

Weaving Community-University Research and Action Partnerships for environmental justice

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Abstract

This article is a case study of one Community-University Research and Action Partnership (CURAP) focused on soil lead, urban gardening, and environmental justice in Sacramento, California. We argue that creating and sustaining CURAPs requires a process of weaving together diverse strands of knowledge, resources, and lines

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of accountability that connect all parties involved. Like the physical process of weaving fabric, weaving CURAPs involve creative and collaborative uses and responses to tension between all elements of a partnership. This is especially true in long-term partnerships intended to address systemic environmental injustices. This case highlights the power relationships and challenges associated with such partnerships and presents several lessons to enrich the scholarship and practices of action research.

Keywords

Environmental justice, urban agriculture, community-university partnerships, soil lead, action research

Introduction

The email from Ubuntu Green's home gardening coordinator came in late Friday afternoon. It was addressed to the partners in a community-university research project on soil lead, home gardens, and environmental justice in Sacramento, California's capital city. In it, the garden coordinator announced that she was leaving Ubuntu Green, a leading community-based organization and the core community partner in the project. Henceforth, the program would be transferred to the organization's director and one remaining employee. But just a few weeks later, the director informed the team that because of funding and staff losses, Ubuntu Green would need to close its home gardening program.

For the university team this looked like the end of the project. The team depended on Ubuntu Green for access to its key research sites and participants in the form of the home gardens and gardeners. Meanwhile, residents with new home gardens risked seeing support for their efforts disappear, including the lead testing provided by university researchers. In short, the sudden change threatened to overturn project plans, disrupting the valuable environmental and scholarly work jointly carried out by community and university partners.

In the end, however, these severe predictions were not borne out. Thanks to a newly configured research design and the cooperation of new community partners, the project was able to go forward.

This unexpected turnaround prompted various questions that we seek to address in this paper. How can we account for this project's capacity to bounce back after this shock? What can this experience of community-university partnership offer scholars and practitioners of action research?

The warp and weft of Community-University Research and Action Partnerships

A diverse, emerging field of scholarship on Community-University Research and Action Partnerships (CURAPs) has helped transform traditional approaches

that assume a one-way diffusion of university research into society at large. New scholarship instead recasts such partnerships as part of a multi-directional process of inquiry and application (Boyer, 1990, 1996; Boyte, 2014; Saltmarsh & Hartley, 2011).

These scholars focus on, and often participate in, promising new practices of knowledge co-production, including participatory action research, community-engaged scholarship, and citizen/civic science. In doing so, they seek to valorize community knowledge, build community capacity, and enhance university competence in collaboration with diverse populations (Fals Borda & Rahman, 1991; London, Tara, Ganlin, & Jenny, 2011; Minkler & Wallerstein, 2010; Reason & Bradbury, 2001). These partnerships are increasingly understood as making research more rigorous, increasing its relevance to community needs and interests, and extending its reach into new fields of action for community benefit (Balazs & Morello-Frosch, 2013).

Many accounts of community-university partnerships showcase successful instances of collaboration. However, as we emphasize below, scholars face the equally important task of addressing the inevitable challenges and tensions that arise in these partnerships and developing new approaches to resolving them. Without such critical analysis, the scholarship on CURAPs may miss crucial opportunities to enhance the field's potential to inform meaningful social change and, at worst, risk devolving into boosterism that may threaten its academic legitimacy. We argue that instead of viewing tension as solely a problem to be avoided, scholarship on CURAPs should not only acknowledge its presence but also view working creativity with tension as necessary for any partnership, and especially those intended to address systemic inequities within communities and between communities and universities.

What are some sources of this tension? One major factor is the disparity in social, economic, and political power between universities and involves organizations and residents in historically marginalized and underserved communities (Benneworth, 2013; London et al., 2011; Nelson, Prilleltensky, & MacGillivray, 2001; Reardon, 1998). Some residents and organizations in these communities point to a legacy of negative experiences with university-based research. Such research, when measured against communities' own needs and values, can seem irrelevant, burdensome, extractive, and even exploitative (Stoecker, 1999). Community organizations and universities may "speak past" each other, using language unintelligible or even offensive to the other (Baum, 2000; Prins, 2005). They may have very different incentive structures, and approach research with very different goals (Nyden, 2003). Community organizations and universities also often work according to very different time structures: community action may require great speed (e.g., leaders may need information for an upcoming public hearing), while university research tends to be slow as measured in the years between research and publication or thesis completion (Nelson et al., 2001; Nyden & Wiewel, 1992). Collaboration between university researchers and activists is also challenged by disparities in resources between salaried university faculty and grant-

dependent community organizations but also by the ebbs and flows of funding and personnel in both academic and non-profit organizations (Baum, 2000; Minkler, 2005; Nelson et al., 2001; Nyden & Wiewel, 1992; Nyden, 2003; Perkins & Wandersman, 1990; Prins, 2005; Siemiatycki, 2012; Stoecker, 1999; Stoecker, 2009; Suarez-Balcazar, Harper, & Lewis, 2005).

One reaction to this seeming morass may be to avoid community-engaged research or to view a project that succumbs to these many potential pitfalls as a failure. Instead, it is useful to take seriously Low's (2008, p. 108) notion of community-university partnerships as "a process of enquiry that is reliant on dissent," together with Hall's (2009) description of the "transgressive" practices of crossing community/university boundaries.

As a way to visualize a structure for CURAPs that recognizes tension as a creative force, we offer the metaphor of *weaving*. Weaving is a metaphor rich in mythos (consider the Greek Fates who spin, cut, and weave the lives of mortals) and pathos (incorporating the processes of dreaming, memory, and identity formation) (Dransart, 2007; Judge, 2002; Wood, 1995). Some of this metaphorical power is derived from weaving's physical form and process. Dario Valcarenghi, renowned scholar of the Turkish kilim textile tradition (Valcarenghi, 1994) articulates this as such.

Weaving involves crossing two threads, the warp and the weft, one vertical and the other horizontal, one stretched taut and the other undulating and intertwined with the first. . . . [I]f the meeting of opposites does not take place, nothing is created, for each element is defined by its opposite and takes its meaning from it.

In weaving a partnership, the warp is the formal structure (systems of accountability to the project goals and between each partner) that should remain static while the weft is the dynamic process through which the partners contribute their unique knowledge, visions, and resources to the project (Figure 1). Without a taut structure, the partnership unravels. Without the undulating processes set in motion by diverse individuals and organizations as they carry out the action research (sometimes in agreement and sometimes in dissent), partnerships can be lifeless and even oppressive.

We conceive of weaving of CURAPS, not as the act of one weaver but as a *collaborative process* undertaken by diverse community and university partners. This collaborative process involves both the creation of the formal structure and its implementation and adaptation in practice over time. Indeed, as CURAPs develop, modifications in the structure may become necessary to adapt to changing circumstances such as the loss and addition of partners, newly identified needs, and even revised goals and visions. This is especially true of partnerships situated in underserved communities where political, economic, and social crises destabilize and stress the fabric of collaboration. Given this dynamism, CURAPs must develop as adaptive systems to ensure that the broader visions and goals for

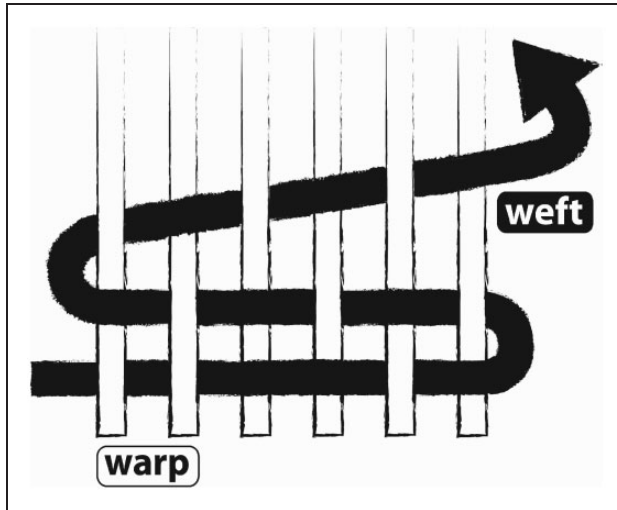


Figure 1. Warp and weft weaving pattern.

the partnership are maintained even as the specific strategies and partners may change.

To not replicate hierarchies of knowledge and to proactively pursue environmental justice, CURAPs must be based in a dynamic of co-learning that values and integrates these multiple ways of knowing and remembering (Balazs & Morello-Frosch, 2013; Corburn, 2005; London et al., 2011; Yosso, 2005). In the context of environmental justice research, CURAPs must respect the knowledge of residents about the environmental and social dynamics in their neighborhoods that can be invisible to researchers without this nuanced and long-term perspective. Approaches to CURAPs in disadvantaged communities should also address issues of structural racism, poverty, and disenfranchisement (Benneworth, 2013; Nelson et al., 2001).

Ideally, the unique knowledge of all partners in a CURAP will be woven into a strong and resilient fabric based on a mutually agreed upon design that can inform collective action for social justice. This requires a strong structure of shared goals and clear roles, responsibilities, and systems of accountability. Ultimately, though, the weavers must have the humility to know that their initial structure will only serve to guide, not determine, the final product. The dynamics of the partners and larger social contexts will inevitably shape the partnership in unforeseeable ways. Like all arts, weaving is an imperfect process that involves surprises and substitutions, which in the best of cases can yield powerful lessons and memorable designs. We now turn to a case study of one CURAP that sought to blend community and academic knowledge about urban gardening as part of an environmental justice praxis.

The art of weaving a CURAP in urban agriculture

Urban gardens can provide a local source of nutritious food and can also help to strengthen community ties. However, there are trade-offs to gardening in the city, such as potential exposure to soil pollutants, including lead from legacy sources such as paint, gas, and industry. Lead in soil is a source of human lead exposure that can adversely affect humans, especially children, if it is accidentally inhaled or ingested. Older neighborhoods, typically occupied by low-income people and people of color, are burdened with the highest soil lead levels. These are often the same neighborhoods that have limited access to fresh fruits and vegetables. The majority of residents in the Sacramento neighborhoods where this CURAP takes place are low-income people of color (African American, Latino, and Southeast Asian) who have experienced cumulative layers of environmental injustice (Benner et al., 2010; London et al., 2015). These injustices result from racialized legacies of housing segregation, the siting of hazardous land uses, and underinvestment in environmental amenities such as sources of healthy food, parks, open space, quality housing, and jobs (Benner et al., 2010; Hernandez, 2009, 2012).

University researchers who had worked with Ubuntu Green and other social and environmental justice organizations on several, previous, collaborative regional equity projects approached Ubuntu Green and several other potential partners to seek funding for a new action research project related to urban gardening in disadvantaged communities in Sacramento.¹ Ubuntu Green was founded by Charles Mason Jr., an African American man, with a staff and board primarily of people of color. It took its name from a Zulu concept meaning “humanity towards others.” The Soil Lead and Urban Gardens (SLUG) project, as it was called, would study the trade-offs between vegetable gardening in the urban environment and the potential exposure to soil lead for residents during gardening activities.² In doing so, it would support Ubuntu Green’s urban gardening program that had been in operation since 2010.

At this writing, SLUG is nearing the end of a five-year collaborative effort among university-based ecologists and social scientists, Ubuntu Green, local residents, and more recently, Yisrael Family Urban Farm (described below). Though each member of the collaboration was motivated by different and specific goals, the overarching goals of SLUG were to generate actionable knowledge about social and natural trade-offs in ecosystem services, building the organizational capacity of the non-profit partners, and ultimately, supporting resilience in underserved communities. These shared visions and goals represented the overarching “warp” or structure of SLUG.

Within this overall structure, each partner had its distinct goals and processes to achieve them (the weft). Ubuntu Green saw the project as supporting its existing program to install raised-bed gardens in residential yards in an effort to improve access to fresh healthy foods and build community cohesion and empowerment in the face of racialized environmental social and economic disparities. Residents wanted to increase access to healthy foods and engage with neighbors around

gardening and improving the overall environment of their neighborhoods. Social science researchers were interested in residents' sense of place and perceptions of gardening, soil lead, and other potential environmental hazards that could be used to inform strategies for community self-empowerment, organizing, and policy advocacy. Ecologists sought to quantify soil lead concentrations in residential yards to provide residents with data to inform the safest placement of gardens and to determine the relationship between soil lead and features of the urban environment such as buildings, roads, tree canopies, bare soil, etc. Ecologists also wanted to understand the trade-off among the ecosystem services of food provisioning and potential exposure to soil lead. More broadly, the team of university researchers, which was made up of four white faculty members, all had interests and commitments to values of social justice and intended their work to benefit the health and well-being of low-income communities and communities of color. Several of them were already engaged in active community-university action research projects in Sacramento and elsewhere and sought to address the challenges involved in working as outsiders in such communities (London et al., 2011; Pickett et al., 2008; Schwarz, Cutts, London, & Cadenasso, 2015).

Each member also played a distinct but interdependent role and contributed important knowledge and resources to the partnership. Ubuntu Green had acquired funding from foundations focused on environmental health and justice to install raised-bed gardens and used its knowledge and connections with the community to recruit residents to participate in the program.³ This funding was supplemented by contributions from the university team.⁴ Residents contacted by the garden program provided information about their neighborhood and household and indicated whether they would be interested in receiving a free lead test by the university researchers. If they were interested in a lead test, homeowners gave their consent and renters acquired the signature of the owner to grant access and permission to sample. University researchers returned to the property to conduct the lead test. Lead testing was done using an instrument that takes multiple in situ readings of the surface soil. A map was generated for each property showing all sample locations and lead concentrations. The data, map, explanatory cover letter, and materials about preventing exposure to soil lead and safe gardening practices as well as information about inexpensive ways to mitigate any soil lead hazard were delivered to the resident. Hand delivery allowed the resident to ask any questions he or she may have had about the sampling, the data, or the risk of soil lead exposure during gardening.

Ubuntu Green staff then conducted a site visit to discuss the placement of the garden, the vegetables the resident would be interested in growing, and the process of the soil lead testing. Residents and Ubuntu Green staff used the maps to make decisions about where to locate a garden in the yard and what mitigation measures could be used to minimize exposure to soil lead (primarily mulching, soil amendments, and planting cover crops) (Schwarz et al., 2016). At a later date, a subcontractor or employee of Ubuntu Green would return to build the raised bed, plant the garden, and install an automatic irrigation system. Social science researchers

created and administered resident surveys focused on the experiences of home gardening and/or lead testing, and their impact on home gardeners' perceptions of health, pride of place, and empowerment on an individual and neighborhood level. They also ran a resident video project in which participants created short videos about their experiences of gardening and lead testing (described below).

In sum, SLUG represented a vision of weaving together of the knowledge and resources contributed by each partner towards distinct but complementary goals. Multi-disciplinary research expertise from the universities was combined with the local knowledge of Ubuntu Green and area residents. The university team brought research funding and personnel to complement the garden installation and resident-engagement project funding from Ubuntu Green. All parties developed collaborative agreements for mutual accountability to fulfill their individual roles in the partnership.

Continuity and change in roles and responsibilities

This was the *ideal* vision and goal of the partnership. However, over time, the weaving process was shaped by multiple instances of fraying and even breakage in individual strands of the partners. This demanded constant and creative adaptation by all parties to keep the partnership moving forward to produce its envisioned design.

The Memorandum of Understanding for the project developed by the university team and Ubuntu Green highlighted the need for adaptability.

All parties recognize that when working with communities, flexibility is needed, and, as a consequence some of the targets included here may not be met through any fault of Ubuntu Green or the university team. But Ubuntu Green and the university team will make best efforts to achieve the goals set out here.

Over the course of the project, SLUG had to adapt to continued change in the personnel on both the university and community partner teams. On the university side, this turnover resulted from the natural cycle followed by students as they graduated, and from the needs of professional staff, some of whom left SLUG's part-time and time-delimited project positions to pursue full-time work. On the community partner side, significant employee turnover resulted from a mismatch between the organization's desire to fill multiple voids in the region's environmental justice movement and the lack of financial resources to help employees carry out and sustain this ambitious vision.

SLUG was challenged by this turnover because it had not developed adequate organizational structures to hold the diverse strands of knowledge by the partners.

Despite early efforts to do so, it was not until well into the project that SLUG developed one central repository of project materials, robust documentation of the community-engagement processes, and orderly processes for transferring project roles to new personnel. This was particularly a problem for the social science aspect

of the project, which required greater collaboration between the university team and Ubuntu Green. Most critically, as mentioned in the paper's opening vignette, four years into the five-year project, Ubuntu Green experienced a significant reduction in funding and staffing and had to end its home garden program. This posed a great challenge to the partnership and required several major changes to the project.

First, SLUG increased its soil lead sampling in public parks and community gardens, independently of Ubuntu Green's home garden program. Second, the team recruited gardeners for lead testing throughout the city with the help of neighborhood associations and posting fliers in gardening stores, cafes, and community centers. Third, the university team shifted its community partnerships to two other Sacramento organizations (Soil Born Farms and Yisrael Family Urban Farm). The former is a prominent regional sustainable agriculture organization and was the primary grantee of the home gardening program funded by The California Endowment that had been subcontracting this program in South Sacramento to Ubuntu Green.⁵ Yisrael Family Urban Farm is run by Chanowk and Judith Yisrael, a Black couple and their children with a mission of "Transforming the Hood for Good."⁶ Now, Yisrael Family Urban Farm became the implementing partner through its We Diggitt Urban Gardens program in South Sacramento (funded in part through Soil Born Farm's funding from The California Endowment). Drawing on her community knowledge and relationships, Jeanette Lim (author six) was instrumental in helping to establish these new partnerships. Learning from its earlier experiences, SLUG has developed more explicit agreements with its new community partners about the roles and responsibilities in the garden builds and soil lead testing. Fourth, SLUG greatly improved its systems for data documentation across the ecological and social science components including a comprehensive database for all resident data (surveys, interviews, video, and field notes) and began to share its findings in project publications (e.g., Schwarz et al., 2016).

With this background on the weaving of the SLUG partnership, we now present two specific examples that illustrate strategies used to maintain the structure (warp) while allowing room for the dynamic contributions of the partners (weft.)

Aspiring to 350

A major miscommunication about project resources arose at the very beginning of SLUG about the number of gardens available for use as sampling sites by the university team. University researchers, responding to a funding proposal deadline, had initial conversations with community partners regarding a potential partnership. During those conversations, community partners mentioned their "350 edible garden campaign" and university researchers understood this to mean that there were 350 potential sampling sites. This assumption was included in the research sampling design. In reality, the 350 edible garden campaign was an aspirational goal, inspired by the national 350.org climate change initiative. Many fewer

gardens were actually built or planned. The research team only noticed this misunderstanding after the proposal was successfully funded. Adding to this difficulty, many of the original partners on the grant proposal had left their positions with their organizations by the time the proposal was funded, leaving only Ubuntu Green as the community partner. This initially created tension in the new partnership, as researchers realized that the sampling sites necessary to answer the proposed research questions did not exist. Given this inauspicious start, some of the parties questioned the project's viability. However, all remained motivated and committed to the proposed project.

In order to solve this discrepancy, university researchers reallocated project resources to support additional Ubuntu Green-installed gardens. This allowed both parties to attain mutually beneficial goals in the form of additional sampling sites for the university researchers, and more gardens for community residents. This was not achieved without significant trade-offs for both parties. After providing the unexpected funding contributions to the garden building, university researchers had fewer resources to allocate to personnel and supplies. At the same time, this funding arrangement meant that the Ubuntu Green was now associated with the university partner in a different and at least partially dependent role—as grantee. These changes were only made possible because both parties upheld their accountability to each other and to the collective goals of the partnership while developing an improvisational solution to what at first appeared to be an intractable problem.

Resident engagement in the video voice project

The social science element of the project included a Resident Video Voice Project (RVVP). Video Voice allows people to create short videos to express and share their perspectives on a topic of concern. It has been used around the world, often with historically marginalized communities to ensure that the voices of community actors are given a chance to shape development policies and plans (Lunch & Lunch, 2006). As applied to social science research, Video Voice provides opportunities for residents to speak directly about the topic, with less mediation by university researchers.

The original goals of the SLUG RVVP were to: (1) allow residents to articulate their knowledge on the topics of home gardening and soil lead testing, thereby enriching the research project; (2) provide Ubuntu Green with a tool that could be helpful for future community organizing; (3) offer residents new skills and opportunities for creative self-expression; and (4) allow residents to share their perspectives with the research team and Ubuntu Green in ways that went beyond the research project itself. These goals were re-interpreted and re-prioritized by the original partners and new personnel in Ubuntu Green and the university team that transitioned in and out during the life of the project.

Graduate students enrolled in a Master's degree program in Community Development course at UC Davis taught by the first author took on the Video

Voice as a class project. They consulted with Ubuntu Green to develop a resident recruitment strategy and training modules. The aim was to train residents with newly installed gardens to shoot and narrate a 1- to 3-minute film that articulated their relationship with their gardens, neighborhoods, and city. In a series of pilot workshops, six residents created videos. These were premiered at Ubuntu Green's annual fundraising event and were displayed publically on Ubuntu Green's website. When the graduate course ended, one student (who stayed on as a paid graduate student research assistant) adapted the pilot curriculum. She planned to implement a second round of the workshop to expand participation among residents involved in SLUG to include more residents and a new neighborhood.

Differing visions and priorities for the project surfaced at this point. In particular, the university researchers placed primary importance on the methodological rigor and ethnographic data collection, while Ubuntu Green prioritized the utility of the process and products for their larger community development strategies. Ubuntu Green staff saw the power of the RVVP methodology and decided that they needed greater control of the project to ensure that it aligned with their organizational interests and approach to resident engagement. In particular, they sought to focus the project on engaging residents in broader neighborhood organizing for healthy land uses. Ubuntu Green also sought to shift control of the RVVP from the university students, who were predominantly white and not from Sacramento, to their own organizers, who were people of color living in Sacramento. Therefore, in the subsequent cohort of the SLUG RVVP, the role of the university team changed from leader to logistical supporter.

One significant downside of this shift away from university control of the video project was the loss of the final versions of the first cohort of resident projects. These videos had been posted to Ubuntu Green's website by an outside consultant and were to be transferred to Ubuntu Green staff. However, with the rapid turnover of Ubuntu Green's garden program, the video DVDs were misplaced. Turnover in the university team's own research personnel meant that they had not secured their own copies of the finished videos. Fortunately, the researchers did retain the raw footage of the resident videos and were able to use this as a data source, albeit without the cohesive narratives of the final products.

The experience with the SLUG RVVP highlights the ways that tensions experienced in a CURAP can push the structure in unexpected ways that do not always align with the original vision of the project. This is not unexpected and perhaps may even be appropriate, given that the participatory nature of the methodology actually invites a shift in power from university researchers to members of the community involved in the project.

On the one hand, the shift of the university's role from co-leader to supporter reduced the direct alignment of the videos with the research questions. Most notably, the videos almost exclusively addressed gardening issues, with little focus on soil lead. Nonetheless, the project did provide rich data for the research project; a powerful resident engagement method for Ubuntu Green and

a process through which residents could document their knowledge, perspectives, and values. In particular, the finished videos from the second cohort and the raw footage from the first provided valuable insights about the roles of gardens in individual and neighborhood well-being, attesting the diversity of meanings that residents attach to their gardens, as sites of spiritual fulfillment, catalysts for neighborly interaction, and bases for advocacy on urban agriculture at the city-scale. One African American woman involved in the RVVP spoke to the historical resonance of gardening.

The whole thing of growing food is just so back to the earth . . . I think it's a connection. I feel like I have a connection to my ancestors. Because I know how important growing was to my family, especially to my grandmothers whom I knew and how it made them feel. I think it empowers you to be able to control what you eat and what your family eats.

Another described the catalytic relationship between gardening and neighborhood activism.

Having a garden . . . And having a space of land we were able to change from looking really bad to looking really good and productive and giving us vegetables, really just makes us want to see what else we can do in the community.

These voices ground the SLUG project in the lived experiences of the residents and to keep the ultimate goal of the project—building knowledge to support the health and self-empowerment of residents—at the forefront of the project.

Lessons learned for weaving CURAPS

The SLUG project highlights a number of lessons about how CURAPS can be woven in such a way to balance the need for adherence to structure (warp) and the flexibility to weave in changing, diverse, and even divergent strands of the individual partners over time (weft).

First, as in all relationships, some tensions, conflicts, or instances of dissent, as Low (2008) frames it, are inevitable in CURAPs. Working creatively with tension can increase the strength, utility, and even beauty of the partnership fabric. This approach to conflict and tension is particularly important in projects, such as SLUG, characterized by significant resource disparities between partners and the broader neighborhoods. For example, the Video Voice project started out primarily as a research method and ultimately became a community empowerment and organizing tool. While Ubuntu Green's reframed project did not address one of the university team's research questions on resident perceptions of lead testing, this drawback was ultimately compensated by the richness of the videos, perhaps because of increased investment by Ubuntu Green staff in a method they saw as core to their work. The capacity of the partnership to weather this conflict was

strongly influenced by the trust that the partners had built through shared work prior to and during the partnership.

Second, ensuring that all parties have equitable say in the development of the partnership structure is essential to ensure that all parties' visions, goals, concerns, assets, and limitations reflected in the fabric of the partnership. The fact that SLUG was developed largely by the university team under time pressure to submit the grant reduced SLUG's initial alignment with the needs and visions of its eventual community partners. This lack of early collaboration was partially compensated by the prior working relationships between Ubuntu Green and several members of the university team, as well as the addition of one of the Ubuntu Green staff members to the university team toward the end of the project. In addition, once the grant was awarded, SLUG allocated approximately six months for those involved to work out the initial partnership arrangement. Nonetheless, all parties recognized that building in collaboration up front would have greatly improved the project both as a research and community change strategy.

Third, even a well-designed partnership structure must be flexible and adaptive over the course of a long-term CURAP, as personnel and organizations enter, exit, and change roles in the partnership. It is therefore crucial to invest in building both a *data infrastructure* to document various kinds of information from residents, community organizations, and university researchers, and a *social infrastructure* to maintain accountability and responsibility among all parties even as the project design changes over time. SLUG has begun to implement this lesson in building its new collaboration with Yisrael Family Urban Farm based on explicit roles and responsibilities.

Fourth and finally, despite—or perhaps because of—the complexity of the project, the research has produced some valuable knowledge for the urban agriculture and environmental justice research and advocacy fields (London, Sze, & Cadenasso, forthcoming). For example, the soil lead tests revealed that while there are generally much lower levels than in other cities such as Baltimore (Schwarz, Pouyat, & Yesilonis 2016), the project did identify “hotspots” within individual properties that helped inform lead safe gardening practices for those residents (Cadenasso, 2015). Interviews with residents, advocates, and policy leaders revealed deep and diverse cultural roots of gardening in Sacramento that produce rich meanings as well as grow rich produce. These soil lead level analyses and personal narratives will be shared as resources to help enhance and expand the urban gardening movement in the region.

In sum, while SLUG was not a perfect community-university partnership, we believe that perfection is, in fact, not a desirable or even realizable goal. Instead, such partnerships should be seen as fabric produced through a dynamic interaction between its formal institutional structure and the lived experiences of its members as they integrate their diverse visions, knowledge, and interests into the weaving process and products. The quality of the partnership should therefore not be judged based on the formal aesthetics of the fabric, but on its adaptive capacity to function over time in the face of multiple stressors. This basis of assessment is particularly important in partnerships focused on environmental justice issues in

low-income communities and communities of color. This case study of SLUG therefore points towards an environmental justice praxis of community-university research partnerships in which the structure is designed to address power disparities between members, to mediate tensions, and ultimately, to prioritize the benefits to the health and well-being of residents.

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Notes

1. Jonathan London has collaborated with local partners in action research on environmental justice in the region for many years, and helped facilitate the initial steps in the partnership. Kirsten Schwarz, Bethany Cutts, and Mary Cadenasso have conducted community-engaged research in multiple locations. Charles Mason Jr. founded Ubuntu Green. Jeanette Lim originally worked for the Ubuntu Green before joining the university team. Katie Valenzuela also formerly worked for the Ubuntu Green.
2. Information about Ubuntu Green can be found here: <http://www.ubuntugreen.org/>
3. The foundations supporting Ubuntu Green's garden program included The California Endowment, the California Wellness Foundation, and W.K. Kellogg Foundation.
4. The university team was funded through a grant from the University of California Agriculture and Natural Resources (No. 11-958). Mary Cadenasso is the PI.
5. Information about Soil Born Farms can be found here: <https://www.soilborn.org/>
6. Information about Yisrael Family Urban Farm can be found here: <http://www.yisraelfamilyfarm.net/>

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