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Building protective data infrastructure for urban community gardens: Lessons from the Philadelphia Garden Data Collaborative

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Abstract

Across U.S. cities, community gardens embody a conundrum: they are vital to community well-being and integral to urban social infrastructure, yet they are also profoundly vulnerable due to insecure land tenure, fragmented policy support, and systemic disinvestment. This reflective essay examines how garden data infrastructure can shape both sides of this conundrum, strengthening gardens' contributions to community life while also heightening their vulnerability to land loss. We focus on the case of the Philadelphia Garden Data Collaborative (PGDC), a multistakeholder initiative dedicated to documenting, protecting, and advocating for community-managed green space in Philadelphia. As participant researchers, we trace the evolution of PGDC's efforts from grassroots mapping to the development of coordinated data stewardship, and we explore how these efforts have enabled both emergency interventions (such as preventing sheriff sale evictions) and long-term preservation strategies. We examine the ethical dilemmas involved in collecting and using sensitive community data in a

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context where bureaucratic neglect has historically rendered gardens invisible, and where increased visibility can expose them to new forms of risk. While data can strengthen advocacy and inform policy, it must be coupled with secure tenure mechanisms and sustained public investment to ensure the future of urban gardens.

Keywords
community gardens, urban agriculture, land insecurity, data governance, data infrastructure, Philadelphia

Introduction

Food insecurity affects over 47 million Americans, with urban residents facing particular challenges accessing fresh, affordable food (Rabbitt et al., 2024). Community gardens have emerged as important community responses to these gaps, offering not just sustenance but spaces for connection and self-determination. Vital to urban communities, yet often in an unceasing state of precarity, urban community gardens flourish in the margins. Tucked into vacant lots, nestled between houses, or sprawling across post-industrial land, these spaces provide critical services that cities often struggle to deliver. They are sites of resistance and resilience, where communities assert their right to the city and invest in their neighborhoods on their own terms. They are classrooms where children learn where food comes from, kitchens where cultural traditions are preserved through heritage crops, pharmacies where medicinal herbs provide healing, and town squares where neighbors become family.

Despite their layered contributions to urban health and well-being, community gardens are precarious forms of land use in U.S. cities. Many lack formal tenure or legal protection, existing through informal arrangements or the sustained use of vacant land. Even the threat of loss can have detrimental effects. For many gardeners, the work of building and nurturing a garden is undertaken with an awareness of the garden's fragility. The possibility of destruction influences decisions about what to invest in, as gardeners may hesitate to build structures or commit to long-term plants like fruit trees or other perennials when their space's future is uncertain. As urban land values rise and planning priorities shift, gardens can vanish with little warning, bulldozed for new development, fenced off for infrastructure projects, or erased by neglect.

Consequently, when a garden is lost, it can tear at the social and ecological fabric. The loss of a garden is rarely just the loss of green space. It often signals the collapse of a complex web of social and ecological relationships that took years to build. What is lost is not only what can be seen, but what has been cultivated and shared: soils built through care, plants tended across seasons, and the gatherings that weave communities and give these spaces meaning. In such respects, gardens contribute a form of world-making that defies the alienation, brutalism, and toxicity that otherwise pervade modern urban life.

Preserving garden spaces requires more than good intentions; it demands systematic documentation, strategic analysis, and coordinated action. Preservation efforts, however, can be reactive and fragmented without comprehensive data about where gardens are located, who tends them, what threats they face, and what support they need. Yet data collection itself carries risks: making gardens visible can expose them to speculation and displacement. Navigating this tension is at the heart of the work described in this paper.

This paper draws on the experience of the Philadelphia Garden Data Collaborative (PGDC), a partnership of academics, advocates, and community organizations formed in 2014 to address this challenge. Through collaborative processes, PGDC has created a database that is a geospatial record linking community gardens to the tax parcels on which they sit. This parcel-level structure allows garden data to be cross-referenced with city property records, ownership information, and zoning designations. The database tracks garden locations, boundaries, organizational status, land tenure arrangements, and vulnerability indicators. The information is compiled through partner organization records, field surveys, and historical documentation over more than a decade. The rationale for garden data collection ultimately rests on a simple premise: what is not counted does not count in policy decisions and in the public eye. We begin by examining why gardens matter as urban infrastruc-

ture and why comprehensive data about them has remained elusive. We then turn to the ethical tensions inherent in documenting vulnerable spaces; while data provides a way to put gardens on the map, being on the map can also put gardens at risk. We describe how PGDC has sought to balance the need for visibility with the imperative of protection. Finally, we trace PGDC's evolution from grassroots documentation to active intervention, including a sheriff-sale monitoring system designed to detect when garden parcels are going up for municipal auction. Throughout, we argue that data infrastructure, when developed in partnership with communities and grounded in principles of care and accountability, can serve as a tool for preservation rather than displacement.

Gardens as Essential Urban Infrastructure

Community gardens in Philadelphia function as critical urban infrastructure, though they are rarely recognized as such in city planning documents or budget allocations. In many urban redevelopment models, particularly those shaped by neoliberal policy, land is assessed primarily in terms of its potential to attract investment and generate tax revenue. Within this framework, community gardens are often viewed as inefficient uses of space, especially when compared to commercial or residential developments that promise higher fiscal returns (Drake & Lawson, 2014; Lawson, 2007). Yet this narrow economic calculus overlooks the multifaceted contributions of community gardens, ranging from food production and public health to environmental resilience and social cohesion. Many of these contributions are essential to urban well-being, similar to other municipal public goods like roads, pipes, and power lines, even if they are difficult to monetize or quantify.

Understanding and documenting these multifaceted benefits is crucial for making the case for garden preservation. The most self-evident contribution of community gardens is to food security. Hunger and food insecurity are trenchant problems in major U.S. cities that are riddled by economic inequality. Unequal food access profoundly shapes Philadelphia's urban geography. Roughly 275,000 Philadelphia residents (17.6%) experienced food insecurity in 2023. In such contexts, community gardens serve as critical infrastructure for food security and public health (Feeding America, 2025; Santos, 2024). The Pennsylvania Horticultural Society's City Harvest program provides seedlings and other inputs to community gardens in exchange for the gardens donating a portion of their harvests to local food pantries or sharing crops with their community (Pennsylvania Horticultural Society, n.d.). Beyond food quantity, gardens also contribute to food sovereignty, empowering communities to control their own foodways. This includes offering culturally appropriate foods often unavailable in conventional markets—from Mexican epazote and Caribbean callaloo to Asian bitter melons—thereby enabling immigrant and ethnically diverse communities to maintain food traditions essential to their health and identity (Hynes, 1996; Vitiello & Nairn, 2009).

Gardens also contribute to environmental health. In cities like Philadelphia, dominated by impervious surface cover, community gardens provide rare and valuable pockets of greenspace. These spaces generate numerous co-benefits that foster environmental resilience and urban biodiversity. Unlike impervious surfaces, gardens offer permeable soil and vegetation that allow rainwater to infiltrate on-site, which decreases the volume and velocity of runoff entering municipal stormwater systems and mitigates flooding (Gittleman et al., 2017). The water quality benefits are real but not unconditional; compost-amended soils can leach phosphorus over time depending on amendment type and management history (Small et al., 2024). This is especially critical for cities with aging combined sewer systems like Philadelphia (Philadelphia Water Department, 2011, 2020). Gardens also mitigate urban heat island effects, improve air quality, and sequester carbon (Lovell, 2010; Lovell & Taylor, 2013). Additionally, community gardens help mitigate ecological fragmentation, creating small but critical nodes of connectivity for urban biodiversity and supporting more continuous ecological networks across the city (Di Pietro et al., 2018). Without comprehensive data on garden locations and characteristics, however, the city cannot fully account for these ecological contributions in climate planning.

Perhaps most importantly, gardens serve as social infrastructure, the places where community bonds form and strengthen (Klinenberg, 2018). In neighborhoods fractured by disinvestment, racial and economic inequalities, violence, and displacement, gardens create empowering spaces where neighbors become collaborators. Philadelphia offers vivid examples of this dynamic. Las Parcelas, a community garden in the Norris Square neighborhood, has served as vital social infrastructure since the 1980s, when neighbors transformed vacant lots into a space for cultural expression, intergenerational knowledge-sharing, and community empowerment (O'Brien, 2023). Heritage crops, murals celebrating Latin identity, and culturally significant gathering spaces like "La Casita" reflect the garden's role not just as a place to grow food, but as a site of collective identity and care (Hynes, 1996; Jaramillo, 2017; O'Brien, 2023). Across the city, many gardens host cultural celebrations, youth programs, senior activities, and informal gatherings that weave the social fabric. This social connectivity proves especially vital during crises, as demonstrated during COVID-19 when gardens became lifelines for food access and mental health support (Curlin, 2022; Falkowski et al., 2022; Jaramillo, 2020). In Philadelphia, this response was swift and tangible: the city designated community gardens as essential services within days of the initial lockdown orders, allowing gardeners to continue tending their plots when most public spaces were closed (Jaramillo, 2020). As the pandemic wore on, participation surged across the city, with gardens absorbing heightened demand for fresh food, outdoor space, and community connection at a moment when formal institutions struggled to respond at the same speed (Curlin, 2022).

Taken together, these various facets of community gardens make them crucial sites within a wider urban solidarity economy that extends beyond urban agriculture alone (Safri et al., 2025). By prioritizing shared land stewardship, cooperation, and community-defined value, gardens offer tangible examples of how land, labor, and resources can be organized around sustainability and collective well-being rather than the profit motive (Colding & Barthel, 2013; Ostrom, 1990). With this, they create space to practice and imagine economic relations beyond capitalism.

The Data Gap Challenge

Despite these multifaceted benefits, Philadelphia's community gardens have historically existed in an information vacuum, where efforts to collect data on gardens over time have been fragmented at best. By "data" we mean the systematic documentation of gardens as places: their locations, boundaries, land tenure arrangements, organizational status, and the social and ecological conditions that shape their vulnerability and value. This data gap has serious consequences for garden preservation and support. Without reliable records, preservation opportunities are frequently missed, as advocates are unable to mobilize in time to protect gardens that are threatened. Support organizations struggle to allocate limited resources efficiently, often working reactively rather than strategically. In the absence of aggregated data, advocates also face challenges in making strong policy arguments, as they lack the evidence needed to demonstrate the collective impact of gardens across the city. This data gap can also disempower community members by limiting their ability to connect with other gardeners, access available resources, or learn from shared experiences. As a result, the same patterns of displacement and loss continue to occur, with lessons going undocumented and unaddressed. The Philadelphia Garden Data Collaborative (PGDC), the subject of this paper, emerged directly in response to this gap.

This is not to suggest that there have been no efforts to collect garden data. Since the 1890s, various organizations have attempted to document Philadelphia's gardens, but these efforts remained isolated and incomplete. The Philadelphia Vacant Lots Cultivation Association kept records on vacant land use cases, including gardening, from 1897 until 1927 (Drake & Lawson, 2014). Victory Garden programs squeezed gardens into any available open space during the World Wars; some were documented, but many were not (Lawson, 2005). Penn State Extension counted gardens during the federal Urban Gardening Program (1977–1996), but those efforts wound down once federal funding was cut (Hynes, 1996; Vitiello & Nairn, 2009).

More recently, the Pennsylvania Horticultural Society and Neighborhood Gardens Trust have maintained lists of gardens receiving their support, but they account for only a fraction of all active gardens in the city. Until now, no mechanism has existed to systematically and comprehensively compile, update, and share garden information.

Unlike cities such as Seattle with its P-Patch program, Philadelphia has no dedicated municipal office responsible for community gardens (Kaufman & Bailkey, 2000). Historically, community gardens in Philadelphia have instead relied heavily on support from nonprofit organizations, many of which are funded by philanthropic donors whose priorities can shift over time, leaving gardens vulnerable to changing interests and funding landscapes beyond their control (Vitiello, 2022). The city of Philadelphia only recently began investing in urban agriculture, appointing its first-ever urban agriculture director in the department of parks and recreation in 2019 to develop a citywide plan. The novelty of these developments belies the historically limited municipal capacity dedicated to supporting urban agriculture generally and community gardens in particular (Jaramillo, 2019). Many gardens are nonetheless located on city land. That land falls under multiple city departments (parks and recreation, the water department, public properties, the redevelopment authority, the land bank) with no clear coordination mechanism. This bureaucratic patchwork has meant that no single municipal entity knows how many gardens exist, where they are located, or what support they need. As such, when planning and development decisions are made, it is difficult to advocate for garden interests.

The fragmented character of garden data collection has been compounded by the ephemeral nature of many community gardens, which presents significant challenges to tracking and documentation. New gardens emerge each growing season as communities claim vacant land. Some evolve in form or function over time, while others go dormant during difficult years but may revive with new leadership. Keeping garden information updated is challenging, and without recurrent documentation, this dynamism becomes invisible. Gardens can exist for decades serving hundreds of families, and yet leave no official trace when threatened with development (Drake & Lawson, 2014). The flexible structure of gardens enables them to evolve in response to changing community needs, thereby enabling adaptation, experimentation, and local control (Kremer & Hamstead, 2015). This same quality makes them difficult to formally account for in conventional datasets. Nonetheless, the complexities of documentation should not be seen as a deterrent but rather as an essential step toward fuller recognition of gardens and their values for communities.

It was in response to this persistent data gap that the Philadelphia Garden Data Collaborative emerged. In 2014, academics, advocates, and representatives from garden support organizations came together, recognizing that despite Philadelphia's rich tradition of urban agriculture, no comprehensive database existed to track and protect these vital community resources. Initial partners included researchers from Haverford College and Villanova University; the Public Interest Law Center, which provides free legal representation for threatened gardens through its Garden Justice Legal Initiative (Public Interest Law Center, n.d.); the Neighborhood Gardens Trust, focused on permanent land preservation of community-managed green space (Neighborhood Gardens Trust, n.d.); the Pennsylvania Horticultural Society, with decades of garden support and gardener relationships (Pennsylvania Horticultural Society, 2022); and Soil Generation, a Black- and Brown-led land and food sovereignty collective that has helped ensure the inclusion of community voice in data governance (Soil Generation, n.d.). The collaborative set out to build a geospatial database that could systematically document garden locations, parcel ownership, and land tenure status across the city. The catalyst for collaboration came from witnessing repeated garden losses to real estate development and abandonment, and realizing that without systematic documentation, preservation efforts would remain perpetually reactive, always arriving too late to save threatened gardens. Yet from the outset, members also understood that documentation itself posed risks, a tension that would shape PGDC's approach from its earliest days.

A note on our positionality and approach: Kremer and Borowiak have been active members of the PGDC since its formation, participating in meetings, field campaigns, database development, and partnership decisions over the past decade. Scolio contributes as a graduate researcher engaged in ongoing PGDC data management and analysis. The reflections that follow draw on this sustained participation, on shared meeting records and internal documents, and on continuing dialogue with gardeners and PGDC partners. We write as engaged participants rather than external observers, and our account emphasizes the collaborative's internal reasoning and evolution.

Data as Double-Edged Sword: Risks and Protections

The decision to create comprehensive garden documentation was never straightforward. The collaborative's formation was shaped by a fundamental tension: gardens need visibility to access resources and protection, yet visibility itself can accelerate displacement. This double bind reflects what scholars of data feminism call "the paradox of exposure," where those who stand to gain most from being counted face the greatest danger from that same act of counting (D'Ignazio & Klein, 2020, p. 105). From the outset, the collaborative has had to navigate this tension carefully, weighing the benefits of visibility against its risks, and doing so in ways that earn and sustain the trust of the community growers it serves.

Currently, many of Philadelphia's community gardens exist on land the gardeners do not legally own. Some operate through handshake agreements with absentee landowners. Others simply cultivate abandoned lots, transforming blight into beauty without formal permission. PGDC estimates that nearly two-thirds (61.7%) of the land parcels on which gardens are located can be considered insecure (Borowiak & Kremer, 2025). This access to land enables communities to claim and improve neglected spaces, but it also makes gardens vulnerable to sudden displacement when property values rise or development interest emerges.

For many gardens on public land, land precarity is largely a consequence of bureaucratic neglect, where fragmented policies and inconsistent support have left these vital community spaces vulnerable to displacement. For decades, gardeners' access to public land was governed mainly by year-to-year agreements with the Philadelphia Redevelopment Authority: revocable licenses that granted temporary permission but no property right or land security (Cahn, 2015; Vitiello & Nairn, 2009). By the late 2000s, the agency had lost institutional memory of these agreements (Vitiello, 2022), and although revised city policies in 2012 allowed leases of up to five years for community gardens, the one-year revocable license remained the default and few longer leases were ever signed (Cahn, 2015).

In 2013, the creation of the Philadelphia Land Bank through legislation was heralded as a vehicle to streamline land disposition and preserve public-benefitting uses, including urban agriculture (Cahn, 2015; Public Interest Law Center, 2016). The legislation also includes provisions that enable the Land Bank to make priority bids on sheriff sale properties before they go up for public auction and to then transfer those properties to garden-preserving trustees. However, the Land Bank's performance has often fallen short: transfers to gardens have been few, application processes are opaque and slow, and since 2020 gardens have been required to accept 30-year self-amortizing mortgages linked to the appraised market value—an arrangement that places administrative and financial burden on small nonprofits (Schmidt, 2023a).

The absence of reliable data has contributed to this neglect by limiting public awareness about the true extent and significance of community gardens in Philadelphia. However, PGDC members have repeatedly heard community concerns that publicly documenting gardens could make them easier targets for speculation, a fear grounded in the experience of gardeners in fast-developing neighborhoods where developers have moved to acquire cultivated lots before the communities tending them could secure ownership (Laughlin & De Moya Correa, 2020). A thriving garden on an abandoned lot signals that a neighborhood has turned a corner, making it attractive for investment that rarely benefits existing residents (Safri et al., 2025). Especially in low-income neighborhoods of color that have endured decades of racialized disinvest-

ment, municipal betrayal, and organized abandonment, along with extractive relations from local universities, deep wells of distrust have accumulated over generations.

Recognizing these risks, PGDC developed stringent data protection protocols from its inception. This approach is informed by the concept of ethnographic refusal, as articulated by Audra Simpson (2014), which argues that not all knowledge should be made available for circulation, especially when sharing that knowledge may serve institutional or extractive interests rather than the communities it describes. Simpson frames refusal not as a withholding of knowledge, but as an assertion of sovereignty and care by refusing to reproduce harm through the mechanisms of documentation and disclosure. In that spirit, PGDC treats garden data not as neutral or public information, but as sensitive, community-generated knowledge requiring careful, relational stewardship.

A particular ethical challenge stems from how the database developed. Garden data was compiled over years from multiple sources, including partner organization lists, field surveys, and historical records. Given the informal nature of many gardens and frequent leadership transitions, obtaining retroactive consent from a representative of every garden is practically impossible. Some gardens in the database may not even know they are included. Because gardens often lack formal governance structures or continuity in leadership, there is often no clear individual or entity from whom to seek consent, making truly informed retroactive consent not just difficult, but in many cases unattainable. This creates an ongoing tension between the collective benefit of comprehensive data and individual gardens' right to control their information.

Key protective measures were implemented to enact a cautious approach. Unlike open data initiatives in other cities, PGDC maintains no publicly searchable database of garden locations. Data access is restricted to verified partners with a demonstrated commitment to garden preservation. Data governance within PGDC is structured around two tiers of memoranda of understanding. An internal MOU governs data-sharing and management among PGDC member organizations. External parties, including researchers, garden support organizations, and others, may apply for access through a separate external MOU process, which requires demonstrated alignment with garden preservation goals and includes explicit provisions against uses detrimental to gardens.

The collaborative continually navigates the balance between data protection and data utility. Excessive restriction would render the database useless for advocacy and resource allocation. Yet insufficient protection could transform a preservation tool into a displacement accelerator. This balance manifests in specific decisions about data granularity, access protocols, and sharing agreements. For instance, aggregated data at the census tract level can demonstrate garden concentrations and need without revealing specific locations. Heat maps can show development pressure without pinpointing individual gardens. These approaches enable policy advocacy while maintaining operational security for vulnerable sites. Access is tiered accordingly: aggregated and anonymized data may be shared more broadly for planning and advocacy purposes, while parcel-level location data identifying specific gardens is reserved for vetted partners with an active MOU and a demonstrated preservation mission.

Garden documentation data and supporting infrastructure transform advocacy from anecdotal appeals to evidence-based arguments. When the city proposes selling garden land, advocates can demonstrate exactly how many families depend on that space, what social and ecological benefits it provides, and how its loss would impact the neighborhood (Cahn & Segal, 2016). Data showing that 72.8% of gardens in predominantly Black neighborhoods lack secure tenure compared to 53.1% in predominantly white neighborhoods provide clear evidence of inequity that requires a policy response (Borowiak & Kremer, 2025). By illuminating these patterns, such data equip advocates to make targeted policy demands that address not only garden preservation but also the racial injustices embedded in urban land governance.

By creating comprehensive, accessible, regularly updated information about Philadelphia's gardens, the PGDC ensures these vital community spaces can no longer be ignored, forgotten, or erased without consequence. Data becomes a tool

for visibility, recognition, and ultimately, the preservation of community self-determination through urban agriculture.

From Documentation to Intervention

For the first several years after its inception in 2014, PGDC operated largely through volunteer effort, compiling data from partner organizations, conducting field surveys, and building relationships with gardeners, many of whom were justifiably wary of outsiders documenting their spaces. The collaborative's initial database of 470 gardens demonstrated both the scope of Philadelphia's urban agriculture and the threats it faced. A turning point came in 2023 with Philadelphia's development of its first Urban Agriculture Strategic Plan (Philadelphia Parks and Recreation, 2023). City officials recognized PGDC as the authoritative source for garden data, incorporating the collaborative's findings into official planning documents. As recognized in the plan, such data is crucial for assessing urban agriculture's value for the city, tracking community needs, identifying at-risk gardens, and preventing the accidental sale of garden land. For instance, PGDC's work revealed persistent patterns of garden loss, identifying more than 140 former gardens that had become inactive since 2008, with losses concentrated in low-income neighborhoods of color, many of which subsequently gentrified (Philadelphia Parks and Recreation, 2023, p. 50; Vitiello, 2022). This evidence transformed abstract concerns about displacement into concrete data that advocates could use in policy arguments. The plan's land recommendations direct the city to cross-reference PGDC's dataset against inventories of tax-delinquent property so that active gardens are not sold at sheriff sale, to support and help fund the collaborative's work, and to use PGDC data in land use planning, each with the assurance that garden data shared with the city remains internal and is used only for planning and preservation purposes (Philadelphia Parks and Recreation, 2023, pp. 54, 56).

The year 2024 marked a fundamental shift in PGDC's approach and capacity. The collaborative developed systematic data collection protocols using ESRI Survey123 and other digital tools, creating standardized forms for recording garden characteristics, boundaries, activity status, and threats. These protocols ensured consistency across multiple data collectors and established clear criteria for categorizing gardens by type, security status, and vulnerability indicators.

Building on these new tools, PGDC undertook its most comprehensive field data collection campaign to date. Over the summer of 2024, trained teams systematically visited over 700 known garden sites across Philadelphia, ground-truthing existing data and documenting new gardens. Because each garden in the database is linked to one or more tax parcels, the data can be cross-referenced against property records and tax status, making proactive threat monitoring possible. The updated database now documents 556 gardens across 1,421 parcels, which represents a level of completeness and accuracy that means the database can be fully operationalized in practice. This milestone is the result of years of painstaking work: merging disparate datasets, developing shared protocols, conducting field surveys, and building trust across a diverse network of gardeners and support organizations.

Having parcel-level data opened new possibilities for intervention. With comprehensive data, preservation efforts can shift from reactive to proactive. Most significantly, it enabled PGDC to develop a monitoring system for sheriff sales in 2024 that cross-references garden locations against properties heading to public auction, which enables immediate intervention when gardens face an acute threat of sale. The sheriff sale challenge, and PGDC's response to it, illustrates what becomes possible when comprehensive data infrastructure is in place.

The Sheriff Sale Challenge: A Case Study in Data-Driven Intervention

Philadelphia's sheriff sale system represents one of the most acute threats to community gardens, operating through multiple mechanisms that combine historical injustices, routine tax delinquency, and bureaucratic dysfunction. This crisis and PGDC's response highlights both the urgency of comprehensive garden data and their power to prevent displacement.

In brief, sheriff sales are public auctions executed by the Philadelphia Sheriff's Office in which

properties are sold to satisfy unpaid debts, most commonly delinquent property taxes or defaulted mortgages. They are distinct from the disposition of surplus public land, which follows separate processes through the Philadelphia Land Bank and the Philadelphia Housing Development Corporation (PHDC). Gardens face sheriff sale threats through several pathways. The land on which a garden sits may be sold because its owner has failed to pay property taxes over a number of years, or because the owner has defaulted on a mortgage. In some cases, gardens are located on parcels encumbered by old tax liens now held by private investors who initiate sales to recoup their claims. Regardless of the pathway, the sheriff sale process treats garden land no differently than vacant lots, prioritizing the highest bidder over community value (Philadelphia Sheriff's Office, 2021).

A particular subset of threatened properties stems from Philadelphia's disastrous 1997 tax lien sale. A tax lien is a legal claim a government places on a property when the owner owes back taxes; such liens can be pooled and used to back debt instruments (i.e., bonds) that are sold to investors and repaid as the liens are collected. Facing a school funding crisis, the city sold approximately 33,000 tax liens to private investors through a securitization deal with U.S. Bank (Hayllar, 1997; Melamed, 2021). The deal raised US$72 million in immediate revenue, but the city ultimately defaulted on over US$40 million of the bonds by 2004 (Melamed, 2021; Vargas, 2015). Rather than transferring property ownership, the original sale gave private entities long-term control over the liens, allowing them to initiate sheriff sales on tax-delinquent properties, many of which were informally stewarded community gardens or side yards. Properties encumbered by these liens became nearly impossible for communities to purchase, disproportionately impacting low-income, Black, and Latinx neighborhoods where residents had transformed vacant land without legal tenure. By 2023, approximately 2,000 properties remained affected, with U.S. Bank accelerating sales (Conde, 2023). Sustained advocacy by a grassroots network of community gardeners and allies, some of whom made use of PGDC data to identify at-risk gardens, resulted in the city purchasing US$1.1 million in liens covering 91 garden parcels in an effort to prevent displacement (Goodin-Smith, 2022; Schmidt, 2023b), which enables the Philadelphia Land Bank to exercise its power to acquire these properties at sheriff sale.

While land security has been won for some gardens, many parcels outside of the negotiated U.S. Bank lien settlement remain entrapped in the sheriff sale system, which disproportionately threatens gardens in marginalized communities. Analysis shows that 90% of properties sold since July 2019 were located in neighborhoods near or below the poverty line (Griffin, 2021). The structure of the process creates multiple barriers to community participation: minimal public notice, compressed timelines, online auctions favoring those with ready capital, and cash requirements impossible for most community groups. As a result, the city's land disposition system tends to privilege well-resourced developers while making it exceedingly difficult for communities to retain control of local land.

Recognizing that sheriff sales could erase decades of community cultivation overnight, PGDC developed an emergency monitoring protocol in 2024. Every week, members review sheriff sale listings two months in advance, systematically checking addresses against the garden database. When matches are found, PGDC members are notified and activate their networks. First, affected gardeners are identified and notified. Depending on the specific situation, gardeners are connected with resources to help them devise the next steps, whether that means legal support, alerts to city council members, or coordination with potential funding sources. The results demonstrate the power of systematic monitoring combined with organized response. Since implementation, over 20 garden parcels heading to sheriff sale have been identified, and through coordinated intervention, not a single one was sold.

The sheriff sale monitoring system exemplifies PGDC's evolution from documenting loss to preventing it. The gardens saved so far stand as proof of what is possible when data serve community preservation. Yet, with hundreds of properties still vulnerable, earlier intervention strategies are urgently needed. While celebrating these victories,

PGDC recognizes that emergency interventions cannot substitute for systemic reform. Garden preservation remains an ongoing struggle despite growing systems-level preparedness. The sheriff sale challenge teaches several critical lessons. First, comprehensive monitoring is essential: gardens face various pathways to loss, each with its own legal, historical, and relational dimensions that require different intervention strategies. Only systematic tracking can catch all threats. Second, timing matters. The compressed timeline of sheriff sales means that early warning systems are essential; by the time a sale is publicly announced, organizing effective resistance is often too late. Third, coordination saves gardens. No single organization can address the crisis alone; success requires gardeners, lawyers, politicians, and data providers working in concert. Finally, legal and technical fixes alone cannot solve political problems. As we saw in the case of the Land Bank, which has the legal tools to protect gardens but has nonetheless been stalled by bureaucratic disputes, good policy requires good execution. And that often requires the mobilization of communities and information in defense of gardens as vital community assets.

Reflections and Future Directions

Despite progress, enormous challenges remain for Philadelphia's gardening communities. With only 38.3% of gardens secure and development pressure intensifying, the race between preservation and displacement continues (Borowiak & Kremer, 2025). Analysis of garden loss patterns reveals two distinct threat profiles: gardens facing development pressure concentrated in gentrifying neighborhoods where land values are rising, and gardens vulnerable to closure due to disinvestment and capacity challenges. The latter account for roughly half of recent losses, pointing to the need for capacity-building investments alongside land preservation strategies (Fryberger, 2025). The PGDC is currently designing an interactive online data platform to give the city's urban agriculture community secure access to data that can help them advocate for their gardens. While this platform promises enhanced capacity, it cannot substitute for political will, resource allocation, and recognition of gardens as permanent community assets rather than temporary land uses.

PGDC's evolution demonstrates the need to reconceptualize both data systems and gardens themselves as essential urban infrastructure not only for their material functions, but for the alternative social relations they cultivate. Like water systems or transportation networks, comprehensive garden data enables coordinated action, efficient resource allocation, and crisis response. Gardens also operate within a solidarity economy, offering spaces of mutual aid, ecological stewardship, and collective care that contrast sharply with the extractive logics of mainstream urban development (Safri et al., 2025). These are prefigurative spaces where communities enact the kinds of reciprocal, sustainable relationships they wish to see more broadly. In this context, data become not merely a management tool but also a means of protection. Robust, ethically stewarded data systems can shield fragile commons from displacement, assert their value in policy debates, and build the evidentiary base needed to expand support. Just as cities invest in infrastructure to sustain economic growth, they must also invest in the infrastructures of care that community gardens represent.

By treating data as belonging to the documented communities, the collaborative's approach offers a model for ethical data partnerships in an era of surveillance capitalism and extractive research practices. Rather than positioning data as neutral or universally accessible resources, the PGDC recognizes data as socially situated and subject to the political realities of land insecurity, racialized dispossession, and uneven infrastructural support. Key principles emerging from PGDC's work include working to develop processes through which communities can exercise agency over access and use of their garden data, designing technical systems to support on-the-ground organizing rather than supplant it, securing multi-institutional and community-based support for long-term sustainability, and valuing incremental gains that lay groundwork for deeper, systemic change. This model challenges the dominant paradigms of open data and academic authority by foregrounding accountability to community-defined goals and by reimagining data as a tool for

collective liberation rather than commodification and state surveillance.

The PGDC's approach shares important principles with data sovereignty and data feminism scholarship. In particular, it shares the insistence that data collection serve rather than extract from the communities it describes, and that data stewardship respect those communities' agency over data that originates with them (D'Ignazio & Klein, 2020; Kukutai & Taylor, 2016; Walter et al., 2020). Yet the governance challenges facing urban community gardens are distinct from the Indigenous data sovereignty contexts in which much of this literature is grounded. Data sovereignty, as developed in that body of work, is rooted in Indigenous peoples' rights to self-determination over data pertaining to their nations, territories, and ways of life (Carroll et al., 2021). Applying this framework directly to community garden data risks overstating the parallel and importing assumptions that do not map cleanly onto this context. A fuller theoretical engagement with these connections, and the development of a framework better suited to community-controlled data in urban land governance contexts, remain important future work.

While Philadelphia's context is specific, lessons translate to other cities grappling with urban agriculture preservation. Many urban agriculture initiatives across the U.S. contend with similarly fragmented institutional landscapes, where responsibility for land management, public health, and planning is diffused across siloed agencies. Passive documentation must evolve to active intervention capacity. Data infrastructures must be designed not just to observe or record, but to intervene: to trigger alerts, inform legal action, and support policy change in real time. Community trust, built over years through transparency, reciprocity, and protection, can be destroyed in moments through careless data handling. This data enables a shift from reactive emergency response to proactive advocacy, equipping stakeholders to intervene before displacement occurs. However, realizing this potential requires reimagining the architecture of urban data systems to embed community control, care, and accountability at their core.

Conclusion

Community gardens in Philadelphia are living systems of care, stewardship, and resistance, yet they remain persistently vulnerable due to systemic neglect, fragmented policies, and inequitable access to land security. As this paper has shown, the absence of coordinated, comprehensive data has historically enabled the erasure of these spaces from planning processes and public discourse. PGDC emerged in direct response to this gap, building a careful, consent-based infrastructure to document and protect community gardens. Grounded in community partnerships and careful data governance, PGDC's approach demonstrates the power of grassroots data systems to not only document loss but also actively shape proactive preservation strategies. This effort reflects a refusal to treat gardens as disposable or incidental, instead affirming their centrality to neighborhood life and to broader movements for food justice, environmental equity, and collective self-determination.

However, this emerging infrastructure exists in an urban policy landscape still characterized by ad hoc protections and limited political accountability. While recent successes in lien parcel acquisitions and sheriff sale monitoring demonstrate growing capacity for coordinated response, the continued threat of property loss and lack of comprehensive city support reveal the limits of technical fixes without deeper structural reform. Protecting community gardens in Philadelphia requires more than improved data; it demands sustained investment in land access mechanisms, earlier intervention strategies, and planning frameworks that treat gardens not as temporary land uses, but as enduring components of equitable urban futures.

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