satisfy this market. In 2018, collaborators from Kansas and Missouri were awarded funding from the USDA NIFA Beginning Farmer and Rancher Development Program for the proposal, Supporting Beginning Farmers in Scaling-up into Wholesale Production. The target audience is “a producer with no more than 10 years in operation, both urban and rural, with aspirations to expand in size and/or explore new market channels for their produce”. Current work includes implementation of a farmer-to-farmer mentorship program, one-on-one technical assistance, farmer-to-buyer matching, a Demystifying the Wholesale Market manual, and in-depth wholesaling workshops. In 2019, the mentorship program was established and six mentees were paired with nine mentor farms. Mentors are paid by the hour as consultants through the project and mentees are allowed to consult with any of the mentors on an ala-carte basis. Each mentee is allowed 25 hours of consultation with their mentor. Technical assistance was also provided to at least thirty farmers across Kansas and Missouri including matching farmers with available markets. As a result, thirteen beginning farmers gained access to new wholesale buyers. In 2019, four workshops were conducted with over thirty different attendees to provide education on wholesale production and planning. Future goals include recruiting additional farmer mentees for the mentor program, conducting additional workshops and technical assistance, and developing a GIS map of the regional foodshed.

### Spawning a Network of Northeast Mushroom Educators Serving Urban and Rural Farmer Audiences

*Yolanda Gonzalez*

Harvest NY Cornell Cooperative Extension, Cornell University

Specialty mushrooms are a low-input, high value niche crop, with U.S. consumer demand increasing by 4% annually. Given the flexible scale of production systems, mushrooms have the potential to be incorporated into a diverse range of small and mid-sized farms in urban and rural settings. As a response to this growing demand for both mushrooms and technical production knowledge, Harvest NY and the Cornell Small Farms Program, Farm School NYC, Just Food, and Grow NYC have developed a multi-faceted educational program for new mushroom growers. This program will engage growers at all scales, as well as service provider organizations, and industry partners to enhance the collective knowledge base and capacity of farmers to grow specialty mushrooms and sell them profitably to local and regional markets within 250 miles of New York City. In addition, this program will increase

educational capacity through a network of Community Mushroom Educators throughout the region through technical training and project-based learning grounded in popular education methodology and principles, allowing mushroom educators to gain valuable knowledge and benefit from the collective experience of the mushroom educator cohort. We aim to increase mushroom knowledge throughout the Northeast, in city centers such as Albany, New York City, and Philadelphia through education and research to support new and existing farm businesses--providing economic resilience through crop diversification and production of high-profit specialty crops. Participants of the Community Mushroom Educator program will receive a complete curriculum for specialty mushroom production, along with a teacher's manual to facilitate the transfer of successful aspects of production. The curriculum will have four main competency areas: mycology 101, cultivation best practices, production economics, teaching using popular education. My presentation will highlight this interdisciplinary and accessible approach to education that features individual study, group discussion, live and webinar workshop sessions, and one-on-one support, using a Popular Education model where learning events reflect the collective needs and solutions, while also reflecting the particular context that participants face. Funding to support this program is provided by the USDA NIFA Grant "Expanding Specialty Mushroom Production on Urban and Rural Small Farms" and the Northeast SARE Professional Development Program "Spawning a network of northeast mushroom educators serving urban and rural farmer audiences."

#### Empowering Refugees through Urban Gardening at Global Gardens

<sup>1</sup>*Taylor VanWinkle*, <sup>2</sup>Sarah Sommerkamp

<sup>1</sup>Social Work

<sup>2</sup>Jewish Vocational Service

Global Gardens is a refugee urban gardening program at Jewish Vocational Service, a human rights organization that addresses three areas of impact: health and wellness, workforce development and community integration. Founded in 2012, Global Gardens' mission has been to develop urban garden spaces by repurposing vacant lots and empowering refugees to grow community connections, living beauty, and nutritious produce using organic methods in the urban core of Kansas City, MO. Global Gardens facilitates the transition of recently-arrived refugees to urban agriculture through horticultural education workshops during the winter months in addition to individualized gardening guidance from educators on staff during the growing season. Entering our seventh consecutive year, our program has grown exponentially from assisting six growers at a local community center to serving twenty-one participants on four garden sites totaling more than 65,000 square feet (1.5 acres) of land. For our growers, our program is not only educational but also plays an important nutritional role by providing a source of affordable food. Just this last season, our growers brought home more than 150 pounds of produce each. Overall, that adds up to more than 2.5 tons of locally grown produce in just one year. In the last four years, our program has helped these growers and their families to alleviate food insecurity with nearly 10 tons of nourishing food through successful urban gardening. The majority of our growers regularly report in annual surveys that they increase their consumption of fruits and vegetables as well as their exercise. Beyond physical health, our growers also describe having better mental health, with our surveys from last year showing a 36% decrease in depression symptoms and stronger community relationships through the shared work of gardening. Importantly, our program encourages the cultivation of culturally significant produce in addition to common local varieties. Our refugee growers

create a new sense of place when tending these crops that intertwines their past and future, bolstering their mental and physical health, not to mention enabling community connections. In our presentation, we will share our successful model of urban agriculture that is tailored to refugee community needs, and empowers participants to improve their mental and physical wellbeing in Kansas City through the development of transferable skills and community engagement.

### Training the Future Workforce for Indoor Agriculture Production

<sup>1</sup>*Anusuya Rangarajan*, <sup>2</sup>Wythe Marschall, <sup>3</sup>Jeffrey Landau, <sup>4</sup>Maya Ezzeddine

<sup>1</sup>Horticulture, Cornell University

<sup>2</sup>Harvard University

<sup>3</sup>Agritecture

<sup>4</sup>Cornell University

As urban food production continues to gain momentum, there has been a proliferation of various approaches to indoor or controlled environment agriculture. These systems range from fully sun exposed, such as greenhouses, to fully-enclosed in buildings. To be successful, the indoor agriculture farmer must be able to integrate knowledge and skills drawn from multiple disciplines, including plant sciences, engineering, construction, marketing, chemistry and numerous other fields. As these businesses have started to scale up, finding, training and retaining skilled operators has become a major issue of concern. While there are robust programs offered at various universities, there is a need for shorter, more skill-based training to support employee development. To address this need, we set out to define the skills and abilities needed to be a successful indoor farm operations manager. Initially, we conducted semi-structured interviews with over 30 professionals currently working in this title of indoor farm operations managers (or equivalent) from companies located across the United States and Europe. These interviewees framed the needs for more robust education and training programs in the context of current and expected future trends. From these interviews, we recruited 11 operations managers to participate in a 3-day Develop a Curriculum (DACUM) workshop. This highly facilitated process helps a group of experts reflect on their own jobs, articulate the duties and tasks needed to be successful at that job and then organize these into large buckets of work. As a result of the process, we now have an industry-generated, industry-validated DACUM chart describing the 13 major duties (responsibilities) and 150 component tasks (activities) performed by a successful indoor farm operations manager. To verify that the duties and tasks indeed represented the work of more than just the 11 participants, we surveyed other indoor farm managers to learn if they did the various tasks and how important the tasks were to success in their jobs. We had 380 farm managers from around the world complete the verification survey. Based upon the priorities identified through this process, we are now poised to do detailed analysis of the most important tasks, as a basis for a new curriculum. In this session, we will share the DACUM process, the indoor agriculture operations manager DACUM chart, the industry concerns and priorities, an example task analysis and training module that will carry a sector-supported micro-credential.

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