

**Decentralized Provision of Community-Governed Greenspace in Two Cities:
Chicago (IL) and Louisville (KY)**

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Abstract

Many cities struggle to provide marginalized neighborhoods adequate greenspace, because of post-industrial economic downturn, disinvestment, and legal, social, and political barriers, which impede public good provision. Cities like Chicago, Illinois and Louisville, Kentucky have responded by decentralizing community greenspace provision and governance to third-party organizations and the communities themselves. Chicago created NeighborSpace, a non-profit land trust, to secure small properties for community self-governance. Louisville assigned the local Cooperative Extension Service this responsibility. We examined these arrangements in terms of proposed design principles for state-reinforced self-governance, bridging the gap between principles of informal self-governance and formal decentralization and democracy in complex, highly regulated city systems. We interviewed key decision makers and stakeholders and collected essential documents (e.g., legislation, agreements) to evaluate these solutions within their social-ecological contexts. NeighborSpace exemplifies each of the design principles, efficiently providing greenspace to marginalized neighborhoods and enabling their community governance. Louisville's Extension Service lacks several principles, decreasing its effectiveness and efficiency, and preventing community governance. Effective decentralization entails government sponsorship in the form of sufficient and appropriately specified legal authority, responsibility, tangible support and self-sufficiency, and balanced mechanisms for stability and flexibility, among other essential factors for robust self-governance. The current research demonstrates how these principles were achieved in a model program, overcoming common but substantial barriers to public good provision and cooperation faced in many cities.

Keywords: decentralization, state-reinforced self-governance, design principles, greenspace

1. Introduction

Cities are major hubs of social, economic, and ecological activity, and important players in governance at multiple scales (Grimm et al., 2008). Urban greenspace has been linked with physical and mental health, neighborhood safety, community-building, and ecological knowledge (see Ward et al., 2012 for review). As cities have become more populated and expansive (United Nations, 2014), large greenspaces (e.g., parks) are no longer adequate to support human well-being or ecological function. Hence, small greenspaces like community gardens and parks have become vital for human welfare and urban resilience (Colding and Barthel, 2013). In the U.S., many cities fail to recognize the importance of small neighborhood greenspaces, or struggle to provide access to them for economic, legal, and practical reasons (Chaffin et al., 2016). This is especially true for post-industrial neighborhoods (Green et al., 2006) and marginalized groups, like racial and economic minorities. Therefore, many communities in the U.S. informally self-govern small neighborhood greenspaces on vacant lots. However, these self-governing sites are not sustainable because they lack necessary legal protections, and are viewed as temporary uses awaiting more marketable redevelopment (Cahn and Segal, 2016; Ela, 2016).

Cities have experimented with many solutions (Cahn and Segal, 2016). For example, city agencies in Chicago, Illinois and Seattle, Washington created government-sponsored non-profit land trust organizations—NeighborSpace and P-Patch Trust respectively—to steward small vacant properties, specifically for community-governed greenspace (Erickson et al., 2009; Helphand, 2015). Other cities, like Louisville, Kentucky, maintain more traditional top-down, centralized control, renting vacant properties as public greenspaces for community use (e.g., city-managed allotment gardens). Many other arrangements can exist (e.g., Colding et al., 2013). Programs like Chicago's NeighborSpace have been identified as models for other cities (ICLEI, 2001). However, the legal, institutional (rule-governed), and contextual (social-ecological, sociopolitical) dimensions of such arrangements are poorly understood. Therefore, cities struggle to design effective programs to overcome the legal, social, and economic barriers many post-industrial, marginalized neighborhoods face, regarding land tenure, debt, liability, disinvestment, and political disenfranchisement (Cahn and Segal, 2016; Ela, 2016; Green et al., 2016).

This dilemma involves a more fundamental governance issue: proper balance of powers and effective public good provision in polycentric (multi-centered) democratic societies. Scholars debate the merits of different governance systems (centralized, decentralized, self-governing) (Ostrom, 2010). Cities figure prominently in this debate, because of their importance and complexity in terms of actors, governance scales and systems, and economic dynamics (Ostrom, 2000). Conventional accounts argue that citizens have little place in public good provision and governance, because they are too self-interested and fallible: centralization and privatization are therefore required (Hardin, 1968). In reality, city systems are so complex, many solutions are possible (Foster and Iaione, 2016).

Vincent and Elinor Ostrom (1994, 2000) demonstrate that many actors contribute to provision and governance of social-ecological systems (SEs), through *polycentricity*—governance systems where diverse stakeholders collaborate within and across increasingly complex (nested, interconnected), centralized and decentralized self-governing activity centers. Ostrom (2010) identified several design principles associated with successful self-governance within typically small-scale informal communities or multi-stakeholder governance arrangements, with little government involvement. However, most SEs and dilemmas (e.g., community greenspace) exist within highly regulated systems (e.g., Foster, 2011; Cahn and Segal, 2016). Therefore, Ostrom's design principles do not adequately account for these systems, or inform government-sponsored decentralization (Foster and Iaione, 2016). Ostrom's design principles also do not address complex, polycentric democratic governance systems, like federal systems, which use their legal, administrative, and institutional powers to enable semi-autonomous self-governance and collaborative problem-solving throughout entire societies (cf. Ostrom, 1994).

The current study addresses these gaps by further developing Sarker's (2013) concept of "state-reinforced self-governance" (srSG) (i.e., government-supported self-governance) (see also, Shivakumar, 2005), in the context of community greenspace. DeCaro et al. (2017) recently proposed preliminary design principles for srSG, outlining key legal, administrative, financial, and technical supports governments may provide to facilitate self-governance in polycentric systems. We examine community greenspace provision and governance in Chicago and Louisville, using these design principles. The goal is to inform practical and scientific understanding, to improve democracy and decentralization.

We examine Chicago and Louisville for three reasons. First, these cities face similar challenges regarding greenspace in marginalized communities, but have chosen different solutions. Second, Chicago's NeighborSpace is a potential model for greenspace decentralization (ICLEI, 2001; Green et al., 2016). Third, Louisville's governance of vacant properties and greenspaces is evolving. This comparative case study provides timely insight into dynamics of srSG, comparing a well-established model program to a transitioning program.

When analyzing institutions one must understand the challenges decision makers face and goals they strive to achieve. We begin by discussing the political economy of community-greenspace provision and governance in postindustrial cities. We then describe the design principles of srSG and their hypothesized contributions to polycentric self-governance. We conclude with our scientific findings and their theoretical and practical implications, including policy recommendations.

2. Political Economy of Community Greenspace Provision and Governance

A combination of detrimental factors, including postindustrial economic downturn, racial discrimination, and fragmented, uncoordinated city management, trap many U.S. cities in a cycle of disinvestment that leaves marginalized communities without basic public goods like community greenspace. Vacant lots are central to this process (Cahn and Segal, 2016; Green et al., 2016).

2.1. Louisville's History of Discriminatory Governance and Development Practices

For example, in Louisville there are 6000-7000 vacant properties (VPPA, 2017); about 1850 (26%) are vacant lots (CACH, 2018). Most (4460, 60%) are in Louisville's West End, encompassing nine predominantly Black/African American (77%) neighborhoods (population 64,000). Median household income is \$24,000, compared to \$60,000 in the predominantly White (89%) East End (Marshall, 2017).

Before the mid-1950s, the West End was a thriving multiracial but predominantly White social and economic region (population 147,000) (Croutcher, 2013; Welch, 2013; Poe, 2017). Black residents inhabited several segregated neighborhoods with strong cultural and economic centers, like the renowned "Louisville Harlem" (Walnut Street) in downtown Louisville. Discriminatory practices initiated in the 1930s triggered political abandonment and economic disinvestment, impoverishing these areas.

In 1934, the federal government implemented the National Housing Act, triggering "redlining": Black neighborhoods received negative ("red") insurance ratings due to racial biases (Gotham, 2000). Redlining emboldened discriminatory lending and real estate practices, barring Black individuals from home loans and greatly reducing West End's economic investment. In 1937 and 1945, floods devastated the West End; 50,000 mostly White residents moved to the East End (Welch, 2013; Poe, 2017). From 1945-1960s, real estate agents practiced "block busting," circumventing desegregation laws, by conspiring to sell entire blocks of White-owned households and move them to the East End. Discriminatory "urban renewal" practices also occurred (1954 federal Housing Act; 1964 Highways Act): city governments designated Black neighborhoods "blighted" (Prichett, 2003). In 1957, Louisville razed West End's Walnut Street (Louisville Harlem) to build a highway. By 1970 the West End became a

majority (75%) Black low-income region. Louisville is the 8th most racially segregated U.S. city (Urban Institute, 2017), and lacks many basic public goods (Marshall, 2017).

2.2. Collective Challenges to Community Greenspace

These trends were replicated throughout the U.S. (Gotham, 2000; Pritchett, 2003), including Chicago (Urban Institute, 2017). Many marginalized communities and city governments are trapped in a vicious cycle, struggling to resolve interconnected legal and economic obstacles (Cahn and Segal, 2016).

First, city governments use property taxes and private investment to fund neighborhood public goods. But investment and tax funds are weak in marginalized neighborhoods because of sustained poverty and numerous vacant properties. Vacant properties accrue many liens and maintenance costs (e.g., mowing, policing). Louisville Metro spends \$7 million annually to upkeep vacant properties. Property owners owe the City \$49 million in unpaid fines: \$36 million (88%) comes from the West End (Austin, 2017:72; RKG, 2013:ES-7). Second, multiple entities control vacant lots, which are often poorly documented, and policies to purchase them typically differ across owners. Hence, cities struggle to inventory or sell them, and few citizens have knowledge or time to acquire one (Cahn and Segal, 2016; Green et al., 2016). Until recently, it could take Louisville residents several years to purchase a vacant lot for community greenspace (Austin, 2017; Interview: Owner Lots of Food). Third, when someone purchases a vacant lot, they must resolve existing debts (e.g., foreclosure), and pay property taxes and insurance. These fees are prohibitive even for government agencies (Cahn and Segal, 2016; Ela, 2016). Fourth, cities often view small community greenspace as a luxury, or suboptimal temporary use, preferring to control vacant lots until more lucrative, largescale development investments arise (see Louisville's Vacant and Abandoned Properties Revitalization Report) (RKG, 2013). This is a major reason communities create informal, self-governing greenspaces on vacant lots (Cahn and Segal, 2016).

Many potential solutions may exist (e.g., Colding et al., 2013). We are interested in innovative decentralization and multistakeholder collaboration, for their potential to empower communities and facilitate societal problem-solving. Government agencies may simplify administrative hurdles, prioritize community greenspace, and remove legal barriers (Erickson et al., 2009; Chaffin et al., 2016; Green et al., 2016). Non-government organizations may coordinate stakeholders, share information, and provide technical and in-kind support, reducing transaction costs and encouraging cooperation. And communities may govern important aspects of greenspace (Colding et al., 2013; Helphand, 2015). However, such solutions require proper legal and institutional supports to succeed.

3. Design Principles for State-Reinforced Self-Governance

Governments can use their administrative, legislative, financial, regulatory, and other capacities to enable polycentric self-governance and cooperation (Ostrom, 1994; Shivakumar, 2005). Sarker (2013) describes a case of srSG in Japan, where a federal 1940 Land Improvement Law enables farmers to govern irrigation districts (Land Improvement Districts) in increasingly complex local, state, and national level self-governing arrangements (e.g., farmer districts, council of representatives) in partnership with local, state, and national government. However, governments also impede self-governance and cooperation (Ostrom et al., 1993; Shivakumar, 2005; Ribot et al. Kemper et al., 2007).

Design principles help diagnose these situations by identifying features of governance that fundamentally shape decision makers' incentives (Ostrom et al., 1993:166-167). Ostrom (2010) introduced several design principles for informal self-governance: communication and shared decision-making; accountability (e.g., self-monitoring, enforcement); equitable costs/benefits; social-ecological fit; and well-defined biophysical and jurisdictional boundaries. These principles facilitate self-governance and cooperation by discouraging opportunism, promoting fairness, reducing transaction costs, and

simplifying the social-ecological dilemma to a more manageable scale. Stakeholders may implement design principles differently in different SESs (Ostrom, 2007). Nevertheless, these principles facilitate self-governance by creating a sense of legitimacy, accountability, and security, which can promote trust, acceptance, and collective problem-solving (DeCaro, 2018).

Design principles for srSG should additionally identify factors that create sufficient legal capacity and protections for stakeholders to officially self-organize within highly regulated, polycentric systems. DeCaro et al. (2017) proposed four srSG design principles (Table 1), based on cities (e.g., Wheeler, 2000) and adaptive water governance (Sarker, 2013; Cosens et al., 2018). These design principles instill certain powers, obligations, and resources under law, enabling key stakeholders to innovate, make decisions, and otherwise self-govern in a regulated polycentric system.

Table 1
Design Principles for State-Reinforced Self-Governance

Legal Authority	Authority to make decisions and implement chosen solutions is institutionalized in binding and enforceable legislation or legal documents (e.g., contract, agreement). Authority is relevant, appropriate, and adequate.
Legal Responsibility	Responsibility to contribute to resolution of a social-ecological dilemma is formally defined and assigned to the actor in a legally-binding fashion (e.g., legislation, agreement).
Tangible Support & Self-Sufficiency	Government entities provide sufficient funds, facilities, technology, information, training, and other important resources. The actor has independent sources of financial support (fiscal autonomy) and other resources to be self-sufficient and self-directed.
Balanced Flexibility & Stability	Relevant policies (e.g., agreements, rules) provide appropriate flexibility to permit adaptive decision-making (e.g., policy changes), and stability to encourage long-term commitment.

Legal Authority refers to legislation (e.g., Japan's 1949 Land Improvement law), programs, and agreements that grant decision authority, permitting an actor to manage an important part of a social-ecological dilemma. *Legal Responsibility* refers to legally binding (enforceable) assignment of responsibility for some role or important contribution. *Tangible Support* refers to provision of essential financial, technical, informational, and other (e.g., in-kind) support, required for the responsibility. For example, Sarker (2013) observed that government agencies share important information with district leaders and subsidize farmer-led projects that benefit the public. *Self-Sufficiency* refers to additional sources of tangible support that provide financial and technical autonomy, so that the actor maintains fiscal (decision-making) independence from government sponsors (cf. Kemper et al., 2007). For example, Japan's land improvement districts (LIDs) collect water user fees to fund themselves. LIDs also pool their funds to finance an Administrative Bureau, which provides technical support (Sarker, 2013). *Balanced Flexibility and Stability* refers to net effects of legal sunsets, fixed rules, decision principles and standards, and other sources of institutional flexibility or rigidity, which influence an actor's ability to simultaneously pursue long-term goals and change rules, procedures, or agreements, in order to address system dynamics. For example, farmers maintain long-term irrigation rights in Japan's LIDs, but routinely revise their water management plans to address variability (Sarker, 2013).

These design principles are configural. First, deficiencies in one principle may weaken another, reducing capacity for self-governance. For example, legal responsibility without proper authority, or sufficient resources (e.g., financial, informational), can be debilitating, and is a commonly cited reason for failed decentralization (Ostrom et al., 1994; Ribot et al., 2006). Actors may also neglect delegated authority if action is costly and actors are not held responsible. Deficient responsibility is a commonly

cited reason for government inaction generally (e.g., Wheeler, 2000) and regarding greenspace provision (e.g., Ela, 2016). Authority, responsibility, and tangible support can fuel maladaptive rigidity traps, if provisions for stability outweigh flexibility (e.g., fixed water allocations without provisions for revision) (e.g., Craig et al., 2017). Second, design principles may be derived directly and indirectly from multiple formal and informal laws, policies, and norms that span sectors and scales. Japan's LIDs derive authority from a federal law, contextualized by additional policies at state and local levels. LIDs also have internal rules (e.g., bylaws). All these policies intersect other sectors (e.g., agriculture) (Sarker, 2013). Third, design principles are context dependent: appropriate and effective authority, for instance, depends on the actor(s), their goals, and social-ecological context (e.g., Colding et al., 2013). The design principles must be appropriately combined, matched to context, and balanced. Fourth, the design principles complement Ostrom's (2010) design principles for self-governance. Mechanisms for informal self-governance (e.g., shared decision-making) facilitate problem-solving and sustained cooperation. However, informal systems lack legal protections, increasing their vulnerability to outside interference and dissolution, as observed for informal self-governing community greenspaces (Cahn & Segal, 2016). Finally, other factors may also influence srSG. For example, governments must be willing to transfer their authority; stakeholders must be prepared to self-govern; and economic, political, and other characteristics of the government, actors, and dilemma must be favorable (Kemper et al., 2007).

4. Current Study

We compared two government-sponsored organizations—NeighborSpace (Chicago), Jefferson County Cooperative Extension Service (JCCES) (Louisville)—given the responsibility to provide community-governed greenspace.

5. Material and Methods

5.1. Cases

5.1.1. NeighborSpace (Chicago, Illinois)

Chicago is the third largest U.S. city (population 2.7 million) (US Census Bureau 2017). There are 30,000-40,000 vacant properties and lots in Chicago; about 13,000 (33-43%) are owned by Chicago's Department of Planning and Development (DPD) (City Owned Land Inventory 2018). NeighborSpace was created in 1996 by a 20-year interdepartmental agreement (city ordinance) involving the City of Chicago, Chicago Park District, and Forest Preserve District of Cook County, after being recommended by the DPD (NeighborSpace Agreement, 1996/1998):

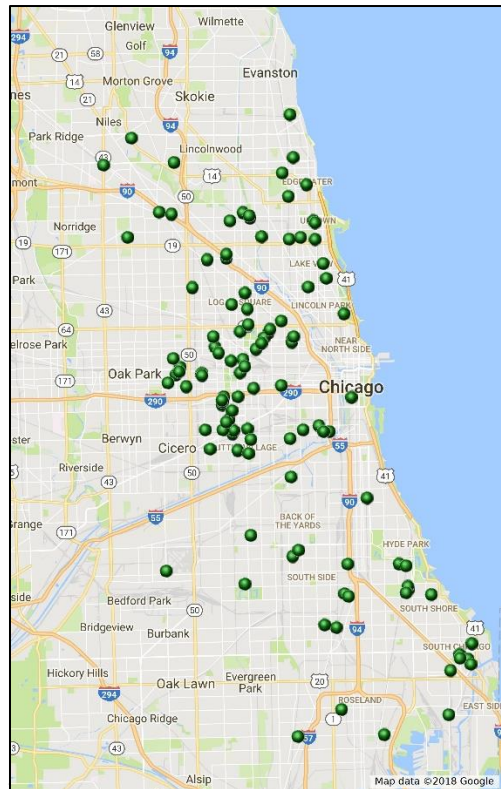
The Department of Planning and Development ("Department") has recommended the formation of a not-for-profit corporation to be known as NeighborSpace" to own, lease, manage, or hold easements to typically small, open spaces in the City for development and maintenance by neighborhood community and business groups since such open space projects can be more efficiently managed by local groups than by governmental agencies (18970).

NeighborSpace is a 501(c)(3) nonprofit organization and land trust (NPLO). Hence, its lands are set aside for public use in perpetuity. There are approximately 114 NeighborSpace greenspaces (Figure 1) (NeighborSpace Gardens list: <http://neighbor-space.org/gardens/>).

NeighborSpace's creation was triggered by lawsuits (e.g., *Alexander v. Chicago Park District*: 548 F., Supp. 277, N.D., Ill. 1982), which alleged Chicago discriminated against Black neighborhoods by failing to provide recreational areas and greenspaces, violating the federal 1974 Housing and Community

Development Act (see New York Times, 1982). Afterward, the city entered a consent decree with the US Department of Justice in 1983 to correct the problem. The DPD conducted a multi-year study, resulting in the 1998 CitySpace Plan, a comprehensive openspace plan, which acknowledges community greenspace as a vital public good and integrates greenspace and vacant lot management. NeighborSpace was originally a pilot project (City of Chicago et al., 1998:44).

Figure 1
NeighborSpace Greenspaces (Chicago, Illinois)



Source: <http://neighbor-space.org/gardens/>

5.1.2. Jefferson County Cooperative Extension Service (Louisville, Kentucky)

Louisville's population is 620,000, ranking 27th among large U.S. cities (US Census Bureau 2017). As previously noted, most of Louisville's 6000-7000 vacant properties and lots (CACH, 2018) (60%) are located in the West End (Marshall, 2017).

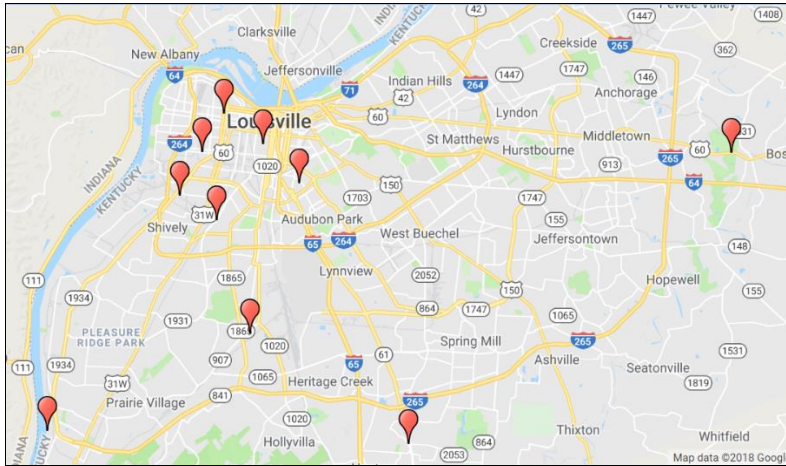
The U.S. Cooperative Extension Service is a federally sponsored university research and outreach program, which gives "land-grant universities" (1862/1890 Morrill Act) land, responsibility, and financial support to share best agriculture and economic practices with farmers and the general public (USDA NIFA 2018). The University of Kentucky—which is 80 miles from Louisville—oversees multiple extension services, including the Jefferson County Cooperative Extension Service (JCCES) in Louisville (UK, 2018).

In 2003, the City of Louisville merged with neighboring cities in Jefferson County, creating Louisville Metro region. Several community greenspaces were managed by non-profit organizations and informal groups. However, these arrangements were unsustainable. Louisville Metro Government asked JCCES to manage these sites, through a verbal agreement associated with an official Memorandum of Agreement (MOA) (e.g., MOA, 2017) authorizing JCCES to operate in Louisville (Interview: JCCES County

Coordinator). JCCES currently manages 10 greenspaces (Figure 2) (Community Gardens list: <https://jefferson.ca.uky.edu/content/community-gardens>). All are allotment gardens: community members pay a small annual fee to rent a garden plot.

Figure 2

Map: JCCES Greenspaces (Louisville, Kentucky)



Source: Created by author, using *Google Maps*.

5.2. Data Collection

We interviewed key stakeholders within each case system, and collected important documents: legislation, agreements, bylaws; government/non-government databases, plans, programs, reports; news articles, webpages; existing case studies, scholarly works. We triangulated these sources to develop a comprehensive understanding of each case (Bennett, 2004).

5.2.1. Interviews and Participants

We interviewed six stakeholders in Louisville: (1) the Senior Policy Advisor and (2) Brownfields Program Director at Louisville Metro Government's primary planning office, Louisville Forward; these individuals are familiar with city greenspace policies and projects; (3) JCCES's County Coordinator; (4) the owner of Lots of Food, the first person to officially convert a vacant lot into an urban farm; this individual navigated Louisville's vacant lot bureaucracy, triggering policy changes; (5) the President of Louisville's Community Farm Alliance and Program Director for Common Earth Gardens, a religious organization involved in two of JCCES's greenspaces; (6) the Executive Director of Louisville Grows, a volunteer service organization previously involved in community gardens. In Chicago, we interviewed NeighborSpace's Executive Director. The Director has served that capacity for 10 years. We did not interview other individuals in Chicago, because there are many studies providing background information about NeighborSpace (e.g., Ela, 2016; Helphand, 2015; ICLEI 2001); NeighborSpace and Chicago maintain excellent policy documentation (e.g., Chicago et al., 1998).

We recruited potential participants by email and phone. Each interview took 1.5-2 hours and was audio recorded with permission. Participants in Louisville were interviewed in-person by a trained Masters student. The NeighborSpace interview was conducted by phone. The interviewer first administered informed consent, then read a brief project description. We conducted semi-structured interviews: questions targeted the origin, history, goals, and greenspace activities of each organization.

Subsequent questions targeted srsG design principles (DeCaro et al., 2017) and self-governance (Ostrom, 2010) (see Supplement Section A for interview questions). The Lead PI's research assistants transcribed the interviews verbatim, and checked their accuracy.

6. Results

6.1. NeighborSpace

6.1.1. Legal Design Principles

Authority. NeighborSpace derives authority to own, lease, and hold easements to small city lands for community-governed greenspace from the 1996/1998 Intergovernmental Agreement (ordinance) that created NeighborSpace. Chicago is authorized to enter this agreement, and decentralize small greenspace provision to NeighborSpace, by the Home Rule clause (Article 7: Section 6) of the Illinois State Constitution, which grants Chicago jurisdiction over its internal affairs.

In Illinois, 501(c)(3) nonprofit organizations are self-governing and exempt from property taxes and may solicit tax-deductible donations (POI-37, Illinois Department of Revenue). These powers are established by the federal government (US Code Title 26 §501(c)3) and recognized locally by the 1986 Illinois General Not for Profit Corporation Act (IL Admin. Code tit. 86 §130.120). Chicago also permits NeighborSpace to use various land transfer programs, like its former 1996-2005 Tax Reactivation Program, which quickly forecloses existing vacant lots, removing existing liens and returning the land back to market at substantially reduced cost. These programs and exemptions make land purchases feasible for NeighborSpace. Furthermore, as a land trust, NeighborSpace keeps its lands in perpetuity, protecting them from development pressure and supporting long-term stewardship.

Finally, the 1996/1998 Agreement, and NeighborSpaces's Bylaws (Article 5: Section 1), further protect NeighborSpace's independence, forbidding government officials from unilaterally interfering with NeighborSpace's internal decisions. Operational decisions are made by NeighborSpace's Executive Director. Major governance decisions include the Board of Directors, which consists of at least seven government officials from the partner agencies and four non-government individuals.

Responsibility. NeighborSpace's duty to provide greenspaces for community governance comes from the 1996/1998 Agreement, and is codified in NeighborSpaces's bylaws:

...all NeighborSpace sites are to be maintained and managed by a local block club, organization, business, or other group (Article 1:Section 1).

NeighborSpace uses a rigorous application process to ensure community governance. Three community leaders, ten community members (users), and one community sponsor (e.g., church, NPO) create a long-term management plan for approval by NeighborSpace (Interview: Executive Director) (also, [Becoming a NeighborSpace Garden: FAQ](#)). This Community Partnership Agreement is updated annually.

NeighborSpace insists that self-governance is more important than the property itself:

Interviewer: What's a good land for a community garden space?

Director: I mean, the most important thing is that there's actually a community, you know? We get a lot of applications where there's really not a lot of community support. And, you know, those things are doomed. They focus on the thing itself rather than the kind of governance of it.

In exchange for the greenspace's effective community stewardship, NeighborSpace also pays for the property's liability insurance, water, and water infrastructure (e.g., meters, outlets).

Tangible Support and Self-Sufficiency. NeighborSpace does not collect fees from community members. However, the 1996/1998 Agreement provides NeighborSpace \$300,000 annually (\$100,000 from each government sponsor) for essential operations. NeighborSpace also receives charitable donations (e.g., money, land, equipment) and competitive grants from various city, state, and federal government programs. In addition, NeighborSpace receives funds from vacant property development programs (e.g., 1998-2005 Tax Reactivation Program) and "openspace impact fees" collected from developers for openspace provision. City agencies offer NeighborSpace reduced water and installation fees, and discounted office space. City agencies also communicate with NeighborSpace to share administrative information and coordinate land transfers. Finally, NeighborSpace receives in-kind donations (e.g., pro bono legal assistance, garden equipment) from other sources.

NeighborSpace's typical annual budget is \$500,000-\$700,000. Hence, 40-55% is non-government funding, diversifying NeighborSpace's funding portfolio and ensuring its self-sufficiency.

Balanced Flexibility and Stability. Community greenspace requires long-term protection to enable community commitment and capacity (time) to self-organize (Colding et al., 2013). However, city resources sometimes need to be reallocated (Foster, 2011). Multiple factors influence this balance. We highlight three factors: duration of NeighborSpaces's 1996/1998 Agreement (a legal sunset), NeighborSpace's NPLO status (affecting land tenure), and each actor's independence.

First, the 1996/1998 Agreement lasts 20 years. Thus, NeighborSpace has time to organize itself and develop strong city and community partnerships. Community members also have sufficient time to commit themselves to greenspace governance. There are numerous new and ongoing city-sponsored projects, so the agreement will likely be renewed another 20 years (Executive Director). Second, because NeighborSpace is a land trust, its greenspaces are protected in perpetuity, enabling NeighborSpace to transfer stable governance rights to community stakeholders. If a greenspace must be used for a different purpose, NeighborSpace's rights are protected. For example, a greenspace contested by the University of Chicago was relocated nearby (Ela, 2016:263-265). NeighborSpace also uses prudent judgment when considering new greenspaces, encouraging individuals to join existing greenspaces nearby rather than start redundant new ones (Executive Director). Third, NeighborSpace insists community members make decisions themselves to enable trial-and-error learning:

...you [the City, NeighborSpace] gotta have the restraint to not tell people what to do....the duty of the community gardens is that people have the freedom to create what they want and to experiment and re-create it.... (Executive Director)

Thus, with these provisions, NeighborSpace, city agencies, and communities can commit to greenspace provision, while maintaining sufficient flexibility to accommodate change.

6.1.2. Indirect Governmental Supports

In addition to legal liability (e.g., insurance), land tenure, and fiscal sustainability, some challenging barriers to community-governed greenspace are unfavorable city zoning, public hygiene, and water policies (Cahn and Segal, 2016). Chicago created policies to help NeighborSpace and its communities overcome these barriers. Chicago created a public inventory of city-controlled vacant lots, improved agency coordination, and simplified policies for vacant property transfer (Chicago et al., 1998; Ela, 2016). In 2011, Chicago designated community greenspace a legitimate zoning land use (Chicago

Municipal Code (CMC):17-17-0103-F1). In 2014, Chicago introduced programs to encourage community stewardship of vacant lots: the Large Lot (CMC:2-157) and Adjacent Neighbors Land Acquisition Programs (CMC:2-159) allow neighborhood residents to purchase large vacant lots and vacant lots adjacent to one's property for significantly discounted prices. A 2015 ordinance (CMC:11-12-290) grants greenspaces temporary permits to use water hydrants; another (CMC:7-28-715) permits composting of materials obtained offsite. Chicago also incorporates community greenspace in its numerous sustainability plans (e.g., 2013 Recipe for Healthy Places).

Finally, the Illinois Constitution (Article 11: Sections 1-2) contains an "environmental bill of rights" acknowledging each person's right and responsibility to a clean environment. Illinois also has state sustainability policies, requiring and enabling city agencies to use sustainable materials and practices (e.g., 2007 Green Governments Illinois Act). These state-level commitments create favorable norms for a government-sponsored program like NeighborSpace.

6.1.3. Ostrom's (2010) Design Principles

We did not examine whether communities used Ostrom's design principles to govern their greenspaces (see Ela 2016). Instead, we examined the NeighborSpace partnership.

First, geospatial and sociopolitical boundaries (roles, responsibilities, jurisdictions) are well-defined and known. The 1996/1998 Agreement clearly defines each partner's roles and responsibilities. Furthermore, NeighborSpace greenspace sites are publicly registered and mapped, with clear property ownership and physical boundaries. NeighborSpace's bylaws define its roles and responsibilities regarding the communities it serves, and the Community Partnership Agreement defines community members' roles and responsibilities (i.e., community sponsor, leadership team, and users) (see *NeighborSpace: Roles and Responsibilities* <http://neighbor-space.org/get-involved/documents/roles-and-responsibilities/>).

Second, NeighborSpace communicates routinely with the city partners, sharing relevant information and collaborating on important decisions (Executive Director). NeighborSpace communicates with its community stewards, and encourages shared decision-making by each greenspace leadership team and community (Executive Director; Ela, 2016).

Third, several arrangements support effective monitoring, enforcement, and conflict resolution. Per the 1996/1998 Agreement, NeighborSpace's Board of Directors consists of several non-government public stakeholders and officials from relevant government agencies, ensuring multidirectional accountability and transparency. Furthermore, NeighborSpace reports to relevant agencies annually (Executive Director), and community greenspace leaders report to NeighborSpace. Though rare among partners, potential disputes are settled through dialogue. NeighborSpace likewise insists community stakeholders handle conflicts internally (Executive Director), and even provides a Conflict Resolution Plan (<http://neighbor-space.org/get-involved/documents/conflict-resolution-plan/>). All actors must comply with federal, state, and local laws. They may use courts to settle disputes that cannot be addressed internally. However, we are unaware of any such disputes.

Fourth, the partners are mindful to reduce transaction costs of collaboration, and ensure equitable costs and benefits for their mutual benefit. Several passages of the 1996/1998 Agreement acknowledge the importance of removing the financial, legal, and other barriers community members face regarding greenspace provision. These passages also discuss challenges city agencies face and the role each party can play in mitigating them.

Thus, many of Ostrom's design principles for self-governance are robustly present, facilitating trust and cooperation, as mentioned by NeighborSpace:

Well, they [community members] may be able to get land, but they may not be able to get insurance, and they may not have the trust of the government.if anything the biggest thing we [NeighborSpace] have is trust. So the government knows who we are, and they know if we are taking in a property that it's going to be taken care of, and if it's not, then they can hold us accountable.The cost of preserving NeighborSpace is a fraction of the cost of having a new park. (Executive Director)

These benefits of the partnership are also echoed by public officials in a promotional video on NeighborSpace's homepage (<http://neighbor-space.org/>).

6.1.4. Synthesis

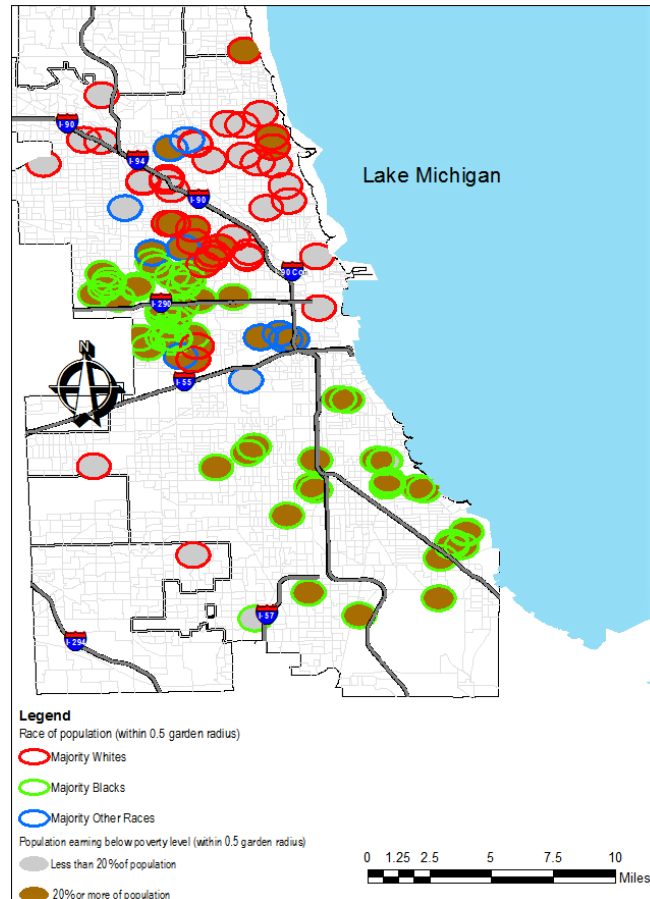
NeighborSpace exemplifies the proposed srSG design principles: it has sufficient and appropriate authority, responsibility, tangible support/self-sufficiency, and flexibility/stability to fulfill its mission and function as a semi-autonomous, self-governing entity. The partnership also incorporates many of Ostrom's design principles for self-governance, facilitating cooperation and providing a cost-effective, mutually beneficial solution for provision and community governance of city greenspace. All 114 NeighborSpace greenspaces are self-governed, and many are in marginalized communities.

Before Chicago's 1998 CitySpace Plan, 61% of its population had inadequate access to greenspaces and recreational areas, especially marginalized Black neighborhoods (Chicago et al., 1998:21). Now, 98% of the population is within a 10-minute walk (0.5 miles) from such an amenity (TFPL, 2018). This improvement cannot be attributed solely to NeighborSpace. However, NeighborSpace is an integral part of Chicago's overall solution to greenspace provision.

To investigate whether NeighborSpace greenspaces serve marginalized Black communities, we used 2010 (5-year) demographic estimates from the U.S. Census's American Community Survey database to determine percentage of Black, White, and other individuals, of low versus high income status, within a 0.5 radius of each greenspace (see Supplement Section B for detailed methods). Most greenspaces (51%, $n=58$) serve majority Black low-income communities (2%, $n=2$ high-income); 12% ($n=14$) serve majority White low-income communities (25%, $n=19$ high-income); and 7% ($n=8$) serve majority low-income Hispanic communities (3%, $n=3$ high-income) (Figure 3). In total, 70% serve low-income Black, White, or Hispanic communities.

Figure 3

Map: Race and Poverty within 0.5 mile radius of NeighborSpace Greenspaces (Chicago, Illinois)



6.2. Jefferson County Cooperation Extension Service (JCCES)

6.2.1. Legal Design Principles

Authority. JCCES derives authority for its primary mission—research-based agricultural public education and outreach—from the federal 1914 Smith-Lever Act, and its Kentucky Statutes (1916/1942 District Cooperative Extension Service Law: KRS 164.110, 164.605-164.675). Authority to operate in Jefferson County/Louisville is granted annually via formal agreement (e.g., MOA 2017). Louisville Metro can enter such agreements via home rule doctrine (KRS 82.082 1980; KY ST CH 2§ 156a-b 1994). JCCES gained authority to manage city-controlled community (allotment) gardens by informal verbal agreement in 2003 (Interview: JCCES County Coordinator, Louisville Metro Senior Policy Advisor).

Every garden is governed by JCCES and operated by hired garden managers or volunteers. The primary manager is JCCES's Horticulture Agent, who oversees all 10 community greenspaces. According to the Horticulture Agent, some communities (six) could potentially self-govern. However, JCCES prefers not to transfer such authority:

...there are gardeners that like to manage themselves sometimes, so, you know, there's always a few you have to kind of rein in a little bit.... (JCCES County Coordinator)

Critically, Louisville Metro officials believe the greenspaces are community governed (Metro Senior Policy Advisor, Community Engagement Strategist). JCCES tried to enable community governance, per the City's verbal agreement. However, JCCES was unsuccessful, citing concerns about liability, lack of confidence in communities and community interest, and insufficient knowledge and resources to facilitate self-governance (JCCES County Coordinator). The 1914 Smith-Lever Act (§5) prohibits JCCES to own or rent land for this purpose, so the owners maintain authority over the properties, making community governance more difficult.

Decisions are hierarchical within Kentucky's Extension Service (UK 2018). JCCES makes operational decisions independently. However, significant financial, administrative, and governance decisions regarding community greenspaces must be reviewed by an advisory board and County Extension Council, comprised of county community members and stakeholders. And, a District Board has final say in any decision (JCCES County Coordinator).

Responsibility. JCCES's primary responsibility is to provide public education and outreach (1914 Smith-Lever Act) for youth development, agriculture/environmental stewardship, community and economic development, and family/consumer science (<https://jefferson.ca.uky.edu/>). JCCES's responsibility for community greenspace comes from verbal agreement with Louisville Metro. JCCES enters a lease agreement with each property owner, making JCCES liable for maintenance (e.g., cleanliness, appearance), safety, and regulatory compliance (e.g., city ordinances).

Community members pay fees (\$10-20 per plot) and enter a 1-year user agreement with JCCES. JCCES provides basic equipment, technical and informational support. Most gardens (eight) receive free water from the City. Two do not, because they are technically on private land. JCCES enforces compliance with state and local laws. Failure to use and maintain the plot, or obey state/local regulations, can result in loss of user gardening rights (JCCES County Coordinator).

Tangible Support and Self-Sufficiency. The 1914 Smith-Lever Act and corresponding Kentucky Statutes (KRS 164.110, 164.605-164.675) outline governmental funding for the University of Kentucky's extension service programs: 45% state, 37% federal, 18% county. These funds primarily cover university research, operations, equipment, and staff salaries/benefits (UK 2018). JCCES receives about \$335,000 from Louisville Metro: \$221,379 (66%) for agent and staff salaries; \$152,923 (34%) for program services and equipment (2017 MOA), \$50,000 (33%) of which is for greenspace management (JCCES County Coordinator). Garden user fees provide about \$9,000 annually. JCCES also benefits indirectly from partnerships with government and non-government organizations, which receive governmental and foundation grants for specific greenspace projects. For example, Louisville Metro's flagship community greenspace, Parkland Community Garden, was funded via such a collaboration (Louisville Metro Senior Policy Advisor, JCCES County Coordinator) (see also, DEGI, 2013).

However, JCCES rarely receives State funding for greenspace projects, because State programs prioritize large-scale rural agriculture. JCCES operated at a \$10,000 deficit in 2017-2018. Thus, JCCES has little independent funding and struggles to maintain financial self-sufficiency.

Balanced Flexibility and Stability. Louisville Metro regards community greenspaces on vacant lots and city-controlled properties as temporary, suboptimal uses, unless purchased by stakeholders (Interview: Louisville Metro Senior Policy Advisor, JCCES County Coordinator). Thus, most JCCES community greenspaces operate on an annual lease agreement, and all remain open to redevelopment—even those maintained for longer periods. For example, in discussing Parkland Community Garden, Louisville Metro's Community Engagement Strategist said:

Um, there was a grocery across the street, which closed long ago that Louisville Metro has recently purchased.... So you know, ten years from now, that might be better served as part of that commercial district. ...We could terminate that lease if we had somebody who says, "Look, I'm gonna build a grocery store on this lot if you'll sell it to me." In that case, we would end the lease and, you know, try to help them find another location for that garden.

Through dialogue with JCCES's Horticulture Agent, we discovered that some greenspace sites lack documentation of ownership. Furthermore, JCCES's greenspace management agreement with Louisville Metro is informal and renewed annually, making these arrangements tenuous. Thus, community greenspace stewardship is imbalanced towards flexibility, with less stability.

6.2.2. Indirect Governmental Supports

Like Chicago, Louisville Metro introduced policies to streamline vacant property ownership and support community greenspace (primarily gardens). In 2017 the Vacant and Public Property Administration introduced the "Adjacent Side Yard" and "Cut It, Keep It" programs: current property owners may purchase an adjacent vacant lot for \$1 or one on their block for \$500, if they agree to maintain it and pay property taxes for three years (VPPA, 2018). In response to demand (e.g., Interview: Owner Lots of Food), the City improved coordination among its property-owning agencies, simplified policies and procedures, posted public inventories of city-controlled lots, and introduced favorable zoning regulations for urban agriculture (Land Use Code 4.3.17/4.3.18) (Metro Senior Policy Advisor).

However, unlike Chicago, Louisville focuses primarily on large-scale parks (e.g., Sustain Louisville 2013), lacking a comprehensive plan for small community greenspace. Kentucky's Constitution lacks an environmental bill of rights, and state "sustainability" plans focus exclusively on basic resource conservation. Hence, City and State norms do not promote neighborhood greenspace.

6.1.3. Ostrom's (2010) Design Principles

We examined the partnership among JCCES, the City, and communities in terms of Ostrom's design principles (see Montgomery, 2016 for an analysis of garden governance).

First, geospatial and sociopolitical boundaries are generally well-defined, with a few important discrepancies. JCCES's greenspaces are registered and mapped, with clear physical boundaries. JCCES was clearly assigned to manage the City's community greenspaces, albeit verbally. JCCES's role as an extension service is well-defined in organizational documents and legislation, and JCCES's agreement with community gardeners clarifies their role. However, some properties lack official owner documentation. There is also confusion about waivers for water fees, because two sites do not receive waivers (JCCES County Coordinator, Program Director Common Earth Gardens). Furthermore, the City mistakenly believes that JCCES's greenspaces are self-governing.

Second, JCCES and the City communicate infrequently, on a case-by-case basis, when their agreement is renewed, a new project appears, or a garden violates municipal code. JCCES and the City do not share decision-making. JCCES routinely communicates with garden members via JCCES's Horticulture Agent. However, garden members cannot make governance decisions.

Third, arrangements exist for monitoring, enforcement, and conflict resolution, but these are primarily unidirectional, top-down. By law, JCCES's District Board, State Advisory Council, and County Extension Council consist of government, university, and county representatives (citizens, major interest groups) to encourage multidirectional communication and accountability. However, supervision of JCCES is hierarchical in practice. JCCES answers to its superiors for major decisions. For example, in one situation involving the 7th Street Community Garden, gardeners violated municipal code. Neighbors

complained to city agencies and a councilperson, which then held JCCES responsible. In another situation, disagreement about greenspace governance arose between staff in JCCES; the District Director had to mediate the dispute. Finally, JCCES itself has mediated several disputes among gardeners, and when doing so must follow University of Kentucky protocol, for legal liability (JCCES County Coordinator).

Fourth, costs and benefits are inequitable among parties. JCCES bears most costs, whereas Metro Louisville and garden users receive most benefits. JCCES manages each greenspace and is liable for the properties, reducing Metro Government's obligations. Gardeners pay user fees, but are relieved of most responsibilities, other than compliance. Metro Government streamlined property acquisition, and improved information disclosure (e.g., public listings of vacant properties), reducing transaction costs for residents and JCCES. However, the Extension Service's bureaucratic decision procedures, and JCCES's centralized governance of community greenspaces, increase JCCES's transaction costs substantially. Hence, the current partnership lacks many of Ostrom's design principles.

6.1.4. Synthesis

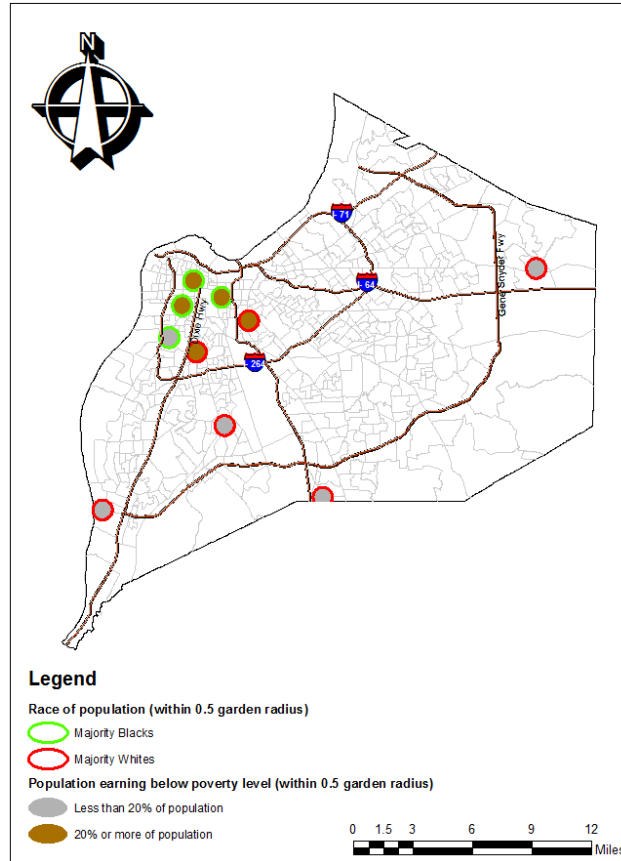
JCCES lacks important legal and institutional supports, reducing its effectiveness. JCCES is authorized to manage city-controlled community greenspaces, but lacks sufficient legal authority (e.g., ownership, decision-making) to govern them independently. Louisville Metro views these greenspaces as temporary, and JCCES cannot own/rent land for community greenspace, so the greenspaces face development pressure. These shortcomings undermine community governance and long-term commitment. JCCES's financial support is insufficient to manage 10 greenspaces, and JCCES's fiscal self-sufficiency is poor. Furthermore, because JCCES is not a non-profit land-trust organization, neither JCCES nor the City can use tax exemptions that make land tenure more feasible. JCCES's informal greenspace agreement, which must be renewed annually, further discourages long-term community governance. Finally, deficiencies in Ostrom's design principles (e.g., equitable costs/benefits, shared decision-making) impede cooperation among stakeholders.

From a decentralization standpoint, JCCES holds responsibility, but lacks sufficient authority, tangible support, or balanced stability/flexibility to fulfill its assigned role well. This constellation of srSG principles exemplifies common forms of maladaptive decentralization, as previously noted.

Louisville has many large recreational areas and parks. However, only 33% of Louisville residents are within a 10-minute walk (0.5 mile) from them (TFPL, 2018b). Most of JCCES's greenspaces (40%, $n=4$) serve majority White high-income communities (Figure 4). However, 30% ($n=3$) serve majority Black communities (10%, $n=1$ high-income), and 20% ($n=2$) serve majority White low-income communities, all in the West End. Overall, 50% serve low-income Black or White communities.

Figure 4

Map: Race and Poverty within 0.5 mile radius of JCCES Greenspaces (Louisville, Kentucky)



7. Discussion

Many cities struggle to provide public goods to marginalized communities. Many solutions are possible (e.g., Colding et al., 2013), including conventional centralized solutions and more novel decentralized, self-governing solutions (Ostrom, 2007, 2010). Decentralized, self-governing solutions can empower stakeholders, facilitate adaptation, improve accountability and efficiency, and distribute costs and benefits of public good provision more equitably—but only if implemented well.

Decentralization and democracy are poorly understood, especially in complex, highly-regulated systems like cities (Ostrom, 1994; Foster, 2011). Governance arrangements that embody Ostrom's (2010) design principles for self-governance, and provide sufficient legal authority, responsibility, tangible support, self-sufficiency, flexibility, and stability, are hypothesized to facilitate effective self-governance, public good provision, and cooperation in polycentric systems (DeCaro et al., 2017). To better understand these principles, we used Sarker's (2013) concept of srSG and DeCaro et al.'s (2017) proposed design principles to investigate decentralized, community-governed greenspace.

The current study is correlational, so causality cannot be determined. However, we can understand important factors associated with effective srSG. In Chicago, three city partners created the NPLO NeighborSpace, giving it substantial responsibility, authority, financial and technical support, self-

sufficiency, flexibility and stability to provide small properties for community greenspace. Most of these greenspaces (59%) serve marginalized Black or Hispanic communities, and all are self-governing and protected against development pressure. The stakeholders cooperate well, using Ostrom's (2010) design principles for self-governance to make decisions, hold each other accountable, share costs/benefits, and reduce transaction costs. In short, NeighborSpace is an effective part of Chicago's overall solution to greenspace disinvestment in marginalized neighborhoods.

In Louisville, an informal verbal agreement enables JCCES to provide marginalized communities increased access to small greenspaces, primarily for food. However, JCCES acquired this responsibility without sufficient legal authority, tangible support/self-sufficiency, or flexibility/stability to fulfill its mission well, or facilitate community governance. The solution lacks many of Ostrom's design principles (e.g., shared decision-making, collective monitoring/enforcement), thereby increasing transaction costs for JCCES and impeding multistakeholder cooperation. Approximately 50% of JCCES's greenspaces serve high-income White and Black communities, improving access for some marginalized Black neighborhoods (30%). However, these greenspaces are considered temporary, suboptimal uses by the City, and JCCES cannot benefit from property tax exemption or own/rent the properties, to protect them long-term like a land trust. Finally, one JCCES agent is heavily involved in daily management of all 10 greenspaces. The current solution is not sustainable considering that Louisville needs many more neighborhood greenspaces to provide adequate access (TFPL, 2018b).

Design principles reveal enabling conditions for srSG. We recommend that Louisville Metro acknowledge community greenspace as an essential public good, incorporate community greenspace in its comprehensive development plans, and consider creating a NPLO similar to Chicago's Neighborspace. Doing so would alleviate burdensome property taxes and liens, secure greenspaces long-term, and empower marginalized communities. Louisville has an energetic Community Farm Alliance active in urban agriculture, and NPOs (e.g., Louisville Grows), which could partner with city agencies and JCCES to create this solution. Our interviews with key stakeholders (e.g., Metro Senior Policy Advisor, Owner Lots of Food), and recent favorable policy developments (e.g., zoning reform, Adjacent Lots program), suggest that Louisville Metro may be receptive to this idea.

Policymakers must consider additional factors. First, if government decentralizes merely to avoid responsibility or reduce its financial burden, then decentralization may be superficial, lacking essential legal and institutional supports (Kemper et al., 2007). The government agencies in Japan's decentralized irrigation systems (Sarker, 2013) and Chicago's NeighborSpace, both acknowledged the importance of srSG and demonstrated genuine commitment to it in law and practice. Stakeholders commitment to self-governance is also essential. Second, multi-lateral mechanisms for accountability may be important to facilitate coordination and deter corruption and opportunism (Ribot et al., 2006). NeighborSpace is accountable to city partners and authorities (upward accountability), community members (downward accountability), and its Board of Directors (horizontal accountability), through multiple formal and informal mechanisms: e.g., board composition, reporting requirements, and its multistakeholder agreements (e.g., 1996/1998 Interdepartmental Agreement, Community Partnership Agreements). Third, social-ecological context matters (Ostrom, 2007). NeighborSpace was triggered by a federal lawsuit: without this, it may not have been created. Still, we do not know why Chicago decision makers chose such a progressive solution. Louisville Metro may not be motivated to innovate this way, without a lawsuit, or other crisis (e.g., Colding and Barthel 2013:162; Chaffin et al., 2016:434).

DeCaro et al.'s (2017) srSG design principles were originally developed based on water governance systems (e.g., Sarker, 2013; Cosens et al., 2018). The current study extends these principles to city greenspaces. These domains differ in terms of legal systems, geospatial and jurisdictional scale (e.g., transboundary, national, international), number and diversity of actors, and sectors (e.g., food-water-energy nexuses). Regardless of system, key actors and their partnerships require sufficient and appropriate (fitting, thoughtful, balanced) legal and institutional supports (cf. Ostrom, 1994;

Shivakumar, 2005). The ideal form of this support (e.g., authority, responsibility, flexibility/stability) must be determined within each SES and dilemma. Hence, future research should investigate other SESs and dilemmas to develop a more refined understanding of srSG.

8. Conclusion

Self-organization is a fundamental but poorly understood aspect of human behavior, and of governance and democracy itself. Failure to grasp fundamental principles of democracy and decentralization means that societies cannot reliably create or maintain such systems. We hope we have informed the scientific learning process by building on Vincent and Elinor Ostrom (1994, 2010) and Sarker's (2013) initial concepts to test potential design principles for srSG. At a minimum, stakeholders need sufficient and appropriate authority, responsibility, tangible support and self-sufficiency, and a balanced set of mechanisms for stability and flexibility, in addition to principles for sustained cooperation and self-governance, to create effective units of democracy.

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