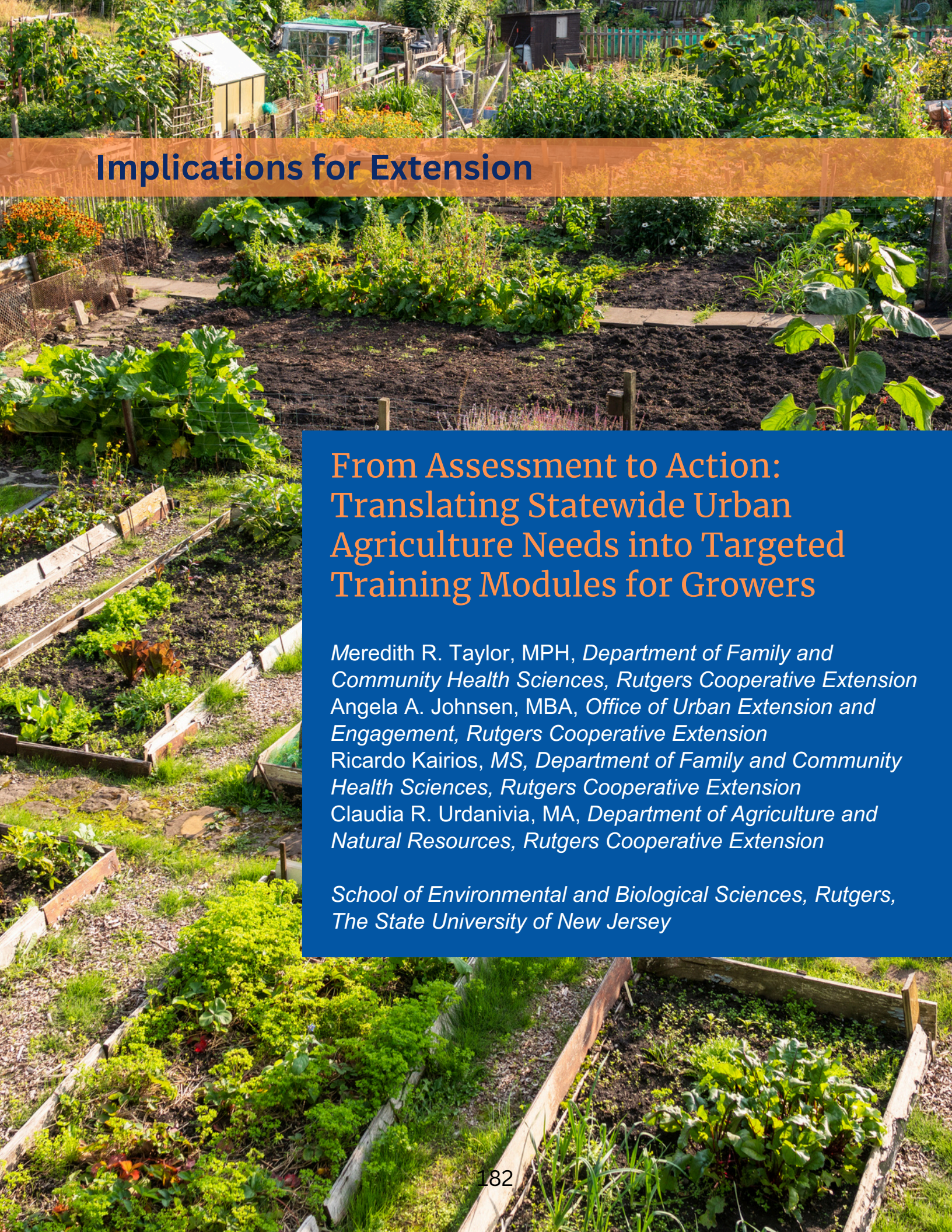




Implications for Extension

From Assessment to Action: Translating Statewide Urban Agriculture Needs into Targeted Training Modules for Growers

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Abstract

Urban agriculture practitioners operate within complex policy and resource environments. Rutgers Extension conducted a Phase One needs assessment of urban growers then used Phase One data to develop and implement a training program in Phase Two. The program, launched in May 2025, aims to increase knowledge and improve agriculture practices. Program participants (N=16) engaged in a hybrid learning format to receive training in food safety, IPM, and soil and water management. Study assessments used a vigorous mixed-methods approach approved by Rutgers IRB. In preliminary data, participants reported workshops would be 'very or extremely useful' at their farm or garden sites.

Introduction

Urban agriculture (UA) is expanding across densely populated regions as communities adopt strategies to increase access to fresh, affordable food, strengthen local economies, and build environmental resilience (Qiu et al., 2024[AJ1] ; Rutgers Cooperative Extension, 2022). UA initiatives may also advance dimensions of food sovereignty by strengthening community control over food production systems (Colson Fearon & Versey, 2022). Systematic reviews associate UA with improvements in food security, dietary quality, physical activity, and social capital, while reiterating the need to manage contamination risks (Audate et al., 2019; Cano- Verdugo et al., 2024). Home gardens and small-scale neighborhood farms can contribute to local food security and community change, particularly when embedded in grassroots networks (Gray et al., 2014).

Despite national growth of the UA movement, disparities continue to exist not only in access to food, but in the ability of urban growers to participate fully in the agricultural community and have UA policies formally enacted to protect UA land and practices (Joyner et al., 2022). Urban Agriculture often operates within fragmented policy landscapes, with municipalities applying inconsistent definitions, zoning rules, and limited support structures (Cohen et al., 2012; Meenar et al., 2017). In this context, UA is often difficult to sustain because policies are not in place to help urban growers navigate the complexities of acquiring land, securing long-term land tenure, or assisting with resources to remediate contaminated soil and build appropriate water infrastructure for irrigation. Extension plays a vital role as a convener and bridge between key stakeholders in this work. In addition to demonstrated leadership in advancing best practices that aid urban growers in mastering critical farm production skills, Rutgers is uniquely positioned to assemble urban growers and provide greater access to training and technical support that increases farmer knowledge and improves agricultural practices.

Objective

This article aims to: (1) describe a Phase One needs assessment of New Jersey UA; (2) demonstrate how Phase One findings informed the Phase Two development and implementation of four targeted UA training modules and workshops; and (3) discuss preliminary findings from Phase Two workshop surveys, and the broader implications for Rutgers Cooperative Extension's efforts to provide greater coordination of resources to support larger investments in UA, consistent with state strategy and federal urban/innovative production support.

Background

Urban agriculture in New Jersey exists within a complex landscape of ecological, regulatory, and policy conditions that vary significantly across municipalities. As documented in statewide analyses, UA systems differ widely in sustainability characteristics, production intensity, governance structures, and land-use constraints (Douziech et al., 2024; NJDEP EJAC, 2019). To ensure that training materials reflect these realities, the Phase One needs assessment was designed to capture the diversity of grower experiences and contextual factors shaping production across the state's rural–urban gradient.

Environmental, Regulatory, and Production Challenges

Environmental conditions shape UA practices in urban regions. Soil contamination, particularly lead (Pb), a legacy pollutant in older and industrialized areas, remains a prominent concern (NJDEP, 2024a). Water access also constrains production: state water supply plans outline climate-related pressures and infrastructure limits, and local municipalities have restricted or ended permit programs allowing water access via city hydrants. Consequently, sites must access water via cisterns on-site which are filled naturally by rainwater, or water is purchased if rainfall is inconsistent or there are drought conditions (NJDEP, 2024b).

Local food safety requirements and cottage food laws often require infrastructure, inspections, and permitting that can be costly for small-scale and urban growers who wish to sell produce or value-added products to the public. (FDA, 2024; NECAFS, n.d.) Integrated Pest Management (IPM) is also essential for UA across small, distributed sites, guided

by national IPM frameworks emphasizing prevention and risk-based decision making (EPA, 2025). More resources and training are needed for urban growers to master these skills. They often experience barriers in accessing technical assistance or expertise specific to the urban context.

Phase One Assessment Overview, Data Sources & Design

Prior statewide analyses confirm that UA in New Jersey encompasses different production methods including, in-ground, raised beds, and complex controlled-environment farms, each shaped by distinct policy and environmental pressures (Douziech et al., 2024; NJDEP EJAC, 2019). Using a mixed-methods approach, data from a Phase One needs assessment survey of urban growers highlighted key priorities for training and technical assistance necessary to increase farmer knowledge and improve agricultural practices. Qualitative data, including interview transcripts, stakeholder meeting notes, and convening summaries, were thematically coded using an iterative, constant comparison approach consistent with best practices for applied qualitative inquiry in agriculture and extension (Cotton et al., 2025; Daniels, 2025). Phase Two course modules, responsive to identified needs, were developed by cooperative extension agents, educators, specialists, and continuing education instructional design teams. This approach aligns with best practices in extension-oriented inquiry, which emphasize inclusive, stakeholder-centered processes to capture multi-sector perspectives in complex agricultural systems (DePhelps et al., 2019; Cotton et al., 2025).

Phase Two Course Module Development and Assessment Tools

A statewide survey captured patterns in

land access, water availability, soil contamination concerns, and technical resource needs, issues previously identified as central to UA feasibility in New Jersey (Rutgers Cooperative Extension, 2022; NJDEP EJAC, 2019). Expertise across Rutgers Cooperative Extension was convened to develop short course modules on Food Safety and Production Practices, Integrated Pest Management, Water and Soil Resource Management. Instructors developed lesson materials for each of these subjects targeting the special needs of urban growers. Each course consisted of two, pre-recorded, one-hour lectures allowing growers to move through the materials at their own pace over a two-week period. Following each online course module, in-person workshops were held allowing growers to participate in hands-on activities designed to reinforce online learning. The project team developed a rigorous evaluation protocol, approved by Rutgers' IRB.

Program participants were asked to complete intake surveys providing information about their histories and experiences as growers, their sites of urban food production, and priority needs of their farm or garden sites. The protocol included additional surveys after each week of online lecture, asking participants to assess if learning goals were achieved, clarity and ease of understanding, and likelihood that new knowledge could be immediately applied. A retrospective survey at the end of two weeks to rate before and after: knowledge acquisition and application, rating usefulness of course content, and identifying barriers to course participation or knowledge application. Finally, a survey at the completion of each in-person workshop to determine ease of understanding and usefulness of course concepts and rating

the workshop experience. Course modules were delivered via CANVAS, the university's online learning platform, because it was the most efficient way to facilitate participation from urban growers across the entire state.

Adult learning frameworks in agricultural education contexts favor hybrid learning models, which combine virtual learning with hands-on, field-based demonstrations, particularly for technical practices such as soil sampling, irrigation design, contamination assessment, and IPM scouting, that require both conceptual grounding and supervised practice (DePhelps et al., 2019; Gudonienė et al., 2025). Evidence from Extension and professional development contexts indicates that synchronous virtual engagement can build communities of practice and support cross-context learning, benefits that complement field days and on-farm practicums (Cotton et al., 2025).

Participant Characteristics

Participants represented a cross-section of individuals operating at different scales and roles in the state's UA ecosystem. UA activities across New Jersey are often coordinated by non-profit organizations. Rutgers coordinated with well-known organizations in north, central, and southern New Jersey recruiting urban growers to participate in this new pilot program. The initial cohort of growers (N=16) completed the intake survey. More than half identified as non-profit, community farmers with six or more years of experience. Growers ranked the main reasons for growing food as supporting educational programs (89%), increasing community food access (84%), and personal use (53%). More than 95% of participants identified as beginning, limited resource, or socially disadvantaged

farmers, according to USDA definitions. The pilot program for urban growers was designed to address their most significant challenges, identified as time (63%), funding (63%), and knowledge/skills (42%). Participation from Extension and research personnel reflects the increasing role of hybrid education and technical assistance models in agricultural workforce development (DePhelps et al., 2019; Gudonienė et al., 2025).

Findings

The two-phase project provides a comprehensive view of the structural, environmental, and educational challenges shaping urban agriculture (UA) across the study region and describes targeted Extension training modules developed in response to those needs. Phase One synthesized grower perspectives (surveys, interviews, stakeholder meetings, convenings) to identify core barriers and training priorities. Phase Two translated those insights into a structured set of hybrid training modules aligned with Extension education best practices. Key results are summarized in Tables 1–4, with brief highlights below.

Phase One: Key Needs and Barriers

Phase One assessment revealed UA spans production systems ranging from community gardens and urban farms built on infill lots to soilless controlled environment farms, each shaped by distinct policy and environmental pressures (NJDEP EJAC, 2019). Respondents identified as urban growers represented a cross-section of individuals and organizations operating at different scales and roles within the UA ecosystem. Urban Agriculture production spaces ranged in size from in-ground small-plot gardens to 2-acre parcels, or controlled

environment systems in small warehouses. UA growers also reported varying motivations for farming and intended uses for their production including: neighborhood distribution to increase community access, small-scale commercial sales to restaurants and grocery stores, and nonprofit donations to emergency food assistance networks (Rutgers Cooperative Extension, 2022). This range in growing scales, contexts and motivations aligns with prior UA research in other geographies (Douziech et al., 2024).

Quantitative and qualitative data in Phase One summarized statewide patterns in production challenges and identified six overarching need categories shaping UA feasibility, safety, and scalability (Table 1), including policy constraints, resource access, environmental health concerns, technical knowledge gaps, and lack of ‘on-site’ technical assistance. Preferences for instructional formats (Table 2) emphasized hybrid delivery with short, practical virtual components and in-person field days at sites reflecting urban constraints (small footprints, mixed land uses, variable soils).

Phase Two: Translating Findings into Targeted Training Modules

Phase Two focused on developing practical training modules responding directly to the barriers documented during Phase One. The four core modules, Food Safety and Production Practices, Integrated Pest Management, Water and Soil Resource Management are summarized in Table 3. Table 4 maps each major Phase One barrier to a corresponding Phase Two training response, demonstrating direct translation of grower-identified needs into curriculum components. Phase Two course modules launched as a pilot program in May 2025.

During final revisions of this manuscript, three of the course modules and in-person workshops have been completed. Online course survey data is still incomplete, but preliminary data collected from in-person workshops has been very positive. Most workshop participants ($\geq 90\%$) reported content would be 'very or extremely useful' at their farm or garden site, and they 'agree or strongly agree' that hands-on activities helped to reinforce course concepts. Participants also emphasized the importance of modules addressing communication and advocacy skill-building, particularly regarding engagement with officials.

Discussion

Assessment-to-action translation enabled Rutgers Cooperative Extension (RCE) to address documented educational, training, and technical assistance needs for UA growers. The hybrid training model developed in this project reflected grower preference and established best practices in adult and Extension education. Successful completion of the Phase One assessment set the stage for a more complicated process of developing and launching the UGTP. Partnering online learning with in-person experiential workshops strengthens the model for our program. However, in our region this means workshops requiring us to be outdoors for activities like scouting for pests, or installing drip irrigation were scheduled at busy times in the growing season. Consequently, it has been difficult to engage with growers and compete for their time and attention. Workshop participation and post workshop evaluations have been strong, but online course participation began lagging between spring and summer.

Timing the roll out of courses will be a significant challenge for the UGTP.

Running classes in the winter may increase participation in online learning, but we would lose the impact of the in-person workshop. The program team may explore options for staggering courses between late fall and mid-spring, during the summer we would have only select workshops and no online courses. This allows growers to engage for one or two half-day workshops. It will be less demanding on their time and may result in higher levels of long-term engagement with the program.

Implications for Extension

Taken together, these results highlight specific areas in which the Extension system can enhance technical training, policy navigation, and coordinated support for UA. We outline three priority actions for the Extension system.

1. Advance risk aware UA practices. Continuing instruction and dissemination of UA practices that reduce environmental risks from soil, protect water resources, apply appropriate IPM controls for urban environments, and strengthen food safety capacity.
2. Institutionalize hybrid delivery. Scale a blended model (short, applied virtual sessions + field-based practicums) to broaden access while maintaining experiential, skills-based learning (DePhelps et al., 2019; Gudonienė et al., 2025).
3. Align with resource streams. Link programming to federal and state supports (technical assistance, soil health services, irrigation, micro infrastructure) via urban/innovative agriculture initiatives (U.S. Department of Agriculture, n.d.; Natural Resources Conservation Service, n.d.).

Grounding training in documented challenges (zoning ambiguity, contamination risk, water constraints, compliance-driven food safety needs) yields a responsive, risk-aware, and scalable curriculum. Sustained progress will depend on iterative updates, clear grower–municipal communication, and Extension’s role in translating regulatory complexity into practical, on-the-ground solutions.

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Tables

Table 1.

<i>Phase One: Key Needs and Barriers Identified by Urban Growers</i>		
Barrier Area	Description of Challenge	Implications for Urban Agriculture
Policy definitions & assessment constraints	Inconsistent municipal definitions; [BLIND#] acre minimum farmland assessment threshold limits eligibility.	Confusion about permitted activities; small parcels excluded from agricultural supports.
Resource access	Limited access to land, water, equipment, and microfinancing; challenges tied to tenure insecurity and infrastructure limitations.	Restricts farm establishment, expansion, and operational stability.
Soil contamination & environmental health	Concerns about legacy contaminants including lead; limited clarity on testing and remediation.	Growers need stronger soil safety guidance to reduce risk.
Technical knowledge gaps	Gaps in Integrated Pest Management, soil remediation, FSMA PSR compliance, and interpreting soil results.	Requires tailored technical training for urban contexts.
Lack of urban specific best practices	No coordinated statewide guidance addressing urban conditions.	Fragmented decision making and uneven support across municipalities.
Preferred learning formats	Strong preference for hybrid interactive models (virtual + field-based).	Indicates need for accessible, flexible, experiential Extension programming.

Tables

Table 2.

<i>Phase One: Preferred Learning Formats Among Urban Growers</i>		
Learning Format	Description	Why Growers Preferred It
Hybrid instruction	Combination of virtual modules and in-person field days	Maximizes accessibility; supports hands-on application.
Short virtual lessons	Asynchronous or brief synchronous segments.	Reduces travel and scheduling burden.
Field demonstrations	Onsite learning at representative urban farms.	Reinforces techniques in real-world conditions.