Growing Tiny Publics: Small Farmers' Social Movement Strategies

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Drawing from fieldwork of 13 small food farms in the Midwestern U.S., we describe the on-the-ground, practical challenges of doing and communicating sustainability when local food production is not well-supported. We illustrate how farmers enact learned and honed tactics of sustainability at key sites such as farmers' markets and the Internet with consumers. These tactics reveal tensions with dominant discourse from government, Big Ag, and popular culture. The success of these tactics depends on farmers having fortitude—control, resilience, and the wherewithal to be exemplars of sustainability. In our discussion, we highlight how the local farmers' social movement work constitutes loosely organized small groups connecting others to an amorphous idea of a sustainable society—one that sustains an environmental, economic, local, cultural, and physical way of life. Using Fine's concept of tiny publics, we identify design opportunities for supporting this less directed kind of social movement.

CCS Concepts: • **Human-centered computing → Human computer interaction (HCI)**; **Computer supported cooperative work**;

Additional Key Words and Phrases: Farming; Agriculture; Small Farms; Social Movement; Social Change; Slow Change; Tempered Radical; Rural; Social Networks

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1 INTRODUCTION

The concept of publics and social movements, when married with design, has been a fruitful approach to engendering social change among heterogeneous stakeholders [22, 46]. Studies have examined systems for publics created with participatory design [46, 48], designs expressing "matters of concern" [25], how artifacts are members of publics [40], and infrastructuring in publics [47]. Some of this work sees the public as a "Deweyan public" [22], multiplicitous and responding to a

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particular shared social condition [48]. Researchers have pointed out how technologies enable and constrain social movements, especially around pivotal events [53, 68].

In this insightful work, the social mandate and change sought is clear—e.g., protests against police violence towards black people [72], housing justice [2], and urban agriculture [57]. However—drawing on fieldwork of small farmers in the Midwest—we describe a different kind of social movement. This is a less overt form of social movement, yet one that is nonetheless just as powerful an instigator for societal change.

This local food movement contrasts with traditional perspectives of social movements [67] that focus on their assertive, strategic, and goal-oriented mobilization. In contrast, the "new social movements" scholarship draws from social theories [4, 32] that highlight discourse and the "identity, heterogeneity, information, and the body" of social movements [67]. This perspective shifts from understanding whether a social movement has succeeded in achieving concrete goals, to how they "contribute *new ideas* to their societies" [67] and views social movements as agile publics that engage in a multiplicity of tactics with stakeholders [28]. This new perspective on social movements resonates with HCI scholarship which re-imagines the role of design in supporting social change. Instead of solving social problems, designers are tasked with creating sociomaterial assemblages capable of collective action [5, 22]. Our work extends this line of thought by incorporating the concept of tiny publics.

Our interest in local food movements arose from our ethnographic investigation of small farmers. We argue that small farmers do discursive social movement work that has implications for how to design for social change. Their social movement work largely takes place in what Fine [31], an American sociologist, calls small groups, "aggregations of persons who recognize that they constitute a meaningful social unit, interact on that basis and are committed to that social unit" (p.21), and who are characterized by "interpersonal collaboration, collective focus, ongoing interaction, and a shared history" (p.25). These small groups provide a discursive space for enrolling [14] consumers in their local food movement. Thus, the small group is about civic engagement; it is a *tiny public* [30, 31] responsible for societal change.

We use the "new social movements" perspective and the concept of tiny publics because, as theoretical views of social change, they focus on everyday life as the medium for social movements. More specifically, this perspective gives us a more pragmatic view of sustainability movements and bridges the gap between individual and group actions. Our findings show that the local food movement is not a distinct, cohesive, task-oriented movement, but, rather, a set of tactics enacted and honed in key arenas (*e.g.,* farmers' markets) by farmers to represent the amorphous idea of sustainability to consumers. Specifically, farmers engage in tactics that define and maintain the *boundaries of their community*, *un-blackbox* food production, and strengthen their *fortitude*—the ability to become exemplars of a social movement.

Our data illustrate the *discursive tensions in sustainability*—that is, tensions between the reality that small farmers are constructing and the reality that other, dominant parties (*e.g.,* supermarkets) have already put in place. It also illustrates the mental and physical tolls of sustainability movements. Lastly, it shows that the movement of sustainability, as practiced by our informants, is not necessarily made up of coherent, directed actions—rather it involves a slower, individualistic, incremental, nonconflictual and nongovernmental set of actions. These tactics overall provide a hazy sense of movement; sometimes they explicitly push forward a local food movement agenda, but often they serve practical concerns, such as convincing customers that they should buy farmers' products and providing farmers with the courage to continue on despite uncertainty.

Our work produces three key contributions. First, we demonstrate how combining sociological theories on social movements and tiny publics can help scholars understand the more mundane, pragmatic sustainability work that bridges the gap between individual and group actions. Second,

we apply this theoretical lens to local small farmers' practices to highlight three key sustainability tactics. Lastly, we identify design opportunities for supporting this less directed kind of social movement.

2 RELATED WORK

2.1 HCI + Farming

HCI researchers outlined an agenda [55] for the intersection of food and sustainability [7, 26]. Their article highlights opportunities for HCI to support sustainable food germane to our study of small farmers—forming a network of trust and accountability, shifting food sovereignty away from large supermarket chains, and being sensitive to sustainable food policies. This vision of food and sustainability in HCI resonates with our own perspective that technology is not a panacea for disrupting food systems and enacting social justice; it is a necessarily messy and complicated affair to go against the grain of farming and food systems. Our work seeks to establish, more concretely, how designers in CSCW and HCI can think about policy and accountability in our food systems. In particular, our work carries out this agenda by providing a perspective of the on-the-ground practices and values of those intimately familiar with food systems—small farmers.

Work in HCI and CSCW has mostly focused on urban farming in its various guises. Bødker et al. [10] use the notion of artifact ecologies to longitudinally understand the shifting actors in volunteer-based communities—in this case, an organic food community, where local foods are delivered weekly to its members. They argue that the work to accomplish artifact ecologies is a type of infrastructuring. Hirsch [36] defines urban agriculture as a "practice of producing and distributing food within cities." Hirsch's expanded definition emphasizes urban farming's relationship to social movements. Like Hirsch [36], we see design opportunities to go beyond what he terms material challenges—technologies for irrigation, soil, planting, etc. Rather, urban agriculture poses design challenges around customer engagement, organizational coordination, and food cultures. Other work has similarly argued for technologies to support grower activities for capacity building by sharing knowledge [3, 8]. Social networking services for free food sharing [34] have been shown to provide "ideological framing" for local food communities. This framework has proven useful for our own thinking on the intersection between small farming and social movements. A study by Odom [56, 57] on urban community garden sites describes how members carried out various forms of activism, ranging from events in public spaces to more drastic, "guerrilla gardening" workshops [57, p.185], to espouse their views on the use of public urban land. Odom identifies one pathway for supporting community gardens via designs that "amplify" urban agricultural practices unnoticed by most city inhabitants. Lastly, DiSalvo and Jenkins [24] make an important point that any technologies designed for food need to consider the diverse economies in which they are situated; any grassroots, volunteer-based movement must cohabit mainstream markets (e.g., Big Ag). We build upon this work that has sought to expand the purview of urban farming and agriculture but provide a perspective in a rural setting and with small farmers whose livelihoods, to varying degrees, depend on their practices (vs. farming as a leisure pursuit).

Recent work in HCI at the intersection of sustainable agriculture and development has investigated the technology-related practices and needs of small farmers in developing countries [50, 58]. Work by Oduor et al. [58] is methodologically similar to our study but was conducted in rural Kenya. The Kenyan farmers had limited access to digital technology, and therefore were less "tech-savvy" than the farmers in our study. In both contexts, farmers used technology to get information on farming practices, find markets for their products, and coordinate their activities. Leshed et al. [50] describe a system built and tested to help Latin American coffee farmers understand their production costs so that they can demand a fair price for their products. The concept of the fair

or just price [61, p.34]—a price which represents the "true" value of a product as opposed to the market price—is also important to the farmers in our study and others selling food locally.

Although little work has focused on small farmers in the U.S., fieldwork by Leshed et al. [49] is an exception. They articulated how small-scale, organic family farms exhibit the merging of home and work—namely, that coordination of activities in family farms reflects family members' values about doing activities co-located and their strong bonds with local communities. In the UK, Prost et al. [62] interviewed five farmers along with other members of a local food network in a deprived neighborhood. While we focused specifically on farmers, their paper is a critical analysis of the economics of local food systems more broadly, with an emphasis on issues of food justice. They propose food democracy as a theoretical framing for HCI work that engages with food systems, and identify six strategies for scholars and designers to make food systems more democratic. Also relevant to our study is a paper by Zapico and Söderberg [80] which describes how a food cooperative in Sweden strategically uses social media to make food production more transparent to consumers. Their work provides a more detailed account of some of the un-blackboxing strategies mentioned in Section 5.2.

2.2 Social Movements in HCI

Social movements are social "networks of informal interactions between a plurality of individuals, groups and/or organizations, engaged in political or cultural conflicts, on the basis of shared collective identities" [20]; thus, social movements are not only individual political actions or small localized events, but rather larger, sustained, and (sometimes loosely) connected, contentious political and social activities moving towards informal and established goals [59, 71]. Often, successful social movements are supported by a rich set of interrelated practices, including enrolling members into a social movement, learning about issues, and participating in networked political action [43]. HCI and related extant scholarship focuses on a subset of these practices by demonstrating how social computing platforms (e.g., social networking sites, online spaces, mobile communication) bolster and constrain social movement efforts. Much attention focuses on social media usage within more prominent "in-person" protests and marches, including studies of the Arab Spring [79], Black Lives Matter [16, 68, 72], and the Occupy Movement [15], and for many different topics including sustainability, racial inequality, economic inequality, gender inequality, and so on. For example, Mercea's work highlights how online spaces enable participation in protests and events by on-boarding new members, fostering a group identity, and organizing in-person protests [53]. Other studies have looked at how those practices work in highly contested spaces. For example, Steward et al.'s work demonstrates how oppositional narratives around politically charged events, such as police shootings of people of color, develop, propagate, and interact in online discourse by both the politically conservative and liberal [68].

There are several common themes that have emerged from this social computing-related research, including participation and community. First, prior HCI research highlights that participation in and outcomes based on online and digital efforts for social change take on substantially different forms. For example, Li and Brady tackle the trope of online participation as only "slacktivism" to examine how online spaces allow for different types of participation that may challenge traditional definitions of activism [51]. Similarly, Asad et al.'s work demonstrates how housing justice activists use social media and mobile communication technologies to draw broader attention to housing inequality, to recruit would-be allies, and to garner social support for the movement [2]. As dominant social culture and norms shift, people may take on different roles in their social networks. For example, Blackwell et al. describes how lesbian, gay, bisexual, or transgender parents' social media practices have changed to include identifying potential allies, becoming occasional advocates, and managing their children's online exposure and privacy [6].

Another thread in HCI scholarship highlights the necessity of, required effort for, and challenges when forming community for collective actions. For example, Dimond et al.'s work on Hollaback, an online platform enabling people to share their experiences regarding, usually gendered, street harassment, highlights storytelling as a crucial component in fostering community cohesion [21]. Likewise, Boler et al. demonstrate how women in the Occupy movement, commonly considered a "leaderless movement," frequently engaged in leadership, coordination, and collaboration efforts both online in social media and in-person [11]. Lastly, Crivellaro et al.'s work demonstrates how diverging voices were able to find common ground online to lead to local political action [17].

Our findings build on this literature to demonstrate the farmer's work within local food as a type of social movement. While other scholarship has demonstrated how interest and participation in local food is a social movement [67], we specifically examine the sociotechical nature and interactional components of how local, small farmers maintain the boundaries of their community, un-blackbox farming, and strengthen their fortitude. We develop design implications for helping such social movements work towards social change in slow, pragmatic ways.

2.3 Publics and Tiny Publics

Recent HCI scholarship has drawn from Dewey's [19] notion of publics. Here, publics are multiplicitous, with each group of stakeholders purposefully mobilizing over a particular, shared social issue or condition [25, 40, 47]. As argued by Le Dantec [46], the concept of publics is useful for HCI because it is concerned with how heterogeneous stakeholders engage *with* technology for "shared issues and promoting or supporting different forms of action taken to mitigate or contend with those issues." For example, designs can support the communicative abilities—the "legibility" [46]—of publics that mitigate tensions between different publics (e.g., public of the shelter residents vs. public of the shelter staff). Another approach [40] builds upon Dewey, incorporating an actor-network theory lens, to envision "object-oriented" publics where computing "things" [5] are actors that participate in publics via their material agency. Issue-oriented hackathons by Jenkins et al. [40], for instance, ask participants to think about the roles of computational artifacts in local food systems.

This work provides a lens for understanding how design can play a role in groups oriented towards *specific* issues. The word specific is significant here. Inevitably, the first step for forming a public is identifying these specific issues. DiSalvo et al. [25] says that "issues have to be articulated so that they can also be collectively considered ... [w]ithout articulation, problematic ... issues may remain muddled, unnoticed, or inaccessible." Through participatory design and other "public design," shared issues can begin to be pinpointed.

In *Tiny Publics*, Fine [29] focuses on how the actions of small groups are generative of civic society and identity. Because tiny publics are motivated as an umbrella concept for Fine's extensive oeuvre of fieldwork, they eludes a precise, concise definition. Instead, we find that the emphasis of tiny publics on the *performative* aspects of small groups provides a useful sociological perspective on publics missing in Dewey's philosophical approach. Tiny publics have a culture that is revealed through intersubjective and sociomaterial practices; they are performed for an audience; and, in response, audiences reflect on their connection with these practices (p.34). Members of tiny publics draw from a repertoire of strategies to convey legitimate practices in their culture [70]. Fine also notes that tiny publics perform—via framing (providing justifications) and differentiation (drawing boundaries between groups)—and negotiate norms. Relatedly, tiny publics enact ideology, shared attitudes, and beliefs tied to social issues: "Ideologies are presented ... to enhance the public reputation of presenters or adherents, ideological enactment being fundamentally performative" (p.106).

Like publics, tiny publics provide a space for discourse, but it is more noncommittal, less directed toward specific issues. Tiny publics do not need to generate policies nor laws; they are "casual

structures in civic engagement" (p.128). Tiny publics are also squarely local—motivating participation via local physical spaces, relationships, and shared histories (p.165-171). In this paper, we unpack what is meant by *not* having the specific issues Dewey deems necessary to form a public. Small farmers, although perhaps members of multiple publics, do not coherently articulate singular issues. While the above mentioned methods of public design and object-oriented design could help reach consensus on issues to address with computing, we highlight how the very lack of consensus, activism, or unified front is a response to both ideological and pragmatic motivations of small farmers. Discursive strategies that "play up" these amorphous aspects allow farmers to succeed as tiny publics; we will later argue that if designers wish to become change agents, they may wish to consider this form of public. A tiny publics perspective opens us to less instrumental ways of thinking about designing for collective action and change in HCI. Specifically, it drives design interventions for tiny publics to supporting the performative actions (and the articulation work [63] to carry out these actions) of individuals to "create citizens and civic minded-ness" (p.150).

3 METHODOLOGY

Interview ID	Age(s)	1st-generation farmer?	Products	Size of cultivated land	Organic?	What kind of farm? (Self-labeled)
P2	N/A	No	chickens	N/A	N/A	N/A
P3	58	Yes	beef	4 acres	Yes	hobby
P4	75 (A), 75 (B)	No	eggs	1 1/2 acres	No	small/mini-farm
P5	55	Yes	shrimp, crawfish	5 acres	No	live, fresh/local
P6	35	No	goat milk (for home use only), breeding stock	10 acres	No	small farm
P7	60	No	fish	2 acres	No	N/A
P8	31 (A), 33 (B)	Yes	chicken, pork, turkey, eggs, mushrooms	13 acres	No	small, sustainable/pasture-raised livestock/family farm
P9	57	Yes	herbs, kale, lettuce, houseplants	<1 acre	Yes	greenhouse/indoor
P10	56	No	strawberries, asparagus, puppies	71 acres	No	small, retail produce farm
P11	49	Yes	mushrooms	N/A	Yes	artisan/"urban hipster farm"
P12	62	Yes	flowers, produce, herbs	3 acres	Yes	flower farm
P13	51	Yes	berries, fruit, leafy greens, eggs, mushrooms, honey	1 1/2 acres	Yes	organic berry farm
P14	74 (A), 35 (B), 37 (C)	No	corn, soybeans, wheat, spelt, oats, alfalfa, rye, green beans, pickles, fruit, berries, honey, beef, eggs	1000 acres	Yes	"down to earth"/ "back to our roots"

Table 1. Demographic information of farmers interviewed (some sessions involved interviewing more than one person from the same farm)

We conducted 14 semi-structured interviews (Table 1) with 18 participants between June 2017 and February 2018. Participants were recruited by emailing farmers found on the vendor lists of two farmers' markets, in the employee directory of an agricultural extension program, and on the websites of local farming organizations. Additional participants were recruited through snowball sampling. Each interview was conducted by one or more researchers (usually the first author with a research assistant) and lasted between one and three hours, with an average duration of 85 minutes. In most cases, we visited the participants' farms and were given a tour, during which we took photographs (with permission) and made notes on the conversation. After the tour, we sat down with the participant(s) for an interview, which was audio recorded and later transcribed.

Two interviews were conducted by phone, and one via video conference. One participant was interviewed at her off-farm job rather than at her farm. An early interview (P1) was dropped from the sample because it was not relevant to the focus of our analysis, i.e., local food sales.

The interview protocol addressed the farmers' daily routines, challenges they face, their relationships with their local communities, their participation in farming organizations, and controversy among farmers. We followed a Grounded Theory approach to analyze the interview data [69]. Open coding was done on all interview transcripts. Two transcripts were analyzed by all the authors, who then met to discuss their findings and identify emergent themes. The remaining interviews were each analyzed by one of the authors.

In addition to interviews and farm tours, the first author attended the 2018 Small Farms Conference in Danville, Indiana. At this conference, Midwestern farmers gathered to network and share their expertise through presentations, panel discussions, research posters, and one-on-one consulting sessions. The conference also hosted a trade show where more than 50 companies and non-profit organizations showcased products and services. By attending, we got a sense of what issues are most important to small farmers in the Midwest, as well as the prevailing discourse about local food and sustainability. Notes from several presentations and panel discussions helped shape our understanding of small farms' marketing tactics. Through talking to vendors at the trade show, we learned what problems have already been identified and saw the (often technological) solutions offered by startups, government, and nonprofits. Altogether, notes from the conference both reinforced and augmented our interview findings.

3.1 Participant demographics

As seen in Table 1, our participants are a diverse group of farmers from the Midwestern United States. All the farms in our study are rural, with the exception of one farm that was located at a suburban home. Almost all of our participants were born in rural areas and had family members who farmed, but only six directly grew up on a family farm. Some started farming following their retirement from a non-farm career. Among those who have not yet reached retirement age, most have another source of income to supplement their farm income—a full- or part-time job, spouse's income, or military retirement pay.

Our participants engaged in various types of farming, from animal husbandry to specialty crops to aquaculture. Thus, they varied in farm size (acreage) and resources. They also sell their products through different marketing channels. Almost all of our participants engaged in some form of direct marketing, selling directly to customers. This took place both at farmers' markets and on the farm. Some farms had a storefront on their property; others simply provided their address on their website or Facebook page and encouraged customers to visit. Several farms had community-supported agriculture (CSA) programs in which customers sign up to receive a weekly "share" of produce or meat. Certain farmers also had relationships with small grocery stores, distributors, or farm-to-table restaurants which regularly purchased their products. Most farmers used a mix of these marketing channels to sell their products—e.g., attending farmers' markets, maintaining a storefront, and selling to a local grocery store.

P14, the largest farm in our sample, was introduced to us by another informant. They operate a conventional grain farm but also raise animals on pasture, and are in the process of transitioning their whole farm to sustainable production. They sell meat and specialty crops locally while also selling grain on the commodity market. This quality of being in transition—as well as the fact that they are a multi-generational farm—gives them a unique perspective. Finally, we lack demographic information on P2 because she was a gateway informant, an outreach coordinator of a non-profit agency that assists (e.g., via funding and education opportunities) farmer-veterans.

4 BACKGROUND

4.1 Who are small farmers in the U.S. Midwest?

The United States Department of Agriculture (USDA) defines small farms as all farms whose gross annual sales total less than $350,000. This category includes small farms where the operators are retired or have a major source of income apart from farming, as well as those where farming is the main source of income. The average size for small farms in the 2012 Agricultural Census (the most recent census for which data is available) was 236 acres. By contrast, the average mid-size farm was 1,582 acres [74]. In 2017, small family farms comprised 90% of all farms in the U.S. but only accounted for 23% of production, while large family farms were roughly only 3% of U.S. farms but contributed 45% of total value production [38]. Thus, despite their large numbers, small farms often struggle to compete with their larger peers [39]. 70% of farms with a gross cash farm income below $100,000 are not profitable; these farmers make ends meet through off-farm income and undervaluing their own labor [37]

The U.S. Midwest, which includes the states of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin, is a major agricultural region with a high percentage of land devoted to farms, mostly cash crops [73]. In the state in which this research took place, between 85 and 90% of farms are small family farms. However, as elsewhere, large farms control the majority of farmland and are responsible for the majority of agricultural production. In local sales, the Midwest lags behind California and the Northeastern states: in 2015, the four-state region of Illinois, Indiana, Michigan, and Wisconsin accounted for just 15% of local food sales in the U.S. [75]

4.2 Local food sales in the U.S.

The USDA defines local food sales as food sold directly to consumers (at farmers' markets, on-farm stores, etc.) or through intermediated marketing channels (sales to local restaurants, grocers, and institutions, as well as sales to distributors and other aggregators who market locally [77]). In 2012, 7.8% of U.S. farms engaged in local food sales. The vast majority (95%) were small farms. We adopt the USDA's broad definition of local food sales. Our informants do direct-to-consumer and intermediated marketing (cf. Section 3.1), but our data leans towards the former.

4.3 Defining local food movement

According to Pratt et al. [61, p.45], the local in alternative food movements involves foods that embody authenticity and tradition while also embracing an ethos of "economic resistance to mainstream food chains…and an…attempt to create spaces outside the global circuits of capital." Resistance to a global food system dominated by corporations is a prominent theme in our data. Proponents of local food often position themselves in opposition to over-sized agricultural productions, or "Big Ag" farms. According to the local food movement, industrial farms have adopted unethical and environmentally harmful practices in the pursuit of efficiency. In addition, small farmers feel that Big Ag hurts rural communities by outcompeting small farms and devaluing food. Large, industrial farms are seen as allied with corporate groceries and restaurant chains who encourage a "Cheesecake Factory mentality"—a term uttered in a panel discussion about farm-to-table restaurants at the Small Farms Conference—in consumers, emphasizing quantity over quality. Small farmers, on the contrary, seek to valorize responsibly raised "good" food. Proponents believe buying local leads to benefits for everyone: customers get food that is fresh, tasty, and nutritious; small farms and other local businesses flourish; and the harmful environmental impacts of industrial farming are mitigated.

Local food is bound up with the concept of sustainability. Farmers adopt a broad definition of sustainability, "the three pillars of sustainability": environmental, economic, and social [76]. This

definition is similar, but not identical, to scholarly definitions of sustainability. It has been adapted by small farmers to fit their context and ethics. Thus, discussions of economic sustainability focus on the farm or community rather than on the global economy. The environmental pillar is what is popularly associated with sustainability: responsible use of resources and care for the environment. Economic sustainability encompasses a farm business minimally dependent on external financing where farmers are fairly compensated for their labor. Social sustainability entails concern for the well-being of farm workers and farming communities, as well as food security. When we use the term "sustainable agriculture" in this paper, we are referring to all three pillars of sustainability.

Small farmers participate in the local food movement to varying degrees. Some of our informants were deeply committed to sustainability and local food. For others, participation in the movement was an incidental outcome of trying to make money as small business owners—capitalizing on increasing demand for local, sustainable, or "authentic" food. However, all engaged with, and benefited from, local food culture in some way.

5 FINDINGS

Our findings focus on the key tactics these local, small farmers engaged in to cultivate and enact the local food movement. We find that they employed tactics to maintain the local food community by enabling participation and boundary setting. They also educated potential allies by un-blackboxing farming practices and realities. Lastly, they fostered their own active membership in this movement by cultivating a character of fortitude resilient to physical, mental, and social hardships.

5.1 Maintaining the local food community

5.1.1 Cooperation among farmers. The discourse of social sustainability lies in building and supporting a healthy and independent local community organized around food. Farmers thus strive, for both practical and rhetorical reasons, to present a unified front to consumers. Farmers work together to construct a discursive space for consumers to explore the communal idea of their movement.

Small farmers have to cooperate to survive because they often lack the business opportunities and resources of larger farms. In our fieldwork, we saw farmers sharing resources, tools, knowledge, skills, and a client base in mutually beneficial ways that help maintain the local food community. For example, P8A told us that she and her husband use their neighbors' tabletop saw when they have boards to cut. Sometimes, farmers pay each other for the use of expensive equipment, such as tractors; in other cases, they barter or simply exchange favors. P10 said, *"We barter things off, back and forth. It's like, 'Oh, here, take a bunch of strawberries. Remember that time you helped me out?' That sort of thing."*

Small farmers also have to work together to build a strong local food customer base. We saw this cooperative base-building predominantly at farmers' markets, where farmers cooperate to create positive shopping experiences for customers in a variety of ways. For example, if a customer picks up a product from one vendor and attempts to pay at the neighboring booth, the neighbor will direct them to the correct vendor, or, if that vendor is busy, will collect the money for them. If a vendor cannot supply a product, they will direct customers to vendors who can. One farmer said she will even tell her customers if a competitor is selling the same product she is, to prevent them from making a shopping decision they might regret:

> We try not to compete, but sometimes we both have catnip. And it's like, "This is what mine looks like, but I know my neighbors' [is] bigger." I don't mind being honest with my customers. They'll look at mine, buy mine, and they'll go to the next one and say,

> "This is cheaper and bigger." So, you learn in a couple of years. Don't try to undercut or outsell your neighbor. (P9)

Competition with neighboring vendors leads to unhappy customers; they regret their purchases when they realize they have not gotten the best price. It can also alienate the other vendors, making them less likely to help in a pinch. Overall, these cooperative practices earn farmers their customers' trust, maintain friendly relations with other vendors, and reinforce farmers as a collective entity.

5.1.2 Maintaining Community Standards. Small farmers also work together in various ways to maintain community standards, because rogue or careless farmers could damage the community's reputation or endanger public safety. Through the maintenance of these community standards, small farmers also tactically ensure that they are portrayed in the best light—as a public concerned with the quality and ethical processes of production. These community standards are sometimes reflected in regulations enforced by the government and farmers' market, and other times in norms that farmers themselves enforce.

Some farmers believed they should be trusted to regulate their own behavior and that regulations made by non-farmers are unnecessary and burdensome to farmers. P10 is anti-regulation because he feels that the government is encroaching on his freedom; he fears not being *"free to farm."* P5 says government regulation would be harmful for aquaculture because out-of-touch bureaucrats would make rules and procedures that create unnecessary work for farmers. This would take time away from farm work, causing farms to lose more shrimp and ultimately go out of business: *"Cause you have that guy who's never set foot [on a shrimp farm] making up rules [. . .] Then the important things like testing [water quality] is going to fall short, and the [shrimp's] survival rates are going to die and it's just a huge domino effect. And businesses are going to go out."* When spaces and activities are not well regulated, or enforcement is lax, farmers take it upon themselves to police other community members. For instance, P5, who consults new shrimp farmers, holds her clients to high cleanliness standards. Even when visiting competitors' farms, she does not let sloppy hygiene go unremarked. Such practices are necessary for self and community preservation: *"If one person was to get sick on shrimp . . . I don't care where it is, I'm the one that's gonna suffer for it as well. [. . .] So that's why I'm very very cautious about it. If we walk into people's facility, and I see that their facility is dirty, I don't care whether I set you up or not, I will let you know it"* (P5).

In contrast to farmers who policed themselves, other informants expressed more pro-regulation views, stressing the need to protect the public from unscrupulous merchants. They felt that not all farmers could be trusted to do the right thing—only official regulatory bodies have the expertise and authority to properly enforce standards. Such views sometimes stemmed from previous, positive experience with government officials who were friendly and receptive to farmers' input. For instance, P14 had worked with a local inspector who was flexible (enforcing the spirit rather than the letter of the law) and willing to advocate for farmers to the government. However, P14B said that regulations designed to protect consumers are secondary to the open and trusting relationship she and her family have with customers, which enables customers to judge the farm's practices for themselves and hold them accountable (see Section 5.2.2, "Selective Transparency").

Another key way small farmers maintain their community is by mentoring newcomers, through consulting, informal conversations, or posting online content (e.g., YouTube videos or blogs). Almost all of our informants engaged in one or more of these practices to share their knowledge with others. Mentorship is often sorely needed for aspiring farmers because they do not understand farming's natural and economic realities. P2, who works for an organization that assists disabled farmers, says her clients often start out with a romanticized view of farming. Many of them grew up in rural communities and see farming as a way to recapture their childhood, or as a preferable alternative to a stuffy desk job. P2 said:

> Sometimes [. . .] they have this view of farming as a lot nicer and easier and better and [more] wonderful than it is. Part of my job is to make sure they understand how hard it is, because if you can stop somebody from thinking they're spending a lot of money because they're going to make a lot of money, or that their dream . . . isn't necessarily a reality. (P2)

Our informants said that when a would-be farmer asks them for help, they quickly form an idea of whether or not the person has what it takes to farm. Describing two of his *"students,"* P11 said he could tell early on that *"they're pretty serious,"* unlike some others who have sought his advice: *"A lot of people are interested in it, and then when they see all the work, and all the things it takes . . . it's just . . . most people don't wanna do it."*

When they think a mentee is unlikely to succeed, a farmer may decide to withdraw their support. P5 took this approach with several new farmers she was consulting who did not meet her expectations. (In her words, *"They're not paying attention, they're not doing what they're supposed to do."*) In this way, she conserved her own resources, protected her reputation as a consultant, and potentially saved the new farmer from pouring their money into a doomed enterprise. This is one way in which farmers preserve the credibility of the local food movement for consumers.

5.1.3 Enrolling customers in local food community. When farmers interact with consumers at a farmers' market, at their farm, or online, they are not simply trying to make a sale. They are trying to make a lasting connection with someone who will be a repeat customer and an advocate for the local food movement. They do this, in part, by presenting local food as something that is convenient and aligns with consumers' values.

At the Small Farm Conference, much of the marketing advice we heard focused on making shopping more convenient for consumers to lower the barrier to entry into the local food movement. One presenter, a marketing consultant, introduced the concept of customer personas as a way to identify particular types of customers and their needs. He placed customers on a scale from "McDonald's junkie"—those who value convenience over quality—to "Earth muffin tree hugger"—health-conscious environmentalists. People on the "tree-hugger" end of the scale will buy directly from farmers even if they must make an effort to do so; fast-food junkies will never set foot in a farmers' market. In between those two extremes are people who may be persuaded to buy local if doing so is compatible with their lifestyle and values. The more convenience and flexibility you offer your customers, the farther you can penetrate into the market (the closer you can get to the "McDonald's junkie" side of the scale). To this end, farmers adopt point of sale systems, like Square, so customers who do not carry cash can pay with credit cards. A second marketing presentation by a successful market vendor suggested making market shopping more convenient by allowing customers to preorder online; providing premade grocery lists and recipes; packaging food in meal kits; and offering to help customers carry their purchases to the car. By doing these things, farmers send the message that the farmers' market is a viable alternative to grocery stores: It is a way for consumers to fit sustainability into their busy lives.

5.2 Un-blackboxing Farming

These small farmers enroll consumers into the movement by un-blackboxing farming to customers—many of whom do not know how their food is grown or how it moves from farms to stores. This un-blackboxing takes a variety of forms, including explaining sustainable farming practices and differences in food price and availability from a grocery store. For example, newcomers to farmers' markets initially do not understand why prices for meat and eggs are higher than at a grocery store, why their favorite foods are not always available (because they are not in season, or the farmer has already sold out), or why they can't buy fresh meat (because health regulations require that

meat be sold frozen). To keep customers, small farmers must demonstrate the advantages of locally grown food as well as problematize the practice of buying from mainstream grocery stores.

5.2.1 Differentiation from conventional farms. The first strategy farmers have is to explain key differences between mainstream and alternative (local) food systems. One key example is educating consumers on why local, sustainably grown food may look and taste different from the comparable grocery store products. For example, P14 said the eggs they sell are *"a different product altogether"* from the eggs produced at an industrial farm nearby. *"But some folks, that's all they know, is that kind of egg like [the industrial farm] produces. So, we did have a customer call and say, 'How come your yolks are so orange?!' Like, they'd not seen a farm-raised egg. So, then you have to talk about, 'Well, we raise them on pasture, so they're getting a lot of greens and bugs and . . . '"* (P14B) When the customer tasted the eggs, she was convinced of their superior quality. Through such conversations, farmers introduce customers to the tangible benefits of sustainable agriculture—benefits they can see and taste. Rather than being surprised and alarmed by differences, customers learn to recognize them as markers of quality.

In addition to answering customers' questions, farmers proactively share information about farming through various online channels. P11 said that being active on social media is a way to expose his farming practices to the public. *"I have my own YouTube channel [. . .] A lot of people all over the world look at my videos . . . I have really good, factual information on the kind of [mushrooms] that we grow. And . . . people find it out there."* These videos establish his credibility as a farmer and give consumers an inside look at a process that had previously been opaque to them. By educating customers, farmers begin to close the gap between farms and consumers. In the course of explaining their farming practices, they also raise awareness about issues that are important to the movement, such as the environmental impacts of industrial farming.

5.2.2 Selective transparency. Another strategy for un-blackboxing involves building trust through selective transparency regarding farm practices. Small farmers selling locally cannot compete with big farms using traditional methods and approaches. Instead, these farmers rely on their ability to create and foster personal connections with their customers, which allows customers to literally see how these farmers work, and makes them more forgiving of the farmers' limitations.

Many of these farmers encourage customers to come visit their farms, so that customers can see firsthand how they treat their animals, and their sustainable practices, such as not using pesticides. This willingness to open their farms to scrutiny impresses customers who are used to the impersonal experience of shopping at supermarkets. P14B explained, *"I think the biggest part of what we do is being translucent, like letting people come to the farm, and see what it is, and . . . knowing us personally I think means a lot to someone, instead of just grabbing it off the shelf in the grocery store."*

Farmers cannot always be completely open with customers for fear of *"scaring people away"* (P8A) or disillusioning them about local food: *"So, we're as open as possible, but we do have to politicize our answers sometimes when we feel like we're making a sale. Or, like, cementing education with people. So, they want . . . they want it to be good. They don't want the complexity, or the nuance"* (P8B). Farmers carefully curate the images of farm life on farm websites and social media, as to not give customers negative or compromising information that would possibly dissuade them from buying locally. In a marketing presentation at the Small Farms Conference, farmers were urged to share artfully staged photos of their work process on social media to make their farms look happy, cute, fun, and friendly. These photos deliberately omit less pleasant aspects of life on a small farm, such as bad days, messy work environments, or questionable practices.

Although this kind of selective transparency may seem unscrupulous, informants see themselves as *tailoring* their message to the audience. P12 said in reference to consulting that she has to give clients information that is appropriate to their level of farming knowledge and experience.

With beginners, she covers the basics of starting a farm, whereas established farmers wanting to expand their operation *"get my more sophisticated knowledge."* Similarly, P8A said that when talking to customers, *"we sometimes feel like we're shepherding people along an education path."* With customers who are new to local food, she talks about the big ideas of local food systems and sustainable farming; with long-term customers, she can discuss the messy details.

> And so, like, if they're brand new to the local food scene—which many people tell us they are—there are certain truths and ideas that they're brand new to. And so, like … if they don't know anything about what it means to raise an animal on pasture … we don't wanna start by telling 'em all the bad stuff. We gotta start 'em in on, like, the big ideas and why it's useful. And then, some of our CSA members, that have been with us longer and … know more about their food and are reading about this or learning about it on their own … then we feel like they're excited to hear all the nitty-gritty, and dig into the details and the bad stuff too … (P8A)

In this quote, it is implied that customers who are new to local food don't *want* detailed information about the realities of sustainable farming. (This idea is consistent with Zapico and Soderberg's finding that the majority of their CSA customers did not value "more detailed knowledge about crops and techniques" in their social media posts [80].) However, there also seems to be a tension between the desire to be open and the need to make sales by glossing over *"the bad stuff."* P8A acknowledged feeling *"guilty"* that this could give people a romanticized view of farming, but the practical needs of her business outweighed her other concerns. Overall, farmers we spoke with did not have a single message to convey to customers; instead, they tailored their dialogue in a sophisticated, nuanced manner, depending on their customers' backgrounds.

Selective transparency benefits the local food movement by increasing consumer confidence. It encourages customers to trust small, local farmers—whose farms they can observe in person—over anonymous producers who supply large grocery stores. However, too much transparency can hurt the movement by complicating the rosy image customers have of small farms. In interactions with customers, farmers strive to balance these opposing tensions, even when this means compromising their personal ethics.

5.3 Fortifying the Self for the Local Food Movement

Farm work is notoriously physically, mentally, and socially demanding. Small farmers need to be constantly prepared for bad days, unexpected challenges, and demanding social interactions. For small farmers to succeed, they not only need to produce or raise their products but also need to become, whether they wish to or not, representatives of a local food movement. While some farmers do not see themselves as belonging to a concrete, unified movement, they may be perceived that way by others. As the ones with the expertise, experience, and visibility in the farmers' market, consumers expect farmers to serve as exemplars of sustainability. Farmers need to have fortitude—the courage, endurance, and foresight to successfully enact the tactics we spoke of earlier and establish a foundation upon which such tactics can work. Importantly, some farmers are essentially thrust into this role. P7 said, *"It scares me to think that I'm an agricultural leader, simply because I know something about fish farming in [this state] to where we really know very little. Because I really don't know that much, but yet, you know, people come to me with questions."* These additional demands (a sort of articulation work [63] for Sections 5.2 & 5.1) on farmers' time and energy can strain them to the breaking point, which is perhaps why one of the keynote speeches at the Small Farm Conference was about "farm-life balance": in essence, how to build fortitude.

We now describe three areas where fortitude comes into play: the isolation and lack of resources small farmers experience, unexpected losses due to the unpredictable nature of farming, and the physical demands of farmwork on farmers' bodies.

5.3.1 Misfits and Isolation. Foremost, many of our informants feel set apart from other farmers, either because the type of farming they do is unusual (aquaculture farms, for instance, represented 0.3% of all U.S. farms in the 2012 census), or because they are selling locally instead of selling on the commodity market. They described themselves as *"radically different"* from their neighbors, *"strange,"* and *"unique."* As a result, they sometimes encounter skepticism from their communities.

P5 and P7 run small aquaculture operations while surrounded by and embedded in conventional farming communities. P10 and P14 switched from the commodity market to direct sales while remaining involved with their conventional farming friends and neighbors. For the most part, they report having good relationships with other farmers in their communities. However, there is a sense that their status as farmers is precarious—that they are not quite "real" farmers with respect to conventional farming. For instance, P10 said that there are strong bonds of mutual respect between himself and his more traditional farmer neighbors, but he still worries about what they think of him: *"I wonder how they perceive me sometimes, whether they . . . y'know, think I'm kind of a nut job or what."* P8 is a different case, having previously lived in another state that had strong, well-established local food communities. After moving back to the Midwest, P8A keenly felt the lack of community support for sustainable farming:

> When we were in Vermont and Maine . . . farmers were *rock stars*. And that's not why we got into this . . . but it's part of what keeps you going. [. . .] Farmers were respected, they were valued, they were seen as . . . you know, useful. And here there is a certain portion of our community that totally *is* that way. [. . .] But then there's this whole large contingent of [this state] that has no idea why we're doing what we're doing, and they think we're crazy people. (P8A)

Being different from other farmers also translates into a lack of educational resources. New farmers cannot find mentors if there is no one else doing the type of farming they want to do. In states where small-scale agriculture is not valued, there are no training programs for new small-scale farmers. As a result, many of our participants learned how to farm by searching out information themselves—in books, open source journal articles, periodicals, websites, blogs, podcasts, and YouTube videos. Now that our informants themselves have become "experts," new farmers reach out to *them*, often after seeing their websites or online content they posted. These new farmers often live outside the Midwest, sometimes even outside the U.S. For instance, P11 said he was contacted by mushroom growing operations in Poland and Greece who were impressed by his YouTube videos and wanted his help with their own farms. Thus, small farmers compensate for the lack of support and acceptance in their local communities by making connections with geographically distant farmers who share similar values and goals. This emphasizes the distributed and loosely connected nature of actors in the food movement.

5.3.2 Resilience. The notion of resilience has been productively applied to crises around significant events [52] or with one's identity [64]. More generally, in CSCW and CHI, scholars are interested in how technology supports resilience, the ability to thrive despite unplanned disruptions. Indeed, throughout our interviews, an outstanding challenge is dealing with the inherent unpredictability of farming. The success of a farm is affected by many factors that farmers cannot control, such as weather, power outages, and equipment failures. This challenge is not unique to small farms, but because they have fewer resources to draw on and narrower profit margins than large farms, small farmers must be especially vigilant. Because of the constraints placed on

farmers by limited resources, one problem often causes another in a domino effect. For instance, P8B recounted what might happen to their farm if they did not gets their pigs to the butcher on the date they had scheduled. Because processing facilities for small farms are scarce, they might have to wait weeks for another appointment; this would strain their resources, delay customers' orders, and burden the farm with additional risk. To avoid situations like this, farmers put plans and backups in place to prevent crises or, when prevention is impossible, to mitigate their effects.

Farmers try hard to plan for contingencies. In a way, this forces all farmers to become experts in finance. Many farmers spoke of creating a business plan to account for losses such as one P2 recounted: *"One friend lost all of her chickens one year, 300-something from a disease, and you have to deal with those situations. You have to plan and think ahead, you have to have a business plan and, you know, plan your years out"* (P2). Farmers also have insurance to compensate them when crops are destroyed by weather (P10) or animals die. However, insurance is not a panacea. P5 explained that she would not submit a claim to her insurance unless she absolutely had to, because doing so would cause her premiums to rise drastically: *"I can't turn in one [shrimp] tank. I can only turn in all [the] tanks if they all die. Cause if I turn in one tank, my insurance quadruples."*

Farmers employ a number of strategies to allow them to continue work when crises happen. P7 embraced a philosophy of redundancy, observing that mistakes happen and it is therefore important to double-check everything: *"Redundancy in everything. Redundancy in equipment, redundancy in your actions, you look make sure you got all your valves closed. Yet, somehow a valve still got left open that shouldn't have been, and you wonder how that happened."* He also had backups of critical equipment in case of unexpected failures. In addition, rural farmers had to work around unreliable electric and Internet service, e.g. by having two Internet service providers instead of one, in hopes that when one fails, the other will still work. P5 further told us of the ecology of actors they have to protect them from power outages, which have the potential to devastate their aquaculture farm:

> If we're sitting here [for] 7 minutes without power, my phone will call us. We have an autodialer that calls us. Then we know we're without power. And I have two farmers in case I'm out of state … that can come over and jump-start the generator and get it going. And by that time, my son is already on his way over here. (P5)

As we mentioned earlier, farmers work with one another for discursive purposes, but we see that it has very real, practical reasons. Here we see this ecology of technologies and people [10] provide farmers with resilience. Most of our farmers had a select few neighbors, family members, or employees whom they trusted to care for their farms while they were away and alert them to problems. The farmers themselves always remained accessible to their helpers by phone, ready to give instructions or to drop everything and rush back home if needed.

Overall, our data suggest that technology can be a double-edged sword for small farmers trying to achieve resilience. On the one hand, technologies help farmers stay connected to the farm when they are away and give early warning of problems. On the other hand, unreliable technology is itself a major source of problems for these small farmers.

5.3.3 Physical challenges. Farmers must also build fortitude to withstand the physical demands of farming. Due to the limited availability of labor and resources, small farmers end up taxing their bodies. For young, able-bodied farmers, this results in soreness and injuries; for older farmers or farmers with physical disabilities, it can limit their participation in farming. It can also be intimidating to women who fear that they don't have the physical strength that farm work requires (P14B). To reduce this reliance on their bodies, farmers design and handcraft solutions. One older farmer noted that certain farm tasks involving repetitive motions were difficult for him: *"that repetitious movement, an old guy like me, I feel that"*. He told us how he modifies his equipment and work practices to minimize physical strain: *"I try to keep everything on wheels. I try to build things*

where it's easy to load and unload, things like that. I try not to overexert myself physically, you know, to where I'm going to hurt myself lifting this or whatever" (P7). Similarly, P8 described the laborious process of moving a *"220 gallon water tank on a hay wagon"* out to their pastures to water their animals. Eventually, they actually *"drilled a well with a pipeline . . . that we could put hoses [in] . . . so you can just point the hose"* to provide water for the animals, simplifying farm chores and eliminating a major physical challenge. This sort of unplanned infrastructuring, making infrastructure as new demands appear, was a common thread among our farmers. Many times, when they could not find what they needed, they constructed it—copying and iterating on other farmers' designs to create solutions that fit their particular needs. Through such acts of adaptation, experimentation, and invention, small farmers make the physical demands of farm work manageable.

6 DISCUSSION

Given that both social movements and design are inherently about change, what lessons can we learn from the social movement work of small farmers? Our qualitative investigation gives us insight into the work, practices, relations, and challenges of people who are participating in slower, less directed social change efforts. We now describe ongoing scholarly conversations relevant to our findings and CSCW. The first conversation concerns where the nexus of design lies for societal change—with individuals or with collectives. The second revolves around new visions of politics. These, we believe, are important foci for researchers and designers interested in supporting tiny publics—in particular, a slower, more loosely organized movement for societal change such as the one the farmers we interviewed were involved with. Lastly, we identify opportunities for design to support farmers engaging in local food movements.

6.1 Bridging the Gap Between Individual and Collective Change

One way that individuals bring about change is through consumer activism—using their buying power as protest and action against companies (e.g., boycotts of products) [35]. Kozinets and Handelman [44] explicitly differentiate social movements from consumer movements—consumer movements try "to elevate consumers' awareness and, through it, to change the consumerist ideology." Despite the high profile of consumer activist movements such as the anti-GMO movement, literature has suggested that consumer activism is ineffectual [18, 78]. A study of 12 environmental protection and 12 animal right boycotts found that boycotts largely failed in their objectives (e.g., lower prices, animal testing) [33]. The personal nature of consumption itself limits consumer activism because consumers themselves are wary of pushing their agenda on others, recognizing that consumption choice is a deeply personal decision reflecting one's individual identity; in addition, data shows that consumer activism may only achieve short term, shallow effects in society [42].

Ultimately, this scholarship claims that individuals, by themselves, are not up to the daunting task of addressing sustainability. Certainly, we may not be surprised that such a complex and seemingly intractable problem as sustainability would be beyond an individual's capacity to address: a workshop on HCI & Sustainability [65] highlighted that "individuals, especially conceived as consumers or users, do not have full control over their resource usage. Rather, they are bound by social norms, economics, and existing infrastructure." A critical review of persuasive sustainability [13] argues that an individualistic view of consumers fails to account for how consumers make decisions with respect to the institutions and actors that surround them. In sum, we see an ongoing conversation about collective action for sustainability because individuals alone cannot address complex problems. This leads us to inquire: What key roles can individuals play in difficult, complex problems like sustainability? Using tiny publics as a theoretical lens, we sketch two possible answers to this

question: one focused on how the work of farmers (as a collective) enables individual action; the other focused on how farmers (as individuals) become leaders in a collective movement.

6.1.1 Creating Local Food Infrastructure. In the course of marketing their products, farmers help to create the infrastructure that enables customers' participation in local food movements. Purchasing food from local farmers may be regarded as an act of consumer activism in that it signifies a conscious decision to decline dominant ways of buying produce and meat. However, as we have shown, this individual action to purchase must be done in conjunction with actions by farmers. Farmers make sustainable practices possible for consumers because they have chosen local farming as an occupation. A shopper's decision to buy only local eggs would be meaningless without the local farmer who tends the hens and collects the eggs, and who makes them available for purchase through a market, CSA, online store, or other venue. In Section 5.1.3, we saw how farmers enroll consumers into the food movement by making it as easy as possible for them to participate: through their efforts, farmers make local food a viable option for conscientious but busy shoppers. Farmers also give consumers *reasons to choose* this option by un-blackboxing farming—explaining their farming practices, problematizing conventional food production, and earning customers' trust through selective transparency.

Farmers also construct the discursive structures on which local food depends. Fine [31, p.139] notes that what tiny publics provide is "a discursive space where ideas of patriotism, nationalism, civic politics, and the public sphere can be explored and enacted, whether or not policy prescriptions are proposed." Although arguably the strength of consumer activism is its laser-focus on a topic, we argue that the discursive skill of farmers lies in their ability to vaguely grasp a notion of sustainability and readily adapt it to serve both their own needs and ethic and that of the consumers. In this sense, sustainability's practical rhetorical strength for farmers lies in its interpretive flexibility [60].

We wish to emphasize that to bridge the gap between individuals and the collective does not mean choosing one over the other—both are necessarily interrelated. In particular, while we can see small farmers as members of a collective, we should also see value in them as individual "change agents"—each of whom find creative, unique ways to move their notion of sustainability further. This mix of individuals, each maintaining their identity, is what makes the social collective ambiguous but stronger. This leads us to our next suggestion, that individual farmers support collective action by engaging in prefigurative politics.

6.1.2 The Prefigurative Politics of Tiny Publics. As our findings show, small, local farmers can be viewed as a type of pragmatic, tempered change agent [54] enacting a *prefigurative politic* [23]. DiSalvo, an interaction design scholar, defines prefigurative politics as a "kind of demonstration that another way is possible, often one that takes place within a condition or system that would seem to suggest otherwise" [23]. Small farmers selling products locally show people that the dominant mode of buying and selling food is not the only way; it can be challenged. Small farmers are tempered in that they are working within the global food system with the resources that they have. They are prefigurative because they are actively working against the status quo [41] to transform the world into their visions of sustainability.

A key attribute of prefigurative politics is its experimental and iterative nature. Its "politics is iterated upon over and over again, as desires are achieved, thwarted, abandoned, or reimagined" [23]. The small farmer, through their everyday actions and everyday encounters with consumers, are carrying out precisely this kind of prefigurative politic. This prefigurative politic shares sympathies with a practice-oriented [45] viewpoint of sustainable HCI [27] that sees how people enact practices in their everyday spheres. And, like the tiny publics we have been speaking of, prefigurative politics can find strength in its lack of "coherent political ideology or set of demands" [23].

Previous arguments have posited that design is well positioned to articulate specific issues, thereby forming a coherent public that can effect real change. Indeed, the role of design seems to be shifting away from problem-solving (criticized as "solutionist") and toward the creation of sociomaterial assemblages—enabling people to explore a situation without prescribing a course of action [9]. Continuing this trajectory, we propose that designers tasked as change agents can learn from the actions of small farmers as tiny publics. As described in Section 2.3, the tiny public perspective foregrounds the performative actions and interactions (and the sometimes invisible work required to *do* these actions) of small groups that connect individuals to civil society. Identifying issues is important; however, the establishment of a set of important issues as a key objective of publics posits that an objective list of issues is possible. (An analogous debate can be found in identifying values in value sensitive design [12]). We acknowledge that work must start somewhere to mobilize groups of people, and that a shared list of issues, no matter how imperfect, can be a useful boundary object [66] to rally around. Yet, an alternative to using design to facilitate identification of issues is to support interactions, cultural identity formation, and discursive strategies that are in service to hazy, multiple concerns.

Instead of being issue-based, tiny publics are based on group identity and implicitly (given Fine's emphasis on the importance of face-to-face conversations) on locality. In the largely rural communities where our informants lived, locality is arguably a stronger foundation for collective action than specific shared concerns. Our data bear out the fact that rural farmers, to a greater extent than urban dwellers, rely on their neighbors for social support, resource sharing, and occasional labor. As Table 1 shows, small farmers are by no means a homogeneous group. They do not all agree on which issues within food systems are most important, or how those issues should be addressed. However, within the broad definition of sustainability embraced by the local food movement—with its emphasis on building strong, economically viable food communities—individuals with different ideological stances can find common ground and work together.

6.2 Designing in Support of Local Food Movements

In the remainder of the paper, we discuss three notable aspects of the local food movement that surfaced in our analysis and suggest possible design interventions. Our data show that small farmers already use digital technologies to find and share information; to promote their farms; to communicate with each other and with customers; to manage their businesses; and to participate in the online economy. Yet, many of the discursive tactics our farmers conveyed to us, and were excited about, ultimately relied on face-to-face conversations in key sites such as their farms or the market. Fine [31, p.131] noted that face-to-face interactions in tiny publics were crucial to recruitment into social movements. Even phone calls or online communications were often merely a preface to an in-person meeting. We therefore wish to stress that the interventions we propose should not replace in-person interactions among farmers or between farmers and consumers. Rather, the goal is to facilitate and enhance these face-to-face conversations.

6.2.1 Selective Transparency. Fostering connections between farmers and consumers is a key objective of local food movements. The desire for "farm to table transparency" has spawned commercial products such as Kakaxi (https://kakaxi.me/), a farm monitoring device and social networking service that allows customers to see information about growing conditions and time-lapse footage of farmers' fields. But as we mentioned earlier, farmers are often *selectively* transparent, deciding what to show customers based on their ability to understand farming's realities and challenges. Thus, social media could incorporate features to help farmers manage these different groups of customers simultaneously—e.g., CSA members, regular farmers' market customers, and casual or infrequent market customers—and manage the different content appropriate for different

groups. Such a system could automate some of the work farmers do to move customers along the "educational path" of local food, revealing more detailed content as the customer's interest in and knowledge of farming deepen. As one example, we imagine an approach similar to that of reward-based crowdfunding sites, in which the most loyal customers receive access to special, bonus content, or, in this case, more "real-life" exposure to the farmers. This could entice casual customers to become more engaged with the farm, and help farmers maintain the selective transparency of their operations.

6.2.2 Social Support. Some of the biggest "pain points" of farmers are related to fortitude—the physical and mental strength required to persevere in a difficult career despite low financial rewards, minimal training, and a lack of social support. The last of these, social support, is perhaps where HCI can have the biggest impact. Farming in the U.S. is in the midst of an aging crisis. Census data shows that "Farmers over the age of 65 now outnumber farmers under 35 by a margin of six to one, and U.S. farmland is overwhelmingly concentrated in the hands of older farmers" [1]. Many of the young people entering farming now do not come from farming backgrounds; they did not grow up on a farm, learning the trade from parents and grandparents. This can exacerbate the isolation that some of our informants reported feeling. One challenge, then, is to help newcomers to farming become part of supportive, local communities—to aid in the formation of tiny publics. This could involve bridging the gap between new sustainable farmers and their conventional farming neighbors—enabling perspective sharing so that traditional farmers recognize sustainable farming as a valid career choice, and sustainable farmers recognize that conventional farmers are not "the enemy." An alternative approach would be to connect new farmers to other small, sustainable farmers in their area, similar to how dating apps connect singles within a set geographic radius.

6.2.3 Access to Mentoring. We discussed how aspiring farmers seek mentoring from more experienced farmers and how the experienced farmers, in deciding how to allocate their limited time and energy, make judgments about who is likely to succeed. Naturally, farmers' judgments about who merits their support can be biased. If would-be farmers are required to demonstrate their preparedness in order to secure a mentor, this can be a barrier to entry for those who are already at a disadvantage, e.g., because they come from a non-farming background, lack access to land or capital, or belong to a minority group that is underrepresented in agriculture in the U.S. Thus, while screening out would-be farmers who are not "serious" helps farmers preserve the credibility of the local food movement, it also opens them up to charges of discrimination which would reflect badly on the movement as a whole. Another challenge, therefore, is to increase access to mentoring without placing unreasonable demands on already busy farmers. For example, we could imagine an informal knowledge-sharing platform which allows new or aspiring farmers to get answers to their questions while building reputation with experienced farmers. By asking and answering questions over a period of time, would-be farmers can demonstrate that they have a real desire to farm and are willing to put in the work required. The format could allow users to go by anonymous identifiers that do not reveal demographic information about them.

In all of the above suggestions, our goal is to enhance the power of tiny publics, which comes from a strong, place-based sense of community.

7 CONCLUSION

We have described how small farmers build and maintain local food communities by presenting a unified front to customers, protecting their collective reputation, and making local food accessible to consumers. We also described the discursive work they do to differentiate local food from conventional food production and to package the complicated concept of sustainability for customers. Underpinning and enabling this work is farmers' fortitude, which enables them to overcome

challenging situations and limited resources to become (sometimes reluctant) leaders within the local food movement. We have identified some strengths and weaknesses of this movement and suggested how design might support small farmers' practices.

In this paper, we have presented Fine's concept of tiny publics as an alternative to Deweyan publics in HCI, arguing that Fine's theory better helps us understand the amorphous nature and performative aspects of farmers' participation in local food movements. However, it seems likely that Dewey himself would sympathize with the goals of local food movements. Dewey's book *The Public and its Problems* ends with a utopian vision of "the great community," a global society that is firmly rooted in the local. Members of this community, Dewey says, will benefit from the cultural and information exchange enabled by transportation and communication technologies, without losing sight of their own place-based identities. In this ideal future, local communities "will be alive and flexible as well as stable," local but not isolated [19, p.216]. The type of localism described in this paper—strong, independent local food communities supported and connected by ICTs—seems to resonate with Dewey's vision. Ultimately, Dewey, Fine, and our informants all seem to agree on one thing: the importance of the local community. It is from local communal life that tiny publics draw their strength to engage individuals in collective actions for change.

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