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Climate resilient agricultural practices for urban growers in Kansas City

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Abstract

The Kansas City metro is expected to be the fifth most impacted urban environment in the United States with regards to climate change. Research indicates that we will continue to experience increased overall temperatures, increased numbers of heat waves, increased annual precipitation characterized by more extreme precipitation events and longer periods of drought, and increased pest, disease and weed pressure. Furthermore, because of increased heavy downpours throughout the Midwest, Kansas City area farmers report the rains we've experienced (such as the 11" of rain that fell over three days in October of 2018) pulverize their soil, resulting in compaction, poor movement of air and water through the soil surface, and crusting. Farmers across our region have begun to experience production, marketing, and management challenges because of changing weather conditions. Yields have become less predictable, pests and diseases have become more prevalent and damaging, sales at outdoor farmers markets becomes more variable in response to extreme temperatures, rain, and wind, and farm business management and planning have become more challenging because of those changes. Cultivate Kansas City recognizes that climate change is a threat to existing and future farm businesses and the local food industry. There is a strong need to educate farmers now to be prepared, to be adaptive, and be resilient with the coming changes to our urban and peri-urban environment. As such, Cultivate Kansas City is committed to providing climate resilient education and resources to urban farmers. In 2020, we launched a project, funded by the Missouri Department of Agriculture, to teach and adapt concepts of farm business resilience to a select cohort of urban farms located in and around Kansas City. In partnership with Laura Lengnick of Cultivating Resilience, two cohorts of farmers (n=13) have participated in workshops, site visits, and one-on-one consultations to identify short-term and long-term goals and strategies to make their farm businesses more resilient. Farmers have also participated in insect pest monitoring and have provided that data to Cultivate Kansas City. Our work with these initial cohorts has allowed us to share some of the lessons learned with a wider farmer audience and we are currently working on two new projects to expand the learning to the refugee farmer population we interact with through the New Roots for Refugees program.

Keywords

climate change, urban agriculture, resiliency, risk management

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INTRODUCTION

The Kansas City metro is expected to be the fifth most impacted urban environment in the United States with regards to climate change (Walsh, et al., 2014). We are expecting an overall increase in temperature (Kenward et al., 2014; Lengnick, 2018), increases in the number of heat waves (Kenward et al., 2014; Lengnick, 2018), increased pest, disease, and weed pressure (Clements & Ditommaso, 2010), increasing annual precipitation, with both more extreme precipitation events and longer periods of drought (Lengnick, 2018).

Farmers across the region are already experiencing production, marketing, and management challenges because of these changing weather conditions. Yields have become less predictable, pests and diseases have become more prevalent and damaging, sales at outdoor farmers markets become more variable in response to extreme weather. One weather-related issue of note is the impact of heavy rain events, which have increased over the last several decades across the country and have hit the Midwest particularly hard. Kansas City area farmers report that the kinds of pounding rains we've experienced (such as the 11" of rain that fell over 3 days in October of 2018) pulverize their soil, resulting in compaction, poor movement of air and water through the soil surface, and crusting.

Having grown over the last 15 years, the local specialty crop industry is still, in many ways, in a fledgling state around Kansas City. Most farmers have less than 10 years of experience managing their own operations and many farm businesses are in the early stages of business development. Weather-related disruptions to production and marketing have the potential to put a halt to this progress in urban and peri-urban local food production.

Cultivate Kansas City's mission is to grow food, farms, and community in support of an equitable, sustainable, and healthy food system for all. At the heart of this mission is support for the growers in Kansas City. Climate change is a threat to existing and future farm businesses and the local food industry. There is a strong need to start the education process with our farmers now to be prepared, to be adaptive, and be resilient with the coming changes to our urban and peri-urban environment.

While Cultivate Kansas City has offered education and networking opportunities addressing the need for climate resilient approaches to agriculture in the past, the project we launched in 2020 was our first attempt at offering extensive training and technical assistance on the topic to a select cohort of urban and peri-urban farmers. Our two-year project was designed to bring specialty crop farmers together to learn from and with each other, to share data to facilitate quick action in response to weather-related disruptions, and to develop plans and approaches to support local farmers by ensuring their businesses succeed.

The short-term, measurable goals of this project were that farmers would walk away with a climate risk management plan tailored to their farm operation, 2-3 climate resilient strategies they could implement immediately, the supplies necessary to implement those strategies, and lastly, the means to implement a farmer-driven pest reporting network to help alert other farmers to pest arrivals and population densities. The anticipated long-term results would be financial stability for the participating farms and the security of fresh local produce being available to the greater Kansas City community.

DISCUSSION

Program design

As originally designed, our program had the following components: 1) the formation of farmer-to-farmer education groups (1 per year) that work to gather and share knowledge and data; 2) designing and hosting workshops for the farmers focused on the development of simple soil monitoring plans and strategies to increase soil resilience and productivity; 3) providing training on risk assessment to help facilitate the writing of climate risk management plans related to current and future disruptions to their farming operations; and 4) developing a system for shared learning/data gathering systems to help farmers focus on the challenges of changing pest pressures in specialty crops. In writing the climate resilient plans, farmers were encouraged to develop farm resilience through stormwater management, soil improvement, and crop diversification. They were also asked to think big and explore transformative approaches to their farming operations that could keep their farms productive and viable despite projected disruptions resulting from climate change.

Additionally, farmers chose strategies to help ameliorate the impact of climate change through the use of technologies such as shade cloth, insect netting, and high tunnels and inputs such as compost, perennial crops, and biological inoculants. Farmers were provided with the supplies needed to implement these strategies and helped formulate the list of strategies based on the needs of their specific farm operation. The project funded a staff member from Cultivate Kansas City to perform site visits at the participating farms to provide technical assistance in implementing these strategies.

Lastly, project participants would have the opportunity to join project staff for a field walk at one of the participant's farms. The purpose of the field walk was to demonstrate risk assessment in the field and collaboratively discuss strategies and solutions to increase resilience.

Our original timeline would have spanned 2020-2021 with farmers meeting in-person in the early part of the year for workshops, and site visits and technical assistance taking place throughout the growing season. Once it became unsafe to meet in person due to Covid-19, workshops for the first cohort of farmers moved online and site visits happened on a case-by-case basis as participants' comfort levels allowed. The project was put on pause in 2021 and the second cohort of farmers started in 2022. By this time, virtual education was the norm, so the workshops remained virtual. Site visits for technical assistance and the group field walk activity took place throughout the spring and early summer of 2022.

Workshops

In 2020 and 2022, two cohorts of farmers participated in a series of workshops with Laura Lengnick of Cultivating Resilience and Glynwood Center for Regional Food and Farming. Cultivate Kansas City recruited participants from our network of urban farmers, hosted the workshops (initially in person, then virtually when Covid-19 disrupted), and facilitated the workshops. Lengnick developed and taught the content of the workshops, with input and feedback from Cultivate Kansas City and workshop participants.

The series of workshops was initially planned as three workshops, then expanded to five in the second year based on feedback. Participants were led through a process to identify short-term and long-term goals and strategies to make their farm businesses more resilient. The workshop sessions introduced the idea of whole farm planning as a climate resilience management strategy, helping farmers think about all layers of their business and operation and how to align their assets, values, and future goals to become more resilient to a changing climate. Lengnick provided an overview of climate risk management principles and strategies to identify specific climate change impacts on a farm operation and explored effective climate risk management practices from around the U.S., particularly for specialty crop farmers. Through every step of the learning process, farmers worked on identifying and assessing climate-related risks on their own farm in preparation for drafting a climate resilience plan. The final workshop featured informal presentations and discussions of each farm's climate resilience plan.

In addition to the workshop presentations and climate resilience planning worksheets developed and presented by Lengnick, participants read several publications including the USDA Bulletin Adaptation Resources for Agriculture and the SARE Bulletin Cultivating Climate Resilience on Farms and Ranches. The combination of reading, lectures, individual work time, group discussion, and presentations was designed to reach a variety of learning styles among participants.

Clearly, Covid-19 disrupted this project significantly, but also presented opportunities to practice resilience and adaptation. Overall, the project was able to cover the material through virtual workshops and participants developed their resilience plans, however the social aspect of building trust and strong relationships in the cohort was lost. Attempts to facilitate ongoing communication and shared learning through Basecamp or WhatsApp groups were not well utilized by participants.

Climate resilience plans

The climate resilience plans that each participant developed were a key outcome of this project. During each workshop, Lengnick led farmers through a series of worksheets to build the foundation for developing their climate resilience plan. The final plan documents incorporated information from a holistic goal setting process, a SWOT analysis, and a whole under management plan, as well as specific strategies and practices to address climate risks.

Over the two cohorts with thirteen participants, eleven climate resilience plans were submitted for feedback from Lengnick and the group. The most often proposed climate risk management strategies were soil health and water management. Ten plans included strategies and practices to improve soil health and seven included a variety of strategies to manage water, both

too much water and too little water. Other notable climate risk management strategies sought to address the increasing threat of late frosts, extreme heat, and increased pest pressure.

Climate resilient strategies in practice

In addition to the workshops and climate resilience plans, each farm received materials to implement practices for adapting to a changing climate. The initial grant proposal stipulated that every farmer would receive shade cloth (to help establish a fall crop during the increased summer temperatures) and would participate in a collaborative Integrated Pest Management monitoring system. In the first cohort, every participant received shade cloth and supplies to use in their fields to assist with germination of fall crops. Two farms reported success with this technique and have incorporated it into their long-term management plan. In the second cohort, four of the five participants asked for something other than shade cloth for a variety of practical reasons. Instead, the funding was used to provide supplies to help implement a practice from their individual climate resilience plans. For most farms, this included materials for building soil health or pest management, including compost, cover crop seeds, biological inoculants, or beneficial nematodes. We made this change to allow the grant project and funds to meet the needs of the participating growers more effectively, although it makes presenting a common outcome of the project difficult.

The first year of the project, growers were given multiple types of pest monitoring supplies, but reporting on the project was sparse. The second cohort attempted to streamline the process in hopes of more consistent reporting, but only two of the five participants reported consistently.

Field Walk

In spring of 2022, members of both cohorts were invited to a field walk with Laura Lengnick at Fair Share Farm in Kearney, MO. The farmers from Fair Share, Tom Ruggieri and Rebecca Graff, participated in the first cohort and truly exemplify the request made to farmers to explore transformative approaches to their farming operations. Lengnick and the Fair Share team led participants on a tour of the site pointing out ways, both big and small, that they had improved farm resiliency over the life of their farm visit. The most ambitious strategy they implement to their farming system was a change from a linear system of farming to one that favored planting along existing contours and thinking critically about the way that water flows over their land. Such a large change led to a cascade of smaller changes touching everything from the types of crops grown and the timing of planting to tool selection and the inclusion of more perennial plantings. Ultimately, Tom and Rebecca have altered their business model to move away from the more resource intensive model of CSA production to focus entirely on value-added fermentation products.

CONCLUSION

We hope that this project was a valuable resource to our participating farmers; it was certainly a learning opportunity for the staff at Cultivate Kansas City. While the outcome of the work initiated in this project won't be fully realized for many seasons to come, we have had reports from participants that the exercises in the workshops, along with the supplies and technical assistance, have led to early victories in whole farm resilience. In reading participant's climate resilience plans, we can infer that most of the farmers we worked with are concerned about soil health and water management and are working towards implementing strategies to increase resilience in these areas. This also provides us with feedback we can use to craft future programming.

Our biggest challenge, aside from operating during a pandemic, was the implementation of on-farm IPM monitoring systems and sharing that data amongst the cohort. We still see value in this type of data collection and will identify different methods of implementation in future programming. One idea we have is to improve monitoring at one of Cultivate Kansas City's farm sites so that we can demonstrate the system in action. Furthermore, if we attempt to collect data from area farms in the future, we will pair it with a financial incentive.

While this program was wrapping up in summer of 2022, we initiated two additional projects aimed at promoting climate resilient strategies with the group of refugee farmers we work with through the New Roots for Refugees program. In both projects, we identified the strategies we wished to teach and promote amongst this population based upon our existing knowledge of their preferred farming systems as well as our experience with our initial two cohorts. Some education will be geared towards participants who are still incubating and learning at our training farm and other education will be tailored to the needs of our graduate farmers who are farming on their own property.

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