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Community Self-Organizing and the Urban Food Commons in Berlin and New York

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Abstract: Food sharing and food commons have both been raised as possible solutions to unsustainable and unjust urban food systems. This paper draws upon ethnographic research conducted in Berlin and New York to examine self-organizing in community food initiatives that are to varying degrees creating urban food commons by opening up urban space and its fruits to community use, sharing, and governance. In New York, the organization 596 Acres has developed an interactive map of vacant land to help community members self-organize to gain access to, steward, and protect the "lots in their life" for urban growing. In Berlin, the organization foodsharing.de has developed an interactive web platform to decentralize and democratize the logistics of food rescue and redistribution through peer-to-peer gifting and community fridges. The paper examines the possibilities and limitations of socio-technical innovations as "tools for commoning," for self-organizing imagination, access, care, and governance in urban food commons. The paper contributes to debates on the role of socio-technical innovation in urban food sharing and practices of self-organizing in urban food commons.

Keywords: food commons; community land access; food sharing; food waste; food justice; New York; Berlin

1. Introduction

Urban food commons have drawn attention in recent years for their potential to build community capacity and mitigate (or at the very least draw attention to) a number of environmental and food justice issues in cities, including food waste, food insecurity, and access to land and green spaces [1–4]. Commons are described by Bollier as, "A self-organized system by which communities manage resources (both depletable and replenishable) with minimal or no reliance on the Market or State" [5] (p. 175). Community self-organizing is a vital element in commoning, and is critical to understanding how commons are created, cared for, and maintained [6] (p. 14). The lens of self-organizing shifts our attention to the social practices of commoning that make and maintain commons, and away from the assumption that commons are simply the result of a good match among already existing communities, institutions, and shared resources. These good matches, often found in isolated and tight-knit communities, are held up as examples of "successful" commons whose strong institutions have managed to avert Hardin's tragedy of the commons [7]. However, these represent only the tip of the commons iceberg [8,9].

A unique combination of creativity and necessity has led to the emergence and recognition of new kinds of commons—including digital commons [10,11], urban commons [12–19], and food commons [20–22]. These exist in parallel and in opposition to the gradual enclosure of material (land, water, seeds, etc.), knowledge, and cultural commons the world over. These commoning activities are increasingly supported by a combination of social and technical innovations in Information Communication Technology (ICT)—such as blogs, social media, visualization and mapping, and online sharing platforms.

Socio-technical innovation is a concept that acknowledges that innovation emerges from both social and technical practices, and that the two are inseparably enmeshed. Even the most technical innovations depend upon social practices for their development and implementation, and a variety of social innovations are supported, reproduced, and made durable by technical tools [23]. A related concept, grassroots social innovation, examines how these sustainability innovations are being developed by grassroots actors in protected niches [24,25]. This concept is further refined in research on transformative social innovation "as a contingent *process* through which SI [social innovation] contributes to transformative change." This work departs from the normative assumption that innovations necessarily drive social change or empower social actors [26]. Each of these approaches toward innovation is oriented towards developing explanations for how sustainability transitions occur. To do so, they draw upon the multi-level perspective [24], and increasingly theories of social practice [25]. While taking cues from this previous research on sustainability transitions, the goals of this paper are more modest in scope. Here, I approach socio-technical innovations as literal "tools for commoning" and offer an empirically grounded case that both demonstrates the co-constitutive role of social and technical innovations, and assesses their contribution to self-organizing in the urban food commons.

This paper examines the possibilities and limitations of socio-technical innovations, including ICT tools such as digital platforms and online maps, for helping communities to self-organize around the urban food commons. The aim of the paper is to understand how community food initiatives develop and use "tools for commoning" to organize imagination, access, governance, and care in two types of urban food commons. The first case considered here is vacant land in New York, where residents are self-organizing to reclaim public lands for community use through urban gardening [27,28]. The second is surplus food in Berlin, where food-sharing activists are self-organizing to decommodify food and share it freely through community fridges [29]. Within Vivero Pol's "food commons" framework [22,30], these are considered quite different types of commons whose material qualities and ownership status makes them difficult to share freely and widely. However, ICT tools are helping communities to do just that [31–35]. The paper extends previous research on socio-technical innovation and grassroots innovation to the practicalities of community self-organizing in urban food commons. By doing so, it contributes to closing the gap between social and technical innovation, while also highlighting the importance of grassroots social innovations as sites for technical innovation, experimentation, and tinkering.

Tools for Commoning

In recent years the empirical focus and conceptual framing of the commons have expanded beyond the notion of commons as a fixed quantity of common pool resources, to include a greater attention to the social practices that make the commons [9,12,36,37]. The result of this work has been a "shift in focus from the commons as a noun to commoning as a verb; this means moving beyond static properties regimes to the dynamic processes through which commons are created and governed" [2] (p. 203). This research also attends to the role of imagination in stimulating the recognition of actually existing commons as well as the capacity to create new ones [4,12]. These conceptual innovations have been spurred in large part by new empirical research and activist practices around commons with different material properties, rules, institutional arrangements, and geographies—such as urban commons, cultural commons, digital commons, and food commons [9,12,13,17,30,38]. These emergent commons challenge the logic of scarcity and raise new material, legal, and governance questions about shareability, exclusion, ownership, responsibility, and community. Answering such questions requires attention to the concrete ways in which communities negotiate access, care, and governance as they nurture collective imaginaries around the commons.

Urban food commons is a conceptual approach that brings together legal and geographic research on the urban commons [17,38] with agri-food studies and policy research on food commons [22,30]. Urban commons research has developed around citizen-led efforts to practice their "right to the city" [39] and claim a say in the collective use, care, and management of urban space and resources

for food provisioning, sociality, art and culture, and housing [4,40]. As Amanda Huron [17] points out, a critical issue for urban commons is the reality that cities are open to such a diversity of users, communities, and activities with competing claims on their use, governance, and future. The density of cities is as much an enabling factor for urban commons as it is a source of continuous market pressure on urban land and resources. Food commons research takes an expansive view of the multiple commons that already populate our food system—such as public health, food safety, culinary heritage, open-source seeds, and community gardens [15]—to stage a call for action for food policies rooted in the recognition that food is (already) a public good, rather than a commodity [22,30]. Vivero Pol argues that governing food as a commodity has led to disastrous sustainability and public health consequences in our food system, and is a major barrier to achieving food security and food sovereignty [30]. Food commons have also been taken up by food sovereignty activists, who view the creation of collective resources for subsistence and self-provisioning as critical for resisting the policies and practices that stem from the commodification and privatization of food and its ingredients (soil, land, water, seeds, and knowledge) [20].

Previous research on urban food commons examines practices such as community gardening and farming, where residents collectively manage urban land for growing food [1,3,14,15,20]. Recent research on urban food sharing, for example, employs the lens of commons to examine how residents collectively manage surplus food [41] as well as the collective risks and benefits of safe and accessible food [2]. One important finding of research on urban food sharing is that urban infrastructures—such as ICT tools, community fridges, and community centers—can play a vital role in making urban food commons more inclusive and accessible. In the pages that follow, I revisit these urban infrastructures, investigating them as "tools for commoning," to gain a better sense of their role in community self-organizing. This paper takes a small step towards uniting two strands of urban food commons research, on land and food, examining them as sites of socio-technical innovation.

An analysis of SHARECITY100 by Davies et al. [42,43] shows just how much the character and infrastructure needs of community self-organizing has changed for food initiatives. ICT innovations in open data, mobile applications, community mapping, open-source code, exchange platforms and marketplaces, wikis, blogs, Facebook, Instagram, and Twitter, as well as platforms that facilitate collective decision-making, all have the potential to support community self-organizing in urban food initiatives in new ways. These tools may help organizations to scale their membership, communicate their impact, coordinate logistics, be transparent in their organizing and decision-making process, gain public visibility, and coordinate a number of organizing activities that would have previously taken place face to face and with a smaller number of participants. In the age of the so-called sharing economy, we are witnessing a proliferation of tools, infrastructures, and platforms for sharing information, goods, and services [44]. Many of these tools have supported the seemingly self-organized growth of platform capitalism [11,45], but increasingly they are being put to use for other possibilities, including grassroots food sharing. These innovations are captured in the SHARECITY100, a crowd-sourced database and map of ICT-mediated food-sharing initiatives in 100 cities [31,42], and investigated by Davies et al. [43] in ongoing research on the role of ICT in urban food-sharing economies.

This paper contributes new empirical research to current debates on the role of socio-technical innovations in urban food sharing and other forms of grassroots social innovation for sustainability. However, it also seeks to extend these debates beyond the frame of sustainability transitions, to evaluate the role of socio-technical innovations in community self-organizing for the urban food commons. I evaluate "tools for commoning," in two community food initiatives. I also compare how these various socio-technical innovations are developed and used to facilitate self-organizing around shared imaginaries, access, use, and governance in the urban food commons. I do this through a descriptive comparison that draws upon ethnographic research conducted with the initiatives foodsharing.de and 596 Acres, and their respective online platforms. These platforms have been designed by the initiatives for the explicit purpose of facilitating community self-organizing around access to land in New York City (livinglotsnyc.org) and access to surplus food in Berlin (foodsharing.de). They perform a unique

combination of logistical, community-organizing, and governance functions, and they depend on an extensive offline community and social infrastructure. The question this paper seeks to answer is: how do community food initiatives develop and use socio-technical innovations to imagine, access, care for, and govern the urban food commons?

2. Materials and Methods

2.1. Background

In cities across Europe and North America, residents have organized to claim space and resources for growing and cooking food together, caring for vacant land, redistributing food, advocating for food justice and food sovereignty, pioneering cooperative and solidarity-oriented forms of food purchase and distribution, planting urban fruit orchards and food forests, and encouraging biodiversity through community seed-sharing and planting. Communities in New York and Berlin have a long history of self-organizing to remediate the social injustices and environmental harms of urban food systems by, for example, cleaning up vacant lots and growing food on them. In Berlin, a glut of vacant land and buildings in the 1990s, combined with a policy encouraging temporary use, has supported a vibrant urban commons in squats, community spaces, and urban gardens. This abundance is, however, rapidly disappearing [46,47]. New York, on the other hand, has a slightly older and more institutionalized urban gardening movement that grew out of land vacancy in the 1970s, and has since gained public support from the Department of Parks, and limited legal protections via community land trusts or parks ownership. As in Berlin, though, vacant land is no longer in abundance, and community gardens are often threatened by development plans. In Berlin, the food-sharing movement, which makes use of a web platform and a network of community fridges to connect individuals with sources of surplus food, is a relatively recent development. Grassroots-led urban food sharing does not really exist in New York, except through the activities of food rescue organizations, food banks, and individual dumpster divers. However, the Department of Sanitation has recently taken the bold step of developing a public web platform similar to foodhsaring.de, which connects charities with sources of surplus food [48,49].

Vacant land and surplus food are not easily comparable types of food commons. Not only are they governed and valued in different ways, they also have quite different material qualities that affect how they are used, accessed, and shared. For example, vacant land can accommodate multiple different users who might participate in shared gardening, composting, relaxation, and leisure. However, in New York and many other cities, the political economy of urban land, together with a severe shortage of affordable housing, places competing demands on the use, ownership, and governance of vacant land, especially as property values exponentially increase through processes of real estate speculation, investment, and up-zoning (to allow for greater density in residential development). Through the everyday injustice of municipal bureaucracy, as well as continued practices of land-grabbing, theft, and deed fraud, communities have long been denied the opportunity to participate in the governance of vacant land in their neighborhoods—except through stewardship-gardening programs such as Greenthumb, a division of the NYC parks department that provides technical support and garden licenses to community gardeners [4,38].

Surplus food, on the other hand, like all food, cannot accommodate multiple users. Food that is "used" is eaten, and then digested by a single user. However, with social innovations such as community meals and community fridges, surplus food can accommodate multiple users, across time and space, who can participate in the everyday practice of sharing, cooking, and eating together. Due to the tremendous wastefulness of our current food system, there is often more than enough surplus food to go around. As a result, surplus food is perceived as abundant and shareable—despite there being clear limits on the number of users a single loaf of saved bread can accommodate. While surplus food is abundant, the window of time for enjoying this surplus food is not. Surplus food risks spoiling and must be eaten as soon as possible, or cooked, preserved, or transformed in such a way as to extend its

life and value. Yet, as I have discussed elsewhere [2], the risk governance of surplus food, especially in the EU, can make it difficult to share freely.

Politically and conceptually, there may be value in bringing together these disparate people, practices, and places in order to examine how "tools for commoning" work across different contexts. Indeed, this is one of the conceptual innovations of the SHARECITY project itself, which brings together a wide range of urban food initiatives under the umbrella of "food sharing." Davies et al. [43] define food sharing as the sharing of food stuff, spaces, and skills at multiple moments in our food system. Additionally, in the SHARECITY100, Davies et al. [31,42,43] have extensively documented the multiple ICT tools that support urban food sharing, as well as the range of activities and organizing practices that have developed around the different materialities of food, which range from land, seeds, and compost, to fresh, foraged, gleaned, and surplus food, to shared meals, knowledge, and skills, to kitchen spaces. It was as a member of this collaborative research project that I conducted six months of ethnographic research with food-sharing initiatives in Berlin and New York.

2.2. Methods

Ethnographic research in Berlin and New York was conducted over the course of six months between 2016 and 2017, with three months of field work in each city. Four case studies were developed in each city to capture a range of food sharing practices, materialities, enterprise models, and levels of ICT usage. Each case study was developed through a combination of online and offline participant observation, a minimum of four semi-structured interviews that followed an interview guide, and a minimum of 10 user engagements in the field. This allowed for the collection of a rich variety of qualitative data, while the online presence of each organization allowed the data collection and community engagement activities to extend well beyond three in-person months.

The field work moved between online and offline spaces, and relied extensively on each organization's web platform, where the researcher collected data, recruited interviewees, learned about events, and conducted participant observation. As a recruitment strategy, the researcher registered and developed a public profile on each platform that clearly identified her as a researcher, and explained the overall purpose of the research—to explore the sustainability potential of food sharing activities. Examples of her online activities include making appointments with people to share food, reading wikis, taking online quizzes (to become a food saver), signing up to organize a specific parcel of property, and "liking" and commenting on photos, posts, and events that were related to each organization.

The online research took an active and participatory approach to data collection, as opposed to an anonymous non-participant approach. Although online research often occurs in "public" online spaces, users relate to and use these spaces in ways that still carry expectations of privacy (even as they consent to data-harvesting analytics). As discussed by Morrow et al., this anonymous non-participant observation raises a number of ethical questions, since research participants cannot fully consent or object to the research if they are unaware that it is being conducted [50]. Furthermore, this non-participant approach often obscures the role of the researcher in the creation and consumption of online media. Through a combination of offline and online participant observation, the researcher was able to meet most of the users face to face, solicit interviews, request informed consent, and gain a sense of the material and social worlds that these platforms are organized around.

The online data included in this paper is treated in a way similar to ethnographic field notes resulting from participant observation. Field notes are a source for emergent themes that are grounded in offline and online participant observation. Names have been anonymized, except for interviewees who requested to be identified by name. The interviews were digitally recorded, transcribed in their native language (English and German), and then coded in NVivo with descriptive and analytic codes that paralleled the interview guide. Codes included the nodes "ICT" "Modes of Sharing" "Urban Space" "Policy, Rules, and Regulations" and "Barriers and Conflicts." Additional data analysis of web transcripts and interview transcripts was completed for this article, tracking themes related to

commons, self-organizing, imagination, access, governance, and care in order to facilitate greater comparison across cases.

The case studies I analyze in this paper are 596 Acres, a non-profit community land access advocacy organization in New York [27], and foodsharing.de, a non-profit association and volunteer network of food savers who seek to reduce and redistribute food waste in Berlin (and across Germany) [29]. They were selected for their use of "high tech" online platforms and mapping tools as well as "low tech" social innovations such as signs and fridges in public space. Both initiatives are non-profit organizations who have become widely known through their ICT platforms, which have enabled them to scale membership within their own cities but also to influence and replicate sharing practices in other cities around the world.

In the following sections, each case is introduced separately along with a descriptive narrative of how various "tools for commoning" affect self-organizing practices in these initiatives. This is followed by a comparison of the ways in which imagination, access, governance, and care of the urban food commons are enacted across both cases. In making this comparison, I use the thread of community self-organizing and socio-technical innovation to bring together food commons with significantly different material, economic, and legal properties, thereby positioning grassroots food-sharing initiatives as important spaces for bringing together social and technical innovations for the creation and care of new urban food commons.

3. Results

3.1. Commoning Land with 596 Acres

In 2011, Paula and Eric began hanging signs on vacant lots in Brooklyn. They were equipped with detailed property records that were the product of months of Paula's legal wrangling, and the revelation that some 596 acres of vacant land in their borough were indeed publicly owned. The signs declared in a bold and folksy way, "This Land is Your Land," and urged nearby residents to self-organize around the vacant "lots in their life." With the help of Eric, who is a GIS specialist, and many others, what began as a long list of property records was eventually transformed into the Living Lots portal, an interactive map of property ownership, advocacy tools, pathways to access, and community-organizing practices.

Eric describes the Living Lots portal as a Facebook page for a piece of property. Pieces of urban land become entities whose "status" is constantly being updated and tracked. However, instead of being listed as "single" or "in a relationship," properties share their profile by listing their ownership and organizing status, and the city or state agency who controls them. The actual people that these properties are in a relationship with are listed as their organizers, who share their contact details. Others can "follow" this property to receive a constant stream of updates. Each page offers a long digital trail of meeting notes, photos, progress updates, copies of emails to city officials and agencies, legal proceedings, and words of solidarity and encouragement in what are often incredibly slow and protracted legal and bureaucratic struggles. In the meantime, the original organizers might get demoralized, burnt out, change jobs, or move, but thanks in part to the data on this page, the work can be picked back up by the next organizers.

Living Lots is a living archive of community organizing. Although much of the popular and academic scholarship on 596 Acres focuses on the map, the technology, and the use of open data [19,51,52], this extensive organizing infrastructure would have little impact (and perhaps even exacerbate existing inequalities around urban land access by supporting ICT-enabled environmental gentrification) without the community organizing practices on the ground that are driven by an ethic of racial and social justice. Until the summer of 2018, 596 Acres and the Living lots portal depended on an extensive offline social infrastructure. When I interviewed Mara, then Director of Partnerships, one of her jobs was to field calls on the 596 Acres organizing "hotline," where anyone could call for support in organizing community land access to a piece of property. She would meet with people, discuss possible pathways to access, stewardship, and ownership; investigate the history of the property;

follow up with multiple city agencies on their behalf to check on the status of their paperwork; help collect signatures when needed; present on their behalf at community board meetings; sit with them for weeks and months of soul-crushing court proceedings; and then vigorously document every detail of this on the Living Lots portal, in the monthly newsletter, and on multiple social-media platforms.

Without question, the vast webs of connection facilitated through these maps, organizing platforms, and social-media tools have made a difference to the work of community self-organizing. However, these maps, platforms, and media do not do the organizing; human beings do. Mara made this very clear in our interview. We were reflecting on the enormous growth of 596 Acres, and how the organization has been able to "open source" the concept, the technology, and the tools to communities as nearby as Philadelphia and as distant as Melbourne to replicate their approach in ways that are local and context-specific. When a new group approaches 596 Acres and requests their help in developing an online map and organizing platform for vacant land in their city, the first thing 596 Acres asks is if they have the people (staff and volunteers) to support this map. This is because, in their experience, a map alone is not enough. Although all of the ICT tools that 596 Acres uses are extremely interactive, they are not equally accessible to everyone and, even if they were, having all of the right data and information may not be enough to mobilize community members or keep them engaged. Although many community members care for the "lots in their life," they are not all able to take time out of a busy schedule to organize and attend meetings, file papers, attend various court and public hearings, follow up on phone calls, or build a community garden from the ground up. Indeed, 596 Acres staff have helped dozens of people organize around vacant land and start community gardens, who have never logged onto the website [40].

Of course, the map also does a great deal; it makes property visible and obscure public property records accessible and transparent, thereby stimulating imagination and access. As Paula writes: "you can't common what you can't see" [4]. Critical geographers have also documented how mapping can play a play a vital role in generating new spatial and economic imaginaries and subjectivities around the commons [53], shifting the way people relate to resources, space, and one another. The people organizing around the "lots in their life" [28] are ideally long-time residents who have experienced all of the downsides of vacancy, urban renewal, the systemic disinvestment in black neighborhoods (e.g., red lining), and now finally have a chance to make a claim on these spaces and enjoy their benefits. Many of these residents know the vacant spaces in their neighborhood in ways that city property records and their spatial representation cannot fully capture. They may know who once lived there, who was evicted, when the building was demolished, and above all they may know what has happened on the land over the previous decades—how it felt when the land became a neighborhood eyesore and burden, or attracted illegal activities such as waste dumping or drug sales. What they might not know is whether or not it is public property, which city agency owns it, what the legal steps are for gaining access, and what political and zoning promises were made for this piece of property. For example, many vacant lots are on urban renewal sites that have community "promises" attached to them for affordable housing or for parks. These promises were often made in exchange for permission to clear slums, displace thousands of people (the majority black and low income), and "develop" neighborhoods in the 1970s. Many of these promises still have not been fulfilled. Knowing this information can be a first step in organizing. To make these promises and plans more visible, 596 Acres developed the Urban Reviewer map [54].

At the time of our interview, Mara was in regular contact with a group of local residents who were organizing around a vacant lot in their Bronx neighborhood. The LivingLotsNYC page attached to this property begins with a simple message from a 596 Acres organizer on May 7 2015. In all caps, she writes, "THIS IS SUPPOSED TO BE A PARK!", links to an article about the park, and urges concerned residents to organize with her to push the Parks Department to clean it up and open it to neighborhood residents. One year later, on April 4 2016, a neighbor who has become enmeshed in this process through several offline meetings with 596 Acres staff, Partnership for Parks, and local council members posts her contact details and takes responsibility for organizing this parcel. There is a steady

stream of back and forth between the neighbor and 596 Acres staff, to share information about the park's ownership and plans. Evidently the land has been vacant for more than 20 years, and the Parks Department has owned the lot for six years but has no plans to renovate it. Through their local civic networks, 596 Acres staff learn that there are plans afoot to "demap" and "alienate" the park and sell it to a housing developer [55].

Mara posts detailed summaries and updates to keep track of the organizing process on the multiple social-media and communication platforms she manages. This is how I learn about their next meeting, which is in the basement of a housing complex in the Bronx. At this visioning meeting, the neighbors are discussing their plans and dreams for the garden over drinks and cookies. One neighbor would like to see a healing garden for cultivating natural herbs and a green space for people relax in. Another neighbor shows us the drawings she has made on her computer that show how the space could be used. This stimulates others to begin imagining bringing their children and grandchildren to the garden. We then take a walk to the vacant lot, stare in through the chain-link fence, and try to picture ourselves inside. The neighbors have maintained frequent contact with Mara over the months (now years) they have been organizing. Mara provides constant guidance and encouragement, advises them on next steps, and keeps track of everything. The next step for this lot is to begin collecting letters of support and signatures that can be presented to the community board. The next day Mara has posted the meeting notes, and a group picture of us at the meeting is on Twitter. Through these social practices, the community that is willing to care for the land comes into focus.

Using the online platform, organizers share vital information about an upcoming city council meeting on public parks that have been closed to the public. Countless community members from the South Bronx turn out for the meeting to share their stories about this parcel of land and their hopes for its future. Their testimony is prepared with support from 596 Acres and then meticulously archived on the public webpage for this lot, where I have been able to access it. Community members describe the feelings of abandonment they came to associate with walking past the same locked parcel of land for 20 years, as well as the sense of curiosity they maintained in its possible use and future, as new weeds and plants grew and new signs of activity became visible. What each person makes clear in their testimony is that they would not have even known about this public meeting, or been able to add their voice to this important community conversation, were it not for 596 Acres. 596 Acres organizers play a vital role in facilitating access to the municipal governance processes that all residents have a right to participate in, by helping citizens to develop the knowledge, tools, and experience needed to take an active role in these public meetings [55]. In this way, "tools for commoning" come to play an important role in facilitating civic participation in the governance of urban land, enabling residents to exercise their collective right to the city.

This extensive offline community infrastructure is not visible on the web portal—or in the extensive write ups about 596 Acres that focus on the technical innovation of the map. This social infrastructure is created by (paid and unpaid) community organizers who are available to meet with residents interested in organizing, hang signs on vacant lots, encourage them to develop a vision and inclusive organizing process, collect signatures when needed, present their case at community board meetings, contact city agencies (and keep contacting them), accompany them in court, and advocate for community land access at multiple levels. While 596 Acres has unfortunately lost the foundation funding that supports this type of labor, the Living Lots web portal remains active [56]. In this way, it continues to help people build community online and offline and share vital information about the "lots in their life." However, as this small example shows, it takes much more than an interactive map to support community self-organizing around the urban food commons.

At present, Living Lots NYC also plays another vital role; it is an organizing archive. In cities like New York, where changes in land use can happen at an incredible pace without community participation or public accountability, it is critical to have an archive of these decisions and practices so that we can make sense of the particular decisions, relationships, and actions that have led to the current state of affairs. Examining this history, we can see that gentrification and land grabbing are

not inevitable processes guided by the seemingly natural laws of capitalism, but political and policy decisions. The page for the vacant lot in the Bronx I have described in this article concludes with the troubling documentation of assembly members in the state capital successfully passing a law to alienate the park from public ownership in order to sell it to a housing developer, effectively side-lining the local governance institutions (the community board, city council, and parks department) through which community members have been organizing for the last three years. Table 1 provides a summary of the different tools and practices that support community-self organizing around imagination, access, governance, and care in 596 Acres. I return to these themes in the discussion.

Table 1. Commoning Land with 596 Acres.

Imagination	Access	Governance	Care
• LivingLotsNYC map makes potential and existing sites for community organizing visible. • Imagination is nurtured and activated through face to face meetings and visioning meetings. • "This Land is Your Land" signs make public property visible offline.	• LivingLotsNYC shares vital public information about the ownership, governance, and status of the land. • LivinglotsNYC and 596 Acres staff help communities pursue possible pathways to access. • "This Land is Your Land" signs share vital information needed to gain access.	• LivingLotsNYC makes the legal and governance processes that affect vacant land visible. • With support from 596 Acres staff, community members gain access to municipal governances processes, attend meetings and provide testimony.	• Volunteers and staff care for the webportal, ground-truth properties. • Once a garden is established care is managed by the gardeners, through stewardship agreements with greenthumb. This includes governance protocols as well.

3.2. *Commoning Food with foodsharing.de*

In contrast to urban land, which is a relatively scarce, sedentary, and costly resource that tends to gain value over time, surplus food is very nearly the opposite. It is abundant, highly mobile, and rapidly degrades in quality and value. ICT tools have long been incorporated into the complex algorithms and logistics of our food system, to the benefit of supermarkets and distributors who can respond to consumer demands and market trends "just in time" and maintain razor-thin profit margins, often at huge expense to upstream producers. The logistics and market devices that prop up our industrial food system may also contribute to food waste, as the exchange value of food can expire far faster than its use value [57,58]. Increasingly, a number of tech start-ups are targeting food retailers and businesses to help them monitor and reduce their food waste, and when possible redirect their surplus to food redistribution programs [59].

In the realm of community self-organizing, ICT tools are being used to decentralize the complex logistics of food rescue and redistribution. Foodsharing.de is a volunteer run food-saving logistics and food redistribution platform that began in Germany and continues to spread its tools, values, and innovations in Europe through grassroots outreach. Their social innovation—the Fair-Teiler (community fridge)—has been taken up throughout Europe by food-sharing groups in Austria and Switzerland, by the UK community fridge network, and by the solidarity fridge network in Spain and Sweden. The web platform foodsharing.de was formally launched in 2012, when a grassroots collective of dumpster divers led by Raphael Fellmer "Lebensmittelretten" (food saving) joined forces with food waste activist and documentary filmmaker Valentin Thurn to combine the food-rescue logistics developed by Lebensmittelretten with peer-to-peer food gifting via online "food baskets." The idea caught fire with hundreds of activists and hacktivists who donated valuable tech and programming skills to further develop the website and mobile app, and eventually open source the concept and code through projects like Yunity.

The foodsharing.de platform's primary function might be described as "just in time" surplus food logistics. Individual partnership managers coordinate matches between food savers and local businesses, who choose a dedicated time each day or week for a trained food saver to collect their surplus food. In additional to matching businesses with individual food savers, the platform is also used for peer-to-peer food sharing through geo-located "food baskets" that private households use

to give away their surplus food. Several data-gathering tools are built into the platform to help foodsharing.de generate impressive statistics about the number of pickups, exchanges, and the tonnage of surplus food that has been saved from the dumpster [60]. When looking at a map of Berlin populated with food baskets, community fridges, and statistics about the amount of food that has been rescued, it is easy to imagine surplus food as abundant, accessible, and shareable.

While a few of these data gathering features are automated, almost every single food-sharing transaction is mediated by an actual person who takes personal responsibility for scheduling and exchanging information between the donors and the recipient. The platform is not driven by an algorithm that facilitates good matches between people and food in time and space but by hundreds of volunteers, individuals, and shop owners and employees who rely on face-to-face conversations, phone calls, text messages, Facebook chats, and instant messages through the food-sharing platforms to negotiate access to surplus food. What the platform has facilitated is the tremendous scaling up of food-sharing membership and the spread of foodsharing.de tools to self-organized communities across Berlin and Germany. However, this growth has not been without growing pains—a theme I return to later.

Not unlike the 596 Acres organizers, who decided to start hanging "This Land is your Land" signs on the fence of vacant lots to make property information visible and accessible to local residents most impacted by land vacancy [4,40], Berlin food sharing activists also grew concerned with the limitations of a mostly online food-sharing platform, for facilitating access to food for those most affected by food insecurity. To address this concern, they developed the concept of a Fair-Teiler (community fridge), which would be accessible 24 h a day for anyone who wanted to give or take food. As an "open-access" food commons, the fridges have raised food safety concerns—since it is almost impossible to draw boundaries, assign responsibility and liability, or ensure traceability. (See [2] for a fuller discussion.)

Beyond logistics, the platform is used to share information about the status of community fridges. Each fridge is geolocated on an online map and has a dedicated page listing its operating hours and the stewards who clean it. On each fridge page, there is an interactive message board where updates and pictures are shared about the contents of the fridge. The map, combined with this constant flow of information, serves not only to make the food commons visible but to connect people. Sharing information helps communities self-organize around the care and maintenance of their fridges. However, information alone is not enough to facilitate joint responsibility in commons ventures. Commons of all kinds require rules for mediating use and access, making decisions, and delivering rewards and sanctions. In the early stages of the organization, many of these issues were negotiated face to face with the help of local ambassadors. However, eventually food-sharing membership and public fridge users began to grow too quickly for these face to face encounters to keep pace, and foodsharing.de began to function as a governance platform as well.

Governance rules, decisions, and discussions are chronicled on numerous food-sharing wikis and discussion pages. Governance concerns such as trust, safety, and values are codified into an online quiz that all food savers must pass in order to access surplus food from food shops. Tools such as the "trust banana," the "violation button," and the "I know this person button" also play an important role in rewarding pro-commons behavior and disciplining free riders (see [2] for a fuller discussion). This ICT infrastructure has multiple security and administrative layers, and as food savers progress in the organization—attaining a higher level of trust—they can also access higher levels of the website, including forums where they can discuss important issues in their area of responsibility. Trust and accountability are further cemented through numerous offline interactions—at community brunches and dinners, at chance encounters around the community fridge, and at neighborhood food-sharing meetings. Table 2 provides a summary of the different tools and practices that support community-self organizing around imagination, access, governance, and care in foodsharing.de. I return to these themes in the discussion.

Table 2. Commoning food with foodsharing.de.

Imagination	Access	Governance	Care
• Data on the location and amount of rescued food. • Making surplus food visible via community fridges.	• Open-Access to community fridges. • Peer-to-Peer gifting via "food baskets." • Direct access to surplus food from local shops is mediated through online Food Saver Quiz and in person training.	• Peer and Self-Governance via food-sharing platform, Wikis, and trust tools. • Online and offline organizing to intervene in municipal food policy. • Neighborhood food-sharing self-governance in face to face meetings. • Association governance by the steering committee in Cologne.	• Care for online platform and tools through Hackathons. • Care for community fridges by community stewards. • Care for relationships between members, shop owners, and the community.

4. Discussion

These two cases illustrate in different ways that technical innovations alone are not sufficient to facilitate community self-organizing around the urban food commons. Foodsharing.de and 596 Acers each rely on a unique combination of technical and social innovations to make under-utilized resources visible and engage community members in their imagination, access, governance, and care. Practices in each organization demonstrate the necessary interrelation between social and technical innovation. This aligns with findings from previous research on grassroots social innovation, which view innovation as "not just as a technical matter, but as deeply value-laden" and emphasize grassroots innovations as "especially well positioned to contribute to more democratic, inclusive and empowering sociotechnical configurations that might otherwise be suppressed" [23] (p. 75). In the cases discussed here, each initiative began with grassroots actors engaged in an existing but somewhat marginalized social practice—community (and guerilla) gardening and dumpster diving. Through very different pathways, each initiative developed a novel technical innovation—an online platform and map—with the potential to make these everyday and somewhat niche sustainability practices accessible to a wider public.

However, in scaling these practices, the organizers in these initiatives became concerned about whether or not their innovations were actually accessible to those community members most impacted by food insecurity or land vacancy. They thus devised offline and place based social innovations (a community fridge and the "This Land is Your Land" sign) along with social support systems (of paid and unpaid community organizers) to ensure that their innovations had the desired impact. The result is a community self-organizing infrastructure made up of both social and technical innovations. In assessing the impact of socio-technical innovations for the commons we can identify several patterns across these two distinct cases. For example, technical innovations like web platforms and maps are especially helpful for sharing data and information that facilitates access to the commons. However, in both cases, governance and care of the commons relies on extensive offline interactions and social innovations to support more democratic and inclusive forms of engagement. Finally, in each case, a unique combination of social and technical innovations has led to new sociotechnical configurations in which imaginaries of the commons can develop and spread through networks of commoners, online and offline infrastructures, and maps.

4.1. Imagination

Both of the organizations discussed use mapping to make urban food commons visible. In this way, they stimulate imagination and draw attention to the commons around us. In small ways, the maps may help us reimagine the city as a space that is not only private or public but also community-managed and shared. Importantly, this visible abundance (of food and land) disrupts the narrative of scarcity that persists around urban space and resources. In New York City, for example, making the commons visible also serves to make the history of red-lining and racial discrimination visible, because vacant

land is most abundant in neighborhoods that suffered from racialized practices of disinvestment. Shedding light on the history and promises attached to a piece of urban land visible simultaneously sheds light on urban land use and draws attention to the very troubling trend of "warehousing" urban land for decades to entice developers. Likewise, in the food-sharing movement, making surplus food visible, offline and online, draws attention to the problem of food waste, while urging individuals and communities to self-organize around this problem. Commoning is a potential solution to some of these problems, but also requires policies that can support change at municipal and regional scales.

Each organization acknowledges the limitations of online mapping for facilitating access to resources for those most in need. 596 Acres has gone to great lengths to engage the most impacted community members offline and online. Organizers use ICT tools and social media to connect with individuals, policy makers, organizations, raise awareness, sound alarm, and celebrate victories large and small. They hang informative "This Land is Your Land" signs on vacant lots to draw in locals, and until recently were able to employ a highly skilled community-organizing staff to support and encourage community members. Community members continue to take up the baton of self-organizing in 596 Acres, and with support from gardening programs like Greenthumb develop shared and inclusive visions for community gardens in New York City. Foodsharing.de members developed the community fridges for similar reasons, to ensure that food was accessible to those who needed it—whether or not they had an internet connection or had registered on the food-sharing platform. Food-sharing activists continue to organize to stock, clean, and maintain the fridges, and protect them from misuse and closure.

4.2. Access

Surplus food and vacant land have significantly different terms of access. Food that is distributed through foodsharing.de is not "owned" by anyone. Yet access to this food (except when it is distributed through the community fridges) is still mediated through interpersonal relationships of trust and reciprocity [2]. Furthermore, access to the food-saving logistics side of the platform is restricted to those who can demonstrate that they understand the rules by passing a very tricky online food-saver quiz. However, access to surplus food is to a large degree controlled by any and all foodsharing.de members, who can practice varying degrees of inclusion or exclusion.

Despite these hurdles, access to surplus food in Berlin is still much easier than access to vacant land in New York. Even though much of the vacant land in New York City is owned by the public, these properties are not governed by or accessible to the public. They are often governed by a maze of municipal agencies with little incentive to make these properties available for community use. Decisions about their future use can be made in the state capital of Albany, over a hundred miles away, with little or no community input. Even though these properties are owned by the public, they are still treated as if they are private property. They are locked behind giant chain-link fences, and "warehoused" in anticipation of zoning and market changes that will enhance the development potential of these spaces.

The first step in gaining access to vacant land is finding out which city agency controls the property and what their plans are. This information can be accessed on the Living Lots NYC page for a given parcel, where it is kept up to date by the community members who are self-organizing around the property. Depending on the ownership status, the most likely pathway is that community members will self-organize and negotiate access to the property through the Department of Parks Greenthumb stewardship program. This program offers training and technical support for gardeners, and provides community gardeners a "license" to use the space for community garden for a fixed amount of time, but it does not offer them the same land tenure protections as a long-term lease. In addition, as Cahn and Segal note, the majority of community gardens that operate through this program are still mapped in public records as "vacant land" rather than parks—rendering community members' stewardship and commoning activities invisible [4]. Despite operating on vastly different time scales, both organizations use their web-platforms to share information and coordinate the logistics that are necessary to begin self-organizing around these resources.

4.3. Governance

Surplus food and vacant land are embedded in very different governance processes (e.g., food safety and urban land use). However, in both cities, public authorities take a significant interest in controlling how food and land are accessed and used. In Berlin, food safety regulators have chosen to interpret EU regulations on food safety and traceability in the strictest possible terms, effectively criminalizing food sharing through community fridges. In New York, a mosaic of land managers and public agencies, along with historic planning and zoning decisions, govern vacant land in quite anachronistic ways. As a result of these arrangements, food and land are governed first and foremost by the state but through the market, with public regulations taking a backseat to safeguard against misuse as needed. Despite these governance constraints, foodsharing.de and 596 Acres have both mobilized community members to become much more involved in the governance processes that affect land and food in their cities. This has been achieved in part through the community organizing on their web-platforms, where press releases and public testimonies are prepared, petitions are signed, and critical updates about relevant public and private meetings are circulated.

When it comes to actually governing these resources as a commons, 596 Acres and foodsharing.de differ in their approach. In foodsharing.de, quite a lot of governance practices happen online, with the help of online wikis, discussion boards, trust tools, and membership quizzes. These ICT tools are effective for managing the scale and speed necessary for self-organizing risk governance in such a large, decentralized network. However, they do not always work the way they are intended to. For example, the much-maligned German language quiz has been accused of being discriminatory towards non-native speakers and posing high barriers to participation. To function well, these tools require constant social support and human intervention to ensure that they do not become overly exclusionary or punitive. In community gardens, self-governance happens almost entirely offline, at community garden meetings, following the governance protocols members have developed in collaboration with Greenthumb.

4.4. Care

The digital commons of foodsharing.de and livinglotsnyc.org, require constant upkeep and care. These maps have been made and maintained in part by the commoning activities of GIS experts and web programmers who have given their time and skills to make the commons visible and accessible. However, money is also needed to pay for webhosting services, and to support the livelihoods of the people who give so much of themselves to these platforms and social movements. Hackathons alone may not be sufficient to keep these platforms functioning over the long term.

A critical difference between 596 Acres and foodsharing.de is their relationship to money. Until recently, foodsharing.de adopted a militant "no money" stance (they currently accept donations through their website). Even though they provide a vital service to community members as well as food retailers, they refuse to collect money for these activities for fear that becoming financially dependent on food waste could compromise their ability to eliminate it. 596 Acres, on the other hand, has always recognized that, for community organizing work to be done, and done well, someone needs to be paid for it. However, the recent loss of foundation funding may reduce the efficacy and equity of the self-organizing activities on this platform. Communities will have less support in their self-organizing, and people with high digital literacy and social capital will probably continue to use the platform quite successfully while others are left behind. The paid labors of community organizers are critical for evening the playing field and ensuring that these "tools for commoning" are used in democratic and inclusive ways.

The material commons (land and food) around which foodsharing.de and Livinglotsnyc.org have mobilized requires care as well. For community gardeners, this care can take the form of a garden workday, spring cleaning, turning the compost bin, or keeping the sidewalk shoveled and free of snow all winter. For food sharers, caring for food means following food-safety protocols to protect the health of the community that shares this food. Food savers also take turns as fridge stewards,

who are responsible for throwing away spoiled food and keeping the fridge clean. They use digital tools on the foodsharing.de platform to schedule and distribute some of these caring responsibilities. However, the majority of care activities that sustain these organizations and the resources they steward are largely offline and invisible.

5. Conclusions

In this paper, I have sought to examine the possibilities and limitations of socio-technical innovations as "tools for commoning," which facilitate community self-organizing around imagination, access, governance and care in urban food commons. I have compared self-organizing practices in two grassroots sustainability initiatives that are well known for their innovative approaches to community food sharing and community land access. Within each organization, practices of imagination, access, governance, and care are mediated through technical as well as social innovations, online and offline. Operating in different geographic contexts and with very different aims and activities, each organization has developed digital platforms and interactive maps to help it make knowledge and resources accessible, fostering community self-organizing offline and online. They have also sought to extend the impact of their technical innovations into urban spaces, through public information campaigns and community fridges. Using these place-based "offline" tools they ensure that vacant land and surplus food are commoned in ways that are also accessible to community members with the greatest stake in their equitable use. The resilience and efficacy of the social relations behind these innovations can be seen in the numerous ways that communities have used these tools to self-organize and protect urban food commons when they are threatened by enclosure.

The narrative sketches I have presented of socio-technical innovation for urban food commons offer a modest corrective to an overly optimistic embrace of technical innovation, and reveal how social and technical innovation are co-constituted. These stories show how grassroots sustainability initiatives are working creatively at the nexus of social and technical innovation to experiment with "tools for commoning" in nuanced and creative ways that are sensitive to the local social and material inequalities that technical and social innovations are already embedded in. The social infrastructure that supports these innovations hints at the tremendous amount of paid and unpaid labor that is always being done "in the background" to create and maintain these innovations. The possibilities that these "tools for commoning" offer for making urban food commons visible and accessible, have potential to support community self-organizing in ways that are decentralized, scalable, and replicable in communities beyond New York and Berlin. However, they also require grassroots initiatives to be open and self-reflexive enough to change course and tinker when these tools fail. Exploring community self-organizing through socio-technical innovation reveals a complex picture of the commons as much more than the result of a good match between communities and shared resources, but rather a spatially and temporally contingent assemblage of people, tools, networks, data, and materialities working together towards equity.

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