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First you need the farmers: The microfarm system as a critical intervention in the alternative food movement

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Abstract

After more than three decades, the alternative food movement has developed multiple strategies, most of which are still struggling. This essay surveys the literature on six key alternative food movement (AFM) strategies, assessing their strengths and weaknesses before describing a novel strategy, the microfarm system, which is being implemented in north central Ohio. It argues that key omissions from most AFM scholarship and practices include sustained attention to training and supporting successful farmers, concerted efforts to help facilitate needed social networks or communities of practices around alternative food developments, and forwarding a set of ambitions that do not appreciate the scale of existing food systems nor the limits of alternative food systems' impact. It offers the microfarm system as an emerging approach to address these omissions.

Keywords

alternative food movement, urban agriculture, sustainable agriculture, community supported agriculture, farmers markets, food hubs, new-entry farmer training, beginning farmers, microfarming

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Author Note

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> The fundamental fact is that we no longer need many farmers.
> —*Paul Krugman, Twitter, March 21, 2019*

The alternative food movement (AFM) is mired in a crisis of identity. At the same time, it faces a series of existential challenges that must be met. We need more clarity about what the AFM is and how its parts function (or do not function) to better understand and to help realize its success. The AFM is defined by both practitioners and scholars as an "attempt to replace the dominant food system with one that is fair, health-promoting, and ecologically sound" (Hoey & Sponseller, 2018, pp. 595–596; Makita, 2022, p. 384; both citing Galt, 2013) and includes "efforts to respatialize and resocialize food production, distribution, and consumption in North America, Europe, and Australia" (Jarosz, 2008, p. 231). Makita (2022) describes it as "a variety of food-related social movements" that include "organic food, vegetarianism, Fair Trade, slow food, food justice, and food sovereignty" (p. 384). The hope is that the AFM can create robust alternative food networks (AFNs), defined as "oppositional, more socially sustainable, or simply more ethical spaces of food production and distribution" (Argüelles, 2021, p. 1385). These are ambitious goals that have emerged from heterogeneous and often grassroot efforts around the world since the 1970s. They have recently gained new momentum, capturing the attention of scholars, university researchers associated with the Cooperative Extension System, and governmental agencies (Argüelles, 2021; Calo, 2018; Oberholtzer et al., 2014).

Seeking to understand the AFM, scholars and practitioners have identified a menu of concepts and strategies to achieve its lofty goals. These include urban agriculture, sustainable agriculture, community supported agriculture (CSA), farmers markets, food hubs, and a spate of beginning or new-entry farmer training programs (Aucoin & Fry, 2015; Blay-Palmer et al., 2013; Carlisle et al., 2019; Galt, 2013; Makita, 2022; Nicholls et al., 2020; Niewolny & Lillard, 2010; Oberholtzer et al., 2014; Sulistyowati et al., 2023; Wardynski et al., 2018). But are they working? The following essay details scholarship around these strategies, exploring the achievements and shortcomings of the AFM, and then describes a new approach that might help refocus scholarship and practices in more strategic and effective ways.

The Alternative Food Movement's Multiple Faces

While the AFM enlists many strategies in its work, this review limits itself to six of the most popular approaches used today. They each overlap with others in their practice but are often thought about in silos. By bringing these six together under the rubric of AFM, we hope to emphasize their intersectionality.

Urban Agriculture

Urban agriculture is defined as "the growing of plants and the raising of animals within and around cities" (Oberholtzer et al., 2014, p. 1). Scholars agree that Detroit, Michigan, was the seedbed for the movement, tracing its origins to an effort in the 1890s to address "land vacancy stemming from neighborhood abandonment" (pp. 425–426), but noting its revival in the 1970s when Mayor Coleman Young launched the Farm-a-Lot initiative, whose approaches and ambitions would become a model for other cities in subsequent decades (Pothukuchi, 2015). Since the early 2000s, urban agriculture has become imbued with great hope and ambitions, promoted as a means of addressing public health, food insecurity, food justice, food sovereignty, economic development, ecological improvements, social capital generation, and the sustainable repurposing of abandoned lands, all aimed at lifting at-risk neighborhoods out of their marginalized conditions (Cohen & Reynolds, 2014; Daftary-Steel et al., 2015; Dixon et al., 2007; Grebitus, 2021; Moragues-Faus & Battersby, 2021; Santo et al., 2016). City government, policymakers, nonprofit organizations, university Extension, and urban planners have taken the lead in creating policy structures, training programs, planning strategies, and grant funding to support and sustain these efforts (Cohen & Reynolds, 2014; Halvey et al., 2021; Horst et al., 2017; Pothukuchi, 2015). The basic idea is simple and intuitive: if cities support the cultivation of food in urban spaces facing food insecurity, food

and poverty problems will be abated.

But urban agriculture has been neither simple nor unproblematic. Scholarship on the practice has ranged from studies identifying obstacles to successful urban farming to stinging critiques highlighting several unintended outcomes, as well as a growing sense that it has turned into a fool's errand. Many of the key obstacles have ranged from common small-scale farming challenges like access to credit, land, and sufficient markets to sell produce, to some unique challenges in urban settings such as contaminated land, access to water resources, land rent prices, unfriendly urban policies, and access to compost (Abdoellah et al., 2023; Cohen & Reynolds, 2014; Halvey et al., 2021; Oberholtzer et al., 2014; Santo et al., 2016; Whittinghill & Sarr, 2021). A cohort of geographers have brought a critical lens, condemning it for reinforcing "neoliberal" values, perpetuating inequalities by advancing mostly income-secure middle-class white practitioners, and contributing to the unjust elevation of land value in low-income neighborhoods through "eco-gentrification" (McClintock, 2018; Tornaghi, 2014; Walker, 2016). One assessment concludes that urban agriculture faces an "unattainable trifecta" when it aims to provide food, offer job training, and create income for at-risk households all at once because there is neither the necessary financial support to sustain farming, nor the required output of marketable food to sustain programming (Daftary-Steel et al., 2015). Moreover, as Horst et al. (2017) similarly concluded, "it is unreasonable to expect disadvantaged populations to cultivate their own food; they are already burdened by working extra jobs and the stress of poverty and are unlikely to have both the time and interest to spend gardening" (p. 281).

While data suggest that urban agriculture is growing as a practice *and* failing to deliver its most ambitious goals, scholars continue to study it in the United States and abroad in attempts to understand what can be done. Some look to its potential to provide food and ecosystem services and continue to see great promise globally (Benis & Ferrão, 2017; Nicholls et al., 2020; Payen et al., 2022). Others search for policy, planning, and training alternatives that might restructure the urban farming context in ways that favor the practice. These include food policy councils, better urban planning approaches, better-targeted training programs, and urban services that support and encourage urban farmers and farming (Cohen & Reynolds, 2014; Halvey et al., 2021; Horst et al., 2017; Oberholtzer et al., 2014; Panagopoulos et al., 2018; Whittinghill & Sarr, 2021). All of them conclude that urban agriculture is not yet living up to its promise, by failing to generate sufficient food, income, or diverse urban farmers in the places where it is being practiced (Dimitri et al., 2016; Horst et al., 2017).

Sustainable Agriculture

Sustainable agriculture or agroecology is frequently identified as an approach designed to counter the ecologically and socially damaging practices of the industrialized, capital-intensive agriculture that dominates food production today. It can be practiced at almost any scale, from small urban plots to large commercial farms, but it requires that farmers attend to more than just crop or animal outputs. They must understand the embeddedness of their farming activities within ecological and social systems that can be damaged by agriculture. Carlisle et al. (2019) call it "the most urgently needed work in the United States" (p. 1) because it counters the environmental damage, health and nutritional deficits, and rural poverty generated by the dominant agricultural practices. To this end, scholars and researchers focus on topics in containing and controlling fertilizer input, water conservation, and fossil-fuel use in attempts to develop strategies that reduce harm and negative impacts (Al Hamedi et al., 2023; Negi et al., 2022; Rashad et al., 2023; Singh et al., 2023). Most sustainable agriculture research is focused on reforming the existing industrial system with new ecologically friendly techniques (Rudnicki et al., 2023).

Sustainable agriculture intersects with the AFM insofar as it *also* focuses on small-scale or urban farming, attends to issues of farm labor, and contributes its insights to developing AFNs. In this arena, advocates seek to help existing AFM farmers improve their practices and to guide new-entry farmers toward enlisting these practices from the start (Carlisle et al., 2019). Combined with the AFM, sustainable agriculture provides guardrails

for alternative farming to create healthy and socially conscious practices. (Carlisle et al., 2019; Timmerman & Felix, 2015).

However, despite the growing demand from AFM farmers to engage in sustainable agriculture, scholars acknowledge that "the deck is stacked against their success" (Carlisle et al., 2019, p. 1). Structural issues in U.S. agriculture pose significant barriers to entry. These include the concentration of agriculture into ever-larger producers, a near absence of women (14%) and farmers of color (4%) producing in the system, and a lack of sustainable income (MacDonald et al., 2018; MacDonald & Hoppe, 2018; U.S. Department of Agriculture Economic Research Service [USDA ERS], 2019b; USDA National Agricultural Statistics Service [USDA NASS], 2019). These conditions make the transition to sustainable agriculture challenging in the existing system; launching an AFN within these constraints also foregrounds additional barriers such as the absence of social networks and lack of access to land, markets, capital, labor, tools, and water (Basche & Carter, 2021; Carlisle et al., 2019). While sustainable agriculture is beginning to make progress in the existing industrial model, some scholars detect an effort by industrialized producers to appropriate agroecology as a set of technical requirements *alone,* while leaving other harms of the existing system to continue (Giraldo & Rosset, 2018). For those entering sustainable farming for the first time on small-scale and urban farms, finding enough capital to "operate at a size sufficient to earn a profit" (Carlisle et al., 2019, p. 7) is a struggle (Calo, 2018). These barriers and risks suggest that sustainable agriculture represents more of a burden than a solution for the AFM and perhaps even a risk to its existence.

Community Supported Agriculture

Community supported agriculture (CSA) is a direct market intervention that has been in practice since at least the early 1990s (McFadden, 1991). While CSAs exist in many forms depending upon the farmer, customers, and geographic location, the basic structure is one where a farmer pre-sells their crops to a group of buyers who then receive "shares," usually in the form of a weekly box of fresh goods from the farm over the course of the season. In some instances, customers also share in the farm work, volunteering time over the season to contribute labor to the farm enterprise (Cone & Myhre, 2000). The CSA model has been adopted by many farmers because of its attractive features: "regular income, including knowing ahead of time the size of the market one is serving, and the income it will generate" (Galt, 2013, p. 356). It is attractive to consumers because it provides a direct connection to farmers and their produce and provides them with a sense that they are investing in local sustainable farming and offering support to the AFM (King, 2008; Makita, 2022; Sulistyowati et al., 2023).

Studies comparing the income from CSAs to wholesale or farmers markets found that CSA crops tend to garner the highest price (Hardesty & Leff, 2010). Moreover, the economic approach of CSAs transcends what many scholars see as a structural danger to AFNs—free market or neoliberal approaches to crop commodification—because they "decommodify food" (Cone & Myhre, 2000; Hinrichs, 2000). By removing the free market approach to food products, "farmers have more freedom to plant crops according to the season without fear of losing income and customers" (Sulistyowati et al., 2023, p. 834). From the outside, CSAs appear to have threaded a needle for the AFM by stimulating local direct markets in fresh produce, securing farmer income, and engaging consumers in more sustainable food production and practices (Cone & Myhre, 2000; King, 2008).

From the inside, farmer success and income depend almost entirely on the size of the farm and how much of it is committed to CSA shares: "The more the farm relies on CSA sales, the lower the earnings … and the less likely it is to be profitable" (Galt, 2013, p. 357). Large farms with CSAs included as a small part of their market find CSAs to provide valuable added profit, but farms of any size that are fully or mostly committed to CSA sales tend to struggle or fail. In fact, CSAs present formidable challenges to both farmers and consumers. Farmers face risks related to promising more than they deliver, struggling to maintain sustainable farming practices, complex farm management problems, and limited labor and skills to farm

effectively (Sulistyowati et al., 2023). CSA members are also challenged to find time to commit labor to the farm, to afford the steep upfront cost of membership, and to alter their own food consumption habits as harvest outputs change during the season (Sulistyowati et al., 2023). The result is that CSAs provide consumers with a sense of virtue in supporting local farmers, while these same farmers are effectively engaged in a form of "self-exploitation" by providing more crops than necessary at prices that do not cover the cost of production and CSA management (Galt, 2013).

Farmers Markets

Farmers markets are another AFM market intervention where, ideally, farmers gather collectively, usually at an urban location, to sell their produce directly to consumers. Like CSAs, farmers markets seek to shorten the food supply chain, cultivate a community around farming and food provisioning, and provide a dependable market for farm produce (Aucoin & Fry, 2015; Tchoukaleyska, 2013; Warsaw et al., 2021). Farmers markets have grown in popularity and geography and now by the dozen in every U.S. state, with a particular concentration east of the Mississippi River and around major U.S. cities (USDA ERS, 2013). There are just over 8,600 registered farmers markets operating in the United States today, a number that has held fairly steady since 2016 (USDA ERS, 2019a).

Considered a critical node in AFNs, farmers markets offer consumers a variety of fresh goods and provide farmers with social networks, direct contact with customers, and a friendly space in which to introduce new products and learn about changing consumer demand (Aucoin & Fry, 2015; Heying, 2010; O'Hara et al., 2022. A regional study in the state of Washington has demonstrated (somewhat ironically) that farmers markets have become more viable in the changing agricultural landscape, encouraged by the neoliberal turn in global food markets where commodity crop production shifting to new regions has left new spaces for small-scale farm producers in their wake (Jarosz, 2008). While often imagined and described as homogenous, research has revealed that farmers markets often exist under heterogeneous regulations and operate according to diverse values advancing different visions about which vendors belong and do not belong (Manser, 2022).

Farmers markets were estimated to have sold more than US$3 billion in produce by 2015, but studies show that these sales have tended to serve predominantly high-end customers and wealthy communities (Schoolman et al., 2023). These markets also often struggle to find enough local farmers; many markets have become overrun with non-produce vendors selling value-added products, non-food goods, and other kinds of services, diverting them from their contribution to AFNs (Aucoin & Fry, 2015). These markets have also fallen short in attracting Black farmers and vendors (Recinos, 2021). Many small-scale farmers are unenthusiastic about farmers markets due to the additional labor involved in packing and marketing crops in that setting, the competition in pricing among participating farmers, and the additional fuel costs transporting to and from the markets (Jarosz, 2008). Thus, while farmers markets provide a sense of virtue to those customers who make a small portion of their household food purchases once a week in this setting, they seem to be built on a fragile foundation and fail to achieve the loftier goals of the AFM.

Food Hubs

A food hub is defined as "a business or organization that actively manages the aggregation, distribution, and marketing of source-identified food products primarily from local and regional producers to strengthen their ability to satisfy wholesale, retail, and institutional demand" (Barham et al., 2012, p. 4). A relative newcomer to the AFM, food hubs are now being studied for their potential to address food insecurity in urban food deserts, their contribution to developing social networks among farmers and practitioners, and their contribution to sustainability, among other issues, and they are showing some promising results (Avetisyan & Ross, 2022; Clark et al., 2019; Shariatmadary et al., 2023). But their greatest hope, according to the scholarship, lies in their promise to revitalize small-scale farming. By providing a consistent local or regional market for farm products, food hubs have the potential to strengthen farmers' access to produce markets beyond the interventions of CSAs

and farmers markets (Phillips & Wharton, 2016). By taking on the role of managing post-harvest sales and marketing activities, food hubs can perform a vital service that improves farmers' knowledge about market demand, and thus decreases the risk in knowing what to plant, at what time, and at what scale while also providing a reliable and consistent source of local and regional food to consumers (Hermiatin et al., 2022).

Since 2013, the Michigan State University Center for Regional Food Systems has been studying and surveying these businesses in the U.S. annually (Bielaczyc et al., 2023). Reaching 107 food hubs in 2021, the MSU survey has found that almost 75% of the responding food hubs have been in existence for less than a decade, and more than half of them operate in the upper Midwest or along the West Coast, with another third in the upper Great Plains and south Atlantic states. More than half are operating as nonprofit businesses (Bielaczyc et al., 2023). Three-quarters of these businesses sell directly to consumers or to a diversified market, with most of them ranging in annual sales from US$20,000 to US$1,000,000 (Bielaczyc et al., 2023). While 91% of the respondents reported break-even or better income, their reliance on grants appears to have been at least as important as food sales in these outcomes (Bielaczyc et al., 2023).

Shariatmadary et al. (2023) have concluded that there are 150 active food hubs in the U.S. aggregating local and regional crops for market sales. Nevertheless, scholars agree that food hubs "have the potential to drive transformative change by making multifaceted contributions to the social and environmental sustainability to the U.S. food system" (Shariatmadary et al., 2023, p. 2). But that potential is tenuous because food hubs, like any market business, only survive when they successfully sell more products than their cost of production, and "if they are unable to achieve this, they will likely close and have minimal positive economic or social impact" (Fischer et al., 2015, p. 97).

Beginning and New-Entry Farmer Training

Responding to the steady decline and rising age of farmers alongside a growing interest in the AFM, drawing nonfarmers into the profession, universities and nonprofit organizations have launched a legion of new-entry or beginning farmer training programs (Argüelles, 2021; Calo, 2018). These efforts tend to be praxis-oriented and exist outside of formal agricultural degree programs, offering a menu of knowledge-sharing and experiential activities designed to prepare a nonfarmer for the demands of farming (Argüelles, 2021; Niewolny & Lillard, 2010; Plana-Farran et al., 2023; Wardynski et al., 2018). To support these efforts, the USDA has launched the Beginning Farmer and Rancher Program, injecting more than US$150 million in federal funding into at least 250 projects around the country since 2009 (Obudzinski et al., 2017). While this funding represents a significant increase in USDA dollars into the new farmer training space, it is still under 4% of the total USDA Research, Extension, and Economics spending in any year (DeLonge et al., 2016). Moreover, only a handful of organizations around the country offer this programming on a consistent basis (Calo, 2018).

These efforts intersect with the AFM, usually focusing on the key values embraced by the movement that include sustainable farming, local food systems, social networks, small-scale and urban farming, and community food systems (Niewolny & Lillard, 2010; Wardynski et al., 2018). However, research has suggested that this approach to training suffers from several deficits. First, they tend to be "positioned at the margins of major research and education agendas" (Niewolny & Lillard, 2010, p. 76). Second, some scholars criticize an excess of what they term "knowledge deficit" approaches, which politicize and fail to acknowledge broader structural and social obstacles to the AFM (Calo, 2018). Finally, other scholars assert that key imaginaries—lack of farmers, farming heroes, and arguments about the social value of sustainable agriculture—motivate the AFM but fail to be effectively integrated in the trainings themselves, leading these programs toward "calculative, instrumental, and managerial practices" (Argüelles, 2021, p. 1398; Dinnie & Holstead, 2018). Like the other AFM interventions mentioned in this essay, beginning or new-entry farmer training programs are failing to deliver on the larger ambitions of the AFM.

Everything But the Farmers

As the summary above demonstrates, scholars evaluate the AFM mostly within the silos they are studying, and within each they are coming to similar conclusions. Hoey and Sponseller (2018) have put it best "they disagree about strategies that could fundamentally, and permanently, change how food is produced and accessed" (p. 596; see also Clendenning et al., 2016; Mount, 2012; Sbicca, 2015). Some focus on protecting various parts of the movement from appropriation by capitalist and neoliberal values (e.g., Calo, 2018; Galt, 2013; Giraldo & Rosset, 2018; Guthman, 2008; Hoey & Sponseller, 2018; McClintock, 2018; Sbicca, 2015; Tornaghi, 2014; Walker, 2016). Others seek to restructure planning and policy to better accommodate the needs and values of one part of the movement or another (e.g., Daftary-Steel et al., 2015; Grebitus, 2021; Halvey et al., 2021; Horst et al., 2017; Panagopoulos et al., 2018; Pothukuchi, 2015; Sulistyowati et al., 2023). Still others criticize land-grant colleges and other organizations for working with an industrial agriculture paradigm and failing to adjust and adapt their approaches to the real needs of the AFM, which usually includes a long menu of outcomes ranging from racial and gender equity to community-building and asset-provisioning (e.g., Iles et al., 2020, 2021; Niewolny & Lillard, 2010; Oberholtzer et al., 2014; Wardnynski et al., 2018). Many tend to focus their critique on the possibilities and failures of engaging the appropriate values in AFM activities (Argüelles, 2021; Gordon & Hunt, 2018; Iles et al., 2020; Manser, 2022; Plana-Farran et al., 2023; Timmerman & Felix, 2015). All of them ignore or elide the critical foundation for a successful AFM: successful farmers.

Nevertheless, we do get hints about farmers and farming that deserve more consideration. Carlisle et al. (2019) remind us that "in order to farm, new farmers must build up and sustain productive assets that enable them to grow crops or raise livestock, and bring these products to market" (p. 5). This is easier said than done, as Sbicca (2015) reports that "small-scale organic farmers face many financial difficulties" (p. 682) and Carlisle et al. (2019) further report that "new entry sustainable farmers face unique challenges" (p. 9). Farmers appear to persist nevertheless, according to Plana-Farran et al. (2023), "based on a long-term orientation that offers an identity and sense of pride in being lifelong farmers" (p. 2) rather than a desire to make a profit or become wealthy. Iles et al. (2020) uncovered this sentiment in one farmer she interviewed who stated, "It's a lifestyle. I think that appeals to us. We make a joke we heard one time about an Amish person that was being interviewed and he just talked and talked about farming, and finally the interviewer said, 'Well, what do you do for entertainment?' 'I farm.' We get that" (p. 29). But, as Iles et al. (2021) recorded from other farmers, loving the work is not enough: "we are not going to make bank and we know that. That is not the point of this. But we have to be above break even and that has to include our labor costs" (p. 361). Many scholars note that, just like all farmers in the U.S., AFM farmers rarely depend upon farm income solely to make ends meet, counting on off-farm employment for additional income and for health insurance benefits (Iles et al., 2021).

Farmers farm for the lifestyle and identity, not the profit, but without sufficient income to maintain themselves and their farms, these ambitions cannot be realized. Meanwhile, AFM scholarship has approached the various interventions, values, and goals of the movement as if they can be addressed *without* attention to making farming itself successful. When these scholars do note that farming is difficult, they do not then ask what might be done to address the challenges faced by the farmer but instead focus on structural deficits or the absence of certain AFM values in the efforts they study. More often they do not consider farms and farming at all, leaving it as the absent referent (Adams, 1990) in studies bewailing the infectious qualities of neoliberalism, the shortcomings of planning, training, and policy, or the short-sighted behavior of food consumers. Throughout this literature scholars seem to take successful farming as a given, assuming that *it just happens* and all that is needed to create the radical changes of the AFM is the proper set of values engaged through the correct structure cultivated through better policy and training. But for more than two decades, these assumptions have led to very little actual move-

ment for the AFM. In several areas the intervention offered little or nothing of need to the working farmers. Sometimes they even promote activities that hinder farmers. If the AFM hopes to make the kind of inroads into the food system it has imagined for itself, these conditions have to change. We have to put successful farming first.

The Microfarm Project

The remainder of this essay will detail an AFM intervention that has sought to put farming first. With the preceding literature review in mind, putting farmers first requires a holistic approach to a food system. As such, it includes university knowledge about the appropriate size and scale of the farming site, the development of aggregation and marketing through a food hub, facilitation of social networks through a local "community of practice," sufficient financing and secure land access for farm start-ups, and robust and sustained training in all aspects of commercial farming. For the past six years, the microfarm project has been building a local food system designed to put farmers first. This approach departs from many existing AFM efforts by making farmer success its primary value, by integrating knowledge-transfer activities in close communication with community and system needs, and by delivering a long-term engagement.

The Microfarm and Microfarming System

The microfarm project began by defining the smallest viable urban farming unit around two critical parameters: income and labor. The solution needed to be large enough for a farmer to earn a supplemental income of at least US$35,000 a year, but small enough to be worked with minimal additional labor. In the spring of 2017, student researchers and the lead author used specialty crop data—both yields per square foot and average market prices—to calculate how much of what mix of crops might produce the income goals. The result was a footprint between one-quarter and one-third of an acre (0.1–0.13 hectare), contained between 6,000 and 8,000 square feet of growing area in small-plot, high-yield beds, and contained high tunnel space covering almost half of the growing area in order to accommodate full-year production of crops in Ohio. According to the calculations, when such a site achieved maximal production—using every square foot, achieving efficient crop turnover, and growing a diversity of bulk and high-value crops—it could bring the financial returns aimed for and be manageable by 1.5 full-time equivalent positions (FTEs) a year. We called it a "microfarm."

The financial estimates assumed that all of the produce grown in the microfarm setting would find a market. For that to happen, the working microfarmer would have to cut into valuable farming time to undertake outreach and marketing activities that may not make those market connections secure and cut into potential profits from crop sales by taking time away from needed farm labor. Here, the solution was a farmer-owned cooperative. Also called a food hub, the farmer-owned cooperative would identify buyers, create crop plans for microfarmers, and aggregate and repackage their produce for buyers. Another set of calculations was run, assessing the minimum number of microfarms needed to support the farmers' businesses *and* provide sufficient cooperative income to sustain an aggregation and marketing cooperative. The answer was at least eight microfarms and ideally 10. On paper, such a system had the potential to establish successful urban farmers if they banded together cooperatively to aggregate and market their produce. The concept was turned into a simple graphic laid atop a map depicting the food deserts and low-income census tracks in Mansfield, Ohio, the small rust belt city where the lead author worked at a regional campus of The Ohio State University (OSU; Figure 1).

To help facilitate the development of such a system, the lead author applied for internal funding from OSU to construct a demonstration microfarm on the OSU-Mansfield campus in 2017. This farm would serve as a site to visualize the concept and test the crop production assumptions developed in the research classroom. During 2017 and 2018, several different crops were planted, sold to the campus cafeteria and the local community, and donated to food-insecurity institutions in the city.

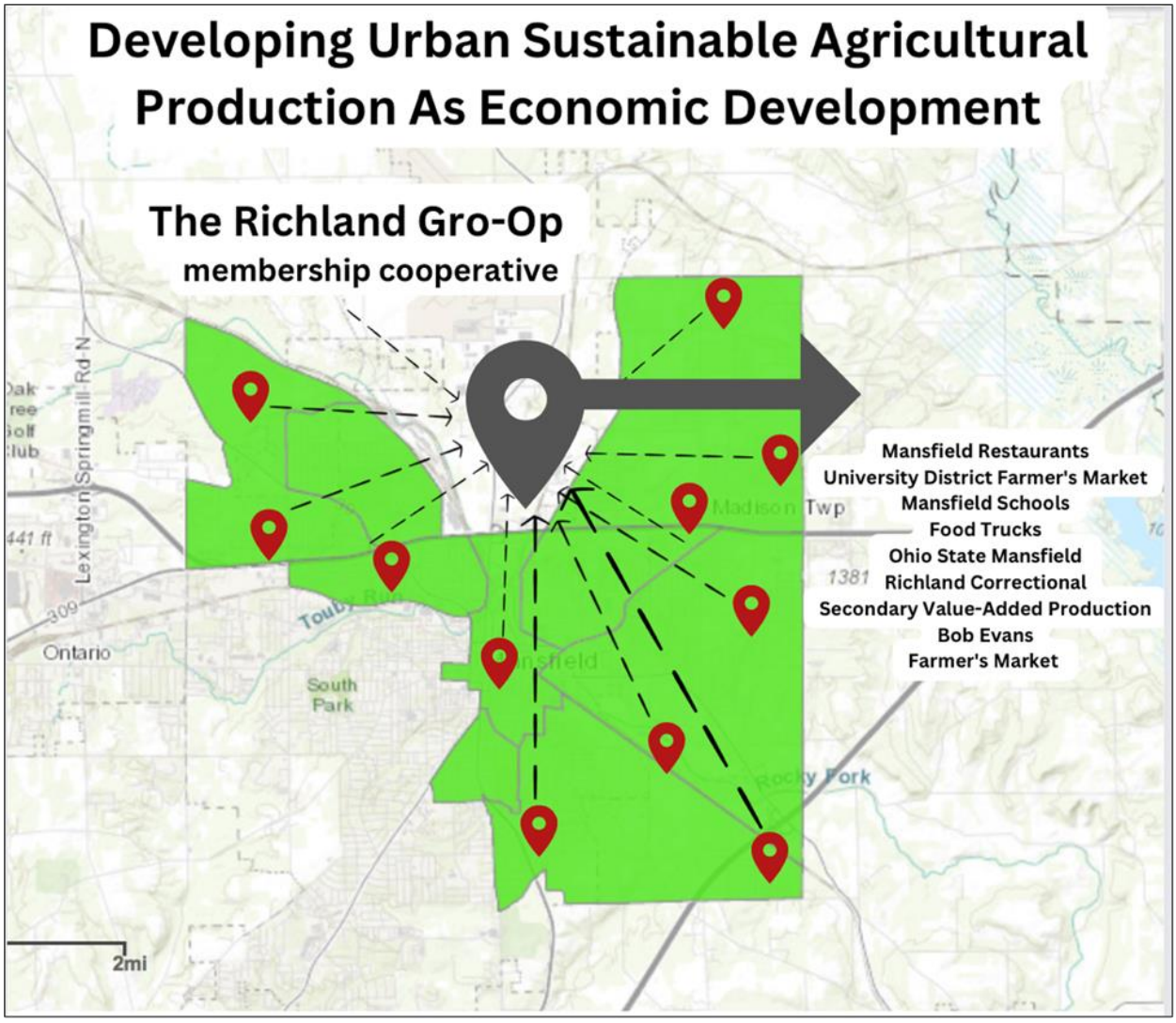
The Community Engagement Effort

Developing the microfarm system in the classroom is one thing. Implementing the concept in practice

is another. To work, it requires an engaged community. The lead author began meeting with individuals and institutions in Mansfield to uncover interest in local food systems, community and economic development, and social justice. He quickly identified the North End Community Improvement Collaborative (NECIC) as a key partner. NECIC had been engaged in asset-based community development in Mansfield since 2007 and had already identified local food as a critical community interest. NECIC had connected local residents to Cooperative Extension Master Gardener Volunteer training and had funded the development of more than a dozen community gardens around the city.

Together with OSU researchers, NECIC facilitated six months of engagement with local businesses, neighborhood residents, politicians, and institutions who might become partners and participants in a microfarm system effort in Mansfield. This engagement culminated in an Urban Farming Summit in late spring 2018, with over 100 attendees. At this event, the microfarm system was described, its needs from the community were explained, and the attendees participated in groups designed to identify specific assets, institutions, and social capital relevant to the concept. By the end of the event, we had codified the commitments of local dollars, institutional support, and interested farmers.

Figure 1. The Microfarm System Graphic Used for Outreach



Following this event, we assembled partnerships and local commitments together with university funding, research, and assets into a proposal submitted to the Foundation for Food and Agricultural Research (FFAR) Seeding Solutions in Urban Agriculture matching grant program. In December 2018, the proposal was awarded funding. A pilot microfarm system was launched in Mansfield in January 2019. The funding supported two years of engaged commercial horticulture training, paid for 10 microfarm "kits," subsidized personnel for a new farmer-owned cooperative, and supported a range of Extension education and social science research exploring the system implementation and its impacts on the surrounding neighborhoods.[1]

Implementation

The project aimed to accomplish three essential goals. The first was recruiting and training a cohort of new-entry farmers in commercial horticultural production. The second was focusing on creating a farmer-owned cooperative where the participating trainees could explore the challenges of marketing the crops grown during their training phase. The third was aiming to cultivate a community of practice both among trainees and among the various community institutions supporting and contributing to the effort to facilitate necessary social networks.

The farmer training program lasted three years. The first year began on the campus demonstration microfarm in small plots with relatively simple-to-cultivate crops like lettuce and radishes in a high tunnel. As each season progressed, the growing area grew and included more labor-intensive crops like tomatoes and cucumbers in the high tunnel and outdoor plots. In the second year, four microfarms were constructed on a leased brownfield[2] site in Mansfield's North End, and trainees were assigned increasingly larger growing areas as each growing season progressed. The purpose was to expose the trainees to increasingly challenging cultivation situations where they would progressively and collectively build their skills and experience. It was also believed that the experiences would begin to help aspirational farmers make an informed decision about their aptitude and interest in taking on a farming lifestyle. Employees of NECIC also participated in this training to afford them the institutional knowledge to become active growers.

Alongside the ongoing cultivation training, trainees learned cooperative development and management and formed a new farmer-owned business known as the Richland Gro-Op (RGO). They studied small farm business and financial management during the training, and each participant created a formal business plan for their future microfarm and then incorporated as a limited liability corporation (LLC). By the end of horticultural training, aspirational farmers were responsible for cultivating approximately half the square footage of a single microfarm. While much of the in-person training work was severely constrained by COVID-19 disruptions, the project advanced 10 farm businesses through the second year of implementation and moved all of them onto their own microfarm for the third year. Our goal was to locate all new farms on farmer-owned land or with secure and robust leases. For some trainees, this involved purchasing low-cost land bank properties in the city, while others already owned rural or peri-urban lands, and still others moved into the microfarms on the leased brownfield site at no additional cost.[3]

The training effort sought to enhance the work of community-based participatory research (CBPR) by focusing on establishing a community of practice engaged in the microfarm system (Hacker, 2017; Wenger, 1999). A community of practice is "a kind of community created over time by the sustained pursuit of a shared enterprise" (Wenger, 1999, p. 45). That is to say, a "community" emerges out of a social practice. A group becomes a community of practice insofar as it develops

[1] Due to COVID-19 disruptions, the social science component of the project had to be cancelled.
[2] A brownfield is a former industrial site whose development is impacted by real or perceived environmental threats. This property was a former pump-manufacturing plant that had been razed and remediated. It had no usable soil, but its grounds posed no dangers.
[3] NECIC acquired a five-year, US$1-a-year lease from Groman-Rupp Pumps, the site's owner, which is perpetually renewable as long as farming continues on it.

three key properties shared by its participants, including mutual accountability, a mutual engagement by all participants, and a communally negotiated joint enterprise. "As a locus of engagement in action, interpersonal relationships, shared knowledge, and negotiations of enterprises," Wenger (1999) argues, "such communities hold the key to real transformation—the kind that has real effects on people's lives" (p. 85).

In other words, the training process was not just about knowledge transfer and sharing of expertise; it was about cultivating a practice in an active community. It required that aspirational farmers and collaborating local institutions worked closely together throughout the training and faced the various challenges involved in commercial horticulture, small-farm business, financial management, and cooperative management together as their own particular, specific, and ongoing set of problems and not just as the extension of a university research effort. It is important to note that none of the knowledge shared throughout the training was new knowledge for Cooperative Extension; all of it existed in various departments for years and most of it had been offered through workshops and trainings multiple times. What distinguished this effort was the manner in which it *catalyzed* those various knowledge sets at the appropriate time and for the appropriate duration to serve the immediate problems faced by these aspirational farmers and their gathering community of practice when they needed it.

Preliminary Results

The implementation process was riddled with challenges, not the least being the COVID-19 disruptions during the second and third year of the grant. Challenges also stemmed from the complicated coordination necessary to translate a centralized crop plan developed by the cooperative into concrete planting and harvesting regimens on each farm. A failure to plant seeds or sustain transplants to meet the timing of harvest projections affected the whole system. Beyond accidents and neglect on individual farms, the cooperative also struggled with the difficult problem of marketing produce. The original plan to sell all of the bulk produce to one or two large buyers generated a price point too low to support the microfarms and sustain the cooperative. A secondary plan to reach supermarkets, restaurants, and multiple small-scale buyers also encountered challenges due to excessive time and labor requirements, also eroding profitability for farmers and the cooperative.

Many of the crop planning and marketing challenges were identified and met during the three-year grant period. We collected microfarm crop data (days to maturity, yields per square foot, etc.) and centralized that data for use by the cooperative. This allowed the cooperative manager to assign highly specific crop plans to all member farmers—what to plant, when, and at what square footage. The cooperative manager also developed a lengthy set of planning, communication, and production protocols providing sufficient oversight and some level of security that crop plans were being implemented effectively on member farms. Marketing was addressed in two ways. First, the marketing manager began to tap into emerging AFNs in Ohio. Finding buyers who already wanted the produce brought a higher price point and increased demand. Second, the cooperative sought to sell 80% of its produce to 20% of its buyers, creating secure sales of bulk produce at an average market price. The remaining 20% could be marketed at a higher-price point to multiple buyers. Both of these approaches left the cooperative and its farmers in a position to continue the system beyond the life of the grant, and they are now beginning their third year of operations independently (2024).

During the final year of the grant, NECIC secured additional funding from the community to help subsidize three additional years of operations for RGO (2022–2024), and this funding has allowed the cooperative to expand its marketing and add 11 new farms to the cooperative in 2024. During 2022, RGO sold just under US$100,000 in produce; in 2023 it expected sales to exceed US$200,000. Because of its successful market development and growing membership, it is estimating crop sales in excess of US$1,000,000 in 2024.

Additional funding was also secured from the USDA Sustainable Agriculture Research and Education (SARE) professional development pro-

gram to review and revise the training process for microfarmers. The review process included evaluating farmer success, interviews with all participants, and a peer review with Extension educators at OSU. Our most important insight from the review process was that different elements of the system were delivered in different curricular silos, often disconnected from other elements of the system and without clarity about how all of the pieces fit together. To remedy this, the curriculum was revised, creating a set of six lessons at the beginning of the course to provide an integrated view of the microfarm system and provide ongoing learning opportunities in the larger system during the experiential field training, including the crop plan, harvest projections, co-op reporting requirements, and Good Agricultural Practices (GAP) harvesting standards. Trainees are also guided through a more robust business plan process, including the development of a five-year financial plan for their future farm.

The authors offered the revised curriculum in Marion, Ohio, during 2022 and 2023. In that community, a similar outreach and engagement process was undertaken, led by the OSU-Marion regional campus, to identify community partners, recruit potential farmers, and host an urban farming summit. In Marion, the project existed without the substantial grant support that facilitated the pilot project in Mansfield and operated without an active community organization like NECIC. In its place, Marion City Schools became our key community partner, raising US$200,000 in implementation funding to facilitate the construction of a microfarm on its urban-located Marion Harding High School. The funding supported personnel to develop a workforce development pathway in agriculture and agricultural education at the school.

Because of the lessons learned in Mansfield and the existence of a nearby marketing cooperative (RGO) and nearby working microfarmers, trainees in Marion had market access for their training crops and mentors available throughout the program. Several of the Marion trainees had already made an effort at farming and owned rural property or nonprofit businesses that they were seeking to enhance by participating in the microfarm system. The authors chose to delay the creation of a cooperative in Marion until late in the second year of the program based on feedback from Mansfield that learning to operate a new farm business and develop and manage a cooperative at the same time had proved challenging and even onerous. However, without the ability to offer the Marion trainees access to financing to facilitate the purchase of a microfarm kit (at an average cost of US$50,000), many of the potential farmers began to grow nervous about their ability to move into commercial microfarming during the second year of training.

The training began with 16 aspiring farm businesses in the spring of 2022, including one team from the foodservice department of a nearby rural high school intending to integrate a schoolyard microfarm into its food provisioning practices. By the time the program moved from the classroom to the field, this number was reduced to 12. A key incentive offered in Marion was the ability to earn funds through the sale of training crops through RGO, but because of unexpected delays in the construction of the Marion Harding High School microfarm, trainees were limited to radishes, greens, and a small run of carrots during 2022, reducing this income potential significantly. By early 2023, the number of aspiring farm businesses in the program had fallen to eight. Throughout spring and early summer, trainees developed five-year financial plans for their farms and assumed responsibility for their portion of the crop plan for the season ahead. The increased time commitment combined with work and personal challenges reduced the number of farm businesses to six by mid-summer. Half of the six were farm owners who had begun market growing on their own sites alongside the increasingly intensive training program, and they found that the divided attention forced them to make difficult choices. This led to a neglect of program requirements when their own market harvests demanded their time. In July 2023, one of the remaining six launched a campaign for mayor of his small town and withdrew from the program. Then, quite suddenly, three of the remaining five determined that they had gained enough knowledge and possessed sufficient resources to turn to their own sites full-time. One of the three offered a farm job to one of the

remaining two, leaving the program with a single farmer in training to complete the course.

While the outcomes of the training program were disappointing, the partnerships in Marion created a permanent infrastructure to continue to advance microfarming opportunities there. The single remaining farmer will be provided space on the Harding microfarm site to incubate her microfarming business at no cost. Coursework developing at Marion Harding High School now offers a pathway for high school students to move into this same opportunity. RGO additionally has offered membership to the remaining farmer, connecting her to a crop plan and the security of market access it provides.

The lessons learned in Marion enhance an understanding of the microfarm system. In particular, it highlights the critical importance of securing local funding and financing prior to launching a training initiative and the need to communicate and demonstrate the difficulties of building marketing channels from the ground up; the aspiring farmers who pivoted to their own local sites saw no value in joining RGO and believe they can sustain their own operations through farm auctions and a spate of federal and state food-insecurity funding targeted at produce growers. Its success with Marion City Schools demonstrates that the system can be anchored in schools as well as community nonprofits to survive.

Conclusions

The AFM has struggled over the past few decades because it wants to do too much all at the same time, and thus often neglects the need for successful farming businesses. In truth, its ambitions to transform the entire food system are well beyond its reach. U.S. agriculture is a US$1.3 trillion enterprise, and an industrialized food system has been in operation globally for more than 150 years. In fact, if AFM scholars and activists did an honest assessment of their own food-provisioning practices, they would notice that they too are mostly dependent on industrialized food on a daily basis. For all of its environmental and social shortcomings, this system has fed and continued to feed the world and, while much of it needs the reforms offered by agroecology, it cannot be changed all at once or even substantially without also leading to mass famine and crisis.

Instead, the AFM should focus on what it *can* do and channel its energies toward doing that effectively. What it can do is build small local food systems that satisfy the growing demand from consumers for healthy local produce—not to replace the industrialized food system, but to tap into a sliver of its massive market to bring opportunities to small-scale and urban farmers who themselves work collaboratively and cooperatively. To do so, it has to retreat from some of its revolutionary goals and confront the limits its practices keep facing at this time. It has to recognize that small-scale and urban farmers cannot succeed and are not succeeding in isolation, and that new-entry and beginning farmers require a long-term and sustained engagement to acquire the skills and experiences needed to become successful farmers. It has to recognize that it is limited in its market opportunities, and it has to account for necessary financing and find available, affordable land for farmers. If farmers are going to earn a better-than-break-even income, they must focus on small local and regional AFNs that are themselves struggling to gain a foothold. Building from the bottom up robustly will not change the global food system, but it will offer local alternatives that work, change the lives of alternative farmers, and satisfy the demand for local produce. Farmers markets and CSAs have not delivered for farmers, but well-constructed food hubs based on robust farmer training and preparation just might.

The microfarm system approach offers such a pathway by creating an appropriate division of labor within a local food system, relieving small-scale and urban farmers of the excessive burdens of marketing and crop planning by reducing the uncertainties of the market. As RGO is beginning to demonstrate in Mansfield, separating marketing activities from farm work has facilitated a scalable cooperative that is now offering this opportunity to more farmers in the city and county. With a viable business model in place, participants in the microfarming system are liberated to pursue many of the other goals of the AFM, including sustainable agriculture, social justice initiatives, food literacy education, farm training for prisoners, farm-to-school

activities, and other community food projects that have the promise to improve our food systems one community at a time. 

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