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# Urban Agroecology

## Interdisciplinary Research and Future Directions

**Edited by**

**MONIKA EGERER AND HAMUTAHL COHEN**



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# *Agroecological Transformations in Urban Contexts: Transdisciplinary Research Frameworks and Participatory Approaches in Burlington, Vermont*

**Martha Caswell,<sup>1\*</sup> V. Ernesto Méndez<sup>1</sup>, María A. Juncos-Gautier,<sup>2</sup> Stephanie E. Hurley,<sup>3</sup> Rachelle K. Gould,<sup>4</sup> Denyse Márquez Sánchez,<sup>5</sup> and Storm Lewis<sup>6</sup>**

<sup>1</sup> *Agroecology and Livelihoods Collaborative (ALC), Department of Plant and Soil Science, University of Vermont, Burlington, Vermont, USA*

<sup>2</sup> *Faculty of Environmental and Urban Change, York University, Toronto, CA and Agroecology and Livelihoods Collaborative, University of Vermont, Burlington, Vermont, USA*

<sup>3</sup> *Department of Plant & Soil Science, University of Vermont, Burlington, Vermont, USA*

<sup>4</sup> *Rubenstein School of Environment and Natural Resources and Environmental Program University of Vermont, Burlington, Vermont, USA*

<sup>5</sup> *Department of Biology, Carlton College, Northfield, Minnesota, USA*

<sup>6</sup> *Department of Environmental Science and Policy, Smith College, Northampton, Massachusetts, USA*

\* *Corresponding author: Email martha.caswell@uvm.edu*

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**KEY WORDS:** *Urban Agroecology, Participatory Action Research (PAR), agroecology principles, transformation*

## 14.1 Introduction

Historically, agrifood systems have been perceived mostly in the realm of activities and policies in rural areas (Wiskerke 2015). Consequently, the potential role of city-regions in developing innovative sustainable food systems has been largely ignored (Sonino 2009). Through integration into the urban fabric and urban ecosystems, urban and peri-urban agriculture (UPA) confront particular socioeconomic and environmental constraints and offer opportunities that set them apart from rural agriculture. This results in UPA filling a distinctive multifunctional<sup>1</sup> role. UPA intersects with food security, public health (physical and mental), community-building, redevelopment and restoration of distressed areas, economic opportunities for low-resource neighborhoods through microenterprises, and the broader spiritual and identity-related benefits of connecting with place in meaningful ways (Lovell 2010).

In this chapter, we assess the potential of agroecology to provide a series of benefits to human and environmental health in urban and peri-urban contexts. Specifically, we explore what differentiates urban agroecology from urban agriculture. According to Vaarst et al. (2017 p. 4), food systems that follow the principles of agroecology call for “resilience, multifunctionality, equity, and recycling of resources... (and offer) significant options for impacting sustainable development in city regions.” Using commonly accepted principles to explore the multiple dimensions of agroecology (environmental, social, political and economic) we hope to provide “...a more holistic framework than urban agriculture to assess how well urban food initiatives produce food and promote environmental literacy, community engagement, and ecosystem services” (Siegnier et al. 2019 p. 557). Grounding our research in agroecological principles, we explore the ways these spaces, actors and systems interact, in order to better understand how urban agroecosystems can be designed to support urban farms and gardens that achieve these diverse ends (Altieri et al. 2017). Parallel to this work, we evaluate the effectiveness of community-based participatory action research to assess the relative importance of, and interactions between, the environmental, social, political and economic elements of our partners’ work within urban and peri-urban contexts.

Participatory Action Research (PAR), is an approach to collaborative inquiry in which researcher and non-researcher partners (e.g. farmers or community organizations) engage in an iterative process of research, reflection and action, with the goal of addressing mutually identified issues of interest (Méndez et al. 2017). The PAR process described in this chapter integrates agroecology (defined for this purpose as the combination of ecological science with other academic disciplines and knowledge systems to study food systems (Méndez et al. 2017)); eco-landscape design (which incorporates ecological principles and values to urban and landscape design (Lovell 2009)); and cultural ecosystem services (the non-material benefits that people derive from ecosystems, which can include spiritual importance, cultural heritage and psychological well-being (Milcu et al. 2013)). By drawing from these academic fields and integrating these perspectives with the knowledge and experience of our selected local partners, we set out to assess what differentiates urban agroecology from urban agriculture and how design choices can optimize these benefits. As a by-product of this process, we also hope to observe whether this type of PAR process serves as an effective mechanism for amplifying agroecology as a relevant option for food systems transformation.

<sup>1</sup> Agricultural Multifunctionality examines multiple functions and/or benefits that agriculture and agricultural land can provide, in addition to producing food, feed and fiber (e.g. ecosystem services, recreation, aesthetics, cultural value, etc.).

In summary, the goals of this project are to:

- assess the potential of agroecology to provide a series of benefits to human and environmental health in urban and peri-urban contexts,
- explore what differentiates urban agroecology from urban agriculture,
- understand how urban agroecosystems can be designed to support urban farms and gardens that achieve these diverse ends, and
- evaluate the effectiveness of community-based participatory action research to assess the relative importance of, and interactions between the environmental, social, political and economic elements of our partners' work within urban and peri-urban contexts.

In this chapter we will address the above-mentioned goals by defining our context and the framework that we are using to guide this research, providing brief descriptions of our community partners and their work, explaining our transdisciplinary PAR process, and then sharing an overview of the research we have conducted to date with one of our community partners. We will close with observations about what we hope to improve upon and pursue as this research continues to evolve.

#### 14.1.1 Geographic and Research Context

We explore the above themes and topics using a case study of Burlington, Vermont, USA, where we have been engaged in agrifood systems work for over a decade, as scholars, researchers, and practitioners. Burlington is a small city located in the northwestern portion of the state of Vermont, on the shore of 150-mile-long Lake Champlain. Vermont is a predominantly rural state, where 78% of the land is forested (Lovell et. al 2010). Agriculture and tourism contribute significantly to both the character and economic viability of the state. Long, cold winters and a relatively short growing season impact the types of agricultural activities that are viable. Dairy continues to dominate the agricultural economy, but recent years of prices at or below the price of production are contributing to a decrease in the number of dairies across the state. With a population of around 43,000, Burlington is Vermont's largest city. Burlington is economically diverse, but relatively racially homogenous; 85% of residents self-identify as white (census.gov 2019). However, waves of refugee resettlement have contributed to increasing racial diversity within the city.

Some Vermonters joke that the best thing about Burlington is that it is so close to Vermont, hinting that its urban feel sets it apart from the traditional conceptualization of the state's culture and rural identity. However, Burlington's contributions to the state match recent trends where small- to mid-sized cities are rapidly growing, both in the US and in other countries (Forman 2008). These cities often have distinct and strong ties to their rural hinterlands (Arnosti and Liu 2018), and maintain more connected and cohesive local urban food movements, including diverse forms of urban agriculture (Bricas and Conaré 2019). Vermont is recognized as a leader within the farm-to-table movement (Benjamin and Virkler 2016), and boasts a strong tradition of successful food activism. Recent efforts include passing the 2016 GMO labeling law and Migrant Justice's "Milk with Dignity" campaigns, among others. In addition, a network of local organizations and universities support research and a growing movement to strengthen food systems and agroecology studies in the region. As actors within Burlington's foodshed, who also work internationally, this research team was drawn to exploring what urban agroecology looks like in our own context and what potential it offers for strengthening our local agrifood system. Our case study offers a framework and research process to guide future participatory and transdisciplinary work in urban agroecology.

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#### 14.2 An Urban and Peri-Urban Agroecological Framework

We sought to investigate the potential of urban and peri-urban agroecology by using established agroecological principles, combined with insight from ecological design and cultural ecosystem services. This approach offered a scaffold for identifying key factors to achieve more sustainable urban food systems.

Additional considerations included optimizing ecological agricultural production, urban sociopolitical dynamics, urban policies, planning and regulations, as well as a desire to deepen our understanding of the environmental implications of and for food production in urban settings (McClintock 2010; Newman and Jennings 2008; Peters et al. 2009). By structuring our examination of these diverse dimensions in ways that explicitly include stakeholders (farmers, gardeners, community stakeholders, decision-makers, etc.), we plan to facilitate the development of a set of scenarios that allow participants to envision "...a wide range of societal and environmental effects...for each scenario" (Nassauer et al. 2007: p.47). We hope that this allows our partners to see themselves, their work and their broader context in potentially new (and transformative) ways.

#### 14.2.1 Agroecology – Definitions and Principles

As agroecology becomes more widely recognized across the globe, what it means<sup>2</sup> and what it represents has also become more contested. In 2018, the Food & Agriculture Organization of the United Nations (FAO) crafted 'the internationally agreed definition', which states that "...agroecology is an integrated approach that simultaneously applies ecological and social concepts and principles to the design and management of food systems" (FAO, 2018). A few years earlier, civil society participants in the 2015 International Forum on Agroecology produced the Nyéléni Declaration, in which they provided a clear outline of expectations for agroecology, specifically for its peasant constituency. This declaration is overtly political, and explicit in stating that one of the motivations for articulating their position is to prevent the cooptation of agroecology. In addition to emphasizing the central role of smallholder farmers and social movements within agroecology, the Nyéléni Declaration calls for solidarity between urban and rural populations as necessary for (re)establishing responsible production and consumption patterns, prioritizing shared benefits and exploring viable models for shared risks (Nyéléni Declaration 2015).

Drawing from its ecological roots, agroecology has been structured around core principles since its early beginnings. Initially, the principles were ecologically oriented and based on experiences in rural environments, as seen in the key earlier texts of the field (e.g. Altieri 1987; Gliessman 1998). As research and development have embraced the notion that there are no 'recipes', but rather that all studies and initiatives need to be adapted to specific contexts, interest in better understanding and applying agroecological principles has grown. According to Patton, "An evidence-based effective principles approach assumes that while the principles remain the same, there will necessarily and appropriately be adaptation within and across contexts in implementing them" (Patton 2017 p. 200). Victor Toledo describes agroecology as something that started as 'an alternative science, but has evolved into an emergent practice and innovative technology that includes social, cultural, and political movements (Toledo 2012). Other authors working with different agroecology frameworks go as far as to name agroecology as a new "knowledge paradigm" (Shiva 2016). Numerous agroecology frameworks proposed in the past decade have incorporated principles within both their conceptual and applied expositions. The FAO adapted the notion of agroecological principles by identifying 10 agroecology 'Elements' (FAO 2018), which align well with the five principles for its Sustainable Food and Agriculture approach (FAO 2014). The Nyéléni Declaration includes key principles and values (referred to as pillars) for agroecology; these are distinct from other lists of agroecological principles because they articulate who should be involved and mechanisms for how change needs to happen (Nyéléni Declaration 2015). In 2018, the CIDSE<sup>3</sup> network published a document that attempts to clarify and align previous interpretations of agroecology from a variety of actors within the movement (CIDSE 2018 p. 3). The result is a list of 15 agroecological principles that cross economic, political, social and environmental domains and aim to articulate "...what

<sup>2</sup> See the collection of definitions of agroecology on Biovision's Agroecology Info Pool, representing various organizations including perspectives from governmental entities, civil society and the research community: <https://www.agroecology-pool.org/agroecology/definitions/>

<sup>3</sup> The abbreviation CIDSE stands for the organization's historical name, originally in French: "Coopération Internationale pour le Développement et la Solidarité" which can be translated as International Cooperation for Development and Solidarity <https://cidse.org/faq/> (Accessed 10/31/19)



agroecology is and what it is not in order to gather political support, for the discipline to flourish, to avoid co-optation, and fight against false solutions” (ibid.).

There is almost no published work that critically analyses the use of principles in agroecological research and applications. As the field evolves, agroecologists are starting to recognize the importance, potential, and need for critical examination of these principles (Bell and Bellon 2018). Given the increasing interest and popularity of applying principles frameworks in different contexts, this has become an important area of inquiry in agroecology work (see the forthcoming special feature on ‘Principles-based approaches in agroecology’, in the journal *Elementa*). One of the key questions to ask when using principles is: how can we best compare information collected across multiple contexts? In theory, principles allow us to use different, site-specific indicators, which would allow for comparison of the principles across contexts. However, this type of comparative analysis has been rarely done in practice, and it remains to be seen whether these comparisons are valid. Rural contexts remain the predominantly cited examples of agroecology principles in practice. However, recent work recognizes the relevance of agroecology beyond rural contexts, and a growing number of studies focus on the unique relevance and expression of these principles in urban areas (Tornaghi and Hoekstra 2017). Our understanding of the diversity of approaches in agroecology and the various interpretations of its principles has informed both our definition of agroecology and selection of a specific set of principles for this study.

### 14.2.2 How We Conceptualize Agroecology

The research team for this project represents a wide range of disciplines and life experiences. It includes scholars from the fields of agroecology, urban landscape design and cultural ecosystem services; multiple NGO partners; and both graduate and undergraduate students, affiliated with several programs within the University of Vermont. This question of what agroecology is, and what it looks like when expressed in urban contexts, is one of the foundational questions for this project and remains at the heart of our study. We appreciate that there are multiple interpretations of what agroecology is and how people engage with it; for us, it is inherently transdisciplinary and participatory (Méndez et al. 2017). When we refer to transdisciplinary, we mean moving beyond just the intentional valuing and integration of different academic disciplines, to also incorporate different forms of knowledge and knowledge systems (e.g. indigenous, local, practical/empirical). Agroecology provides us with a framework to better understand the complex systems and interactions that comprise our agrifood systems in order to work toward transforming them to be ecologically sound, economically viable, and socially just.

### 14.2.3 Participatory Action Research

Participatory Action Research (PAR) is “...an epistemological stance that values knowledge produced from lived experience as equal to that produced in the academy and, in so doing, expands traditional notions of expertise” (Torre 2014 p.1). This combination of perspectives and knowledge types creates a platform for stakeholders to feel joint ownership of the process and results (Hovmand 2014). It rejects historical power dynamics among ‘researchers’ and ‘subjects.’ In PAR, research and non-research partners investigate, reflect, act and/or investigate again through iterative cycles. Because PAR projects increase community members’ access to, and ideally motivation for, taking part in research processes (including design, execution, analysis and results dissemination), the approach supports articulation of problems and potential solutions outside of ‘hegemonic definitions’ (Dlott, Altieri and Masumoto 1994).

This approach is especially appropriate for agricultural inquiries, and even more so for the context-specific inquiries that are central to agroecology. Drawing out the questions, perspectives and insight of multiple actors is central to PAR, considering the often tacit and obscured nature of critical agricultural knowledge and expertise (Milgroom et al. 2016). Researchers and farmers, along with other stakeholders, in diverse contexts, can benefit from processes that work to find ways to combine knowledge and articulate lessons. In this way, learning can be made explicit and accessible to wider audiences. This can serve both to foster connections among people who might not otherwise interact, and to reestablish awareness about food production and agricultural systems among urban populations. In Burlington, for example, urban and

school gardens are a place where gathering and sharing across cultures is encouraged, and when those spaces can also include inquiry and dialogue around issues, the seeds of PAR can be sown.

#### 14.2.4 Our Conceptualization of PAR

As a function of the relationships that develop, and the mutual curiosity and knowledge that emerge from PAR, the processes themselves are often difficult to describe in terms of discrete phases. The research cycle depicted in Figure 14.1 represents a generic PAR cycle. The notable change from our previous visualizations of PAR processes is that instead of depicting isolated moments for reflection, the reflection process is integrated with research and action throughout the cycle. The nodes then become moments to pause for making decisions around where effort and attention should be directed and how to move forward. The graphic applies for the project as a whole (as we aggregate findings about the expressions of agroecological principles across the sites, and engage in collective research, reflection and action), and also individually to each organization as they independently move through this process. An example of this process with one of our partner organizations is described later in the chapter.

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### 14.3 A Transdisciplinary Research Approach

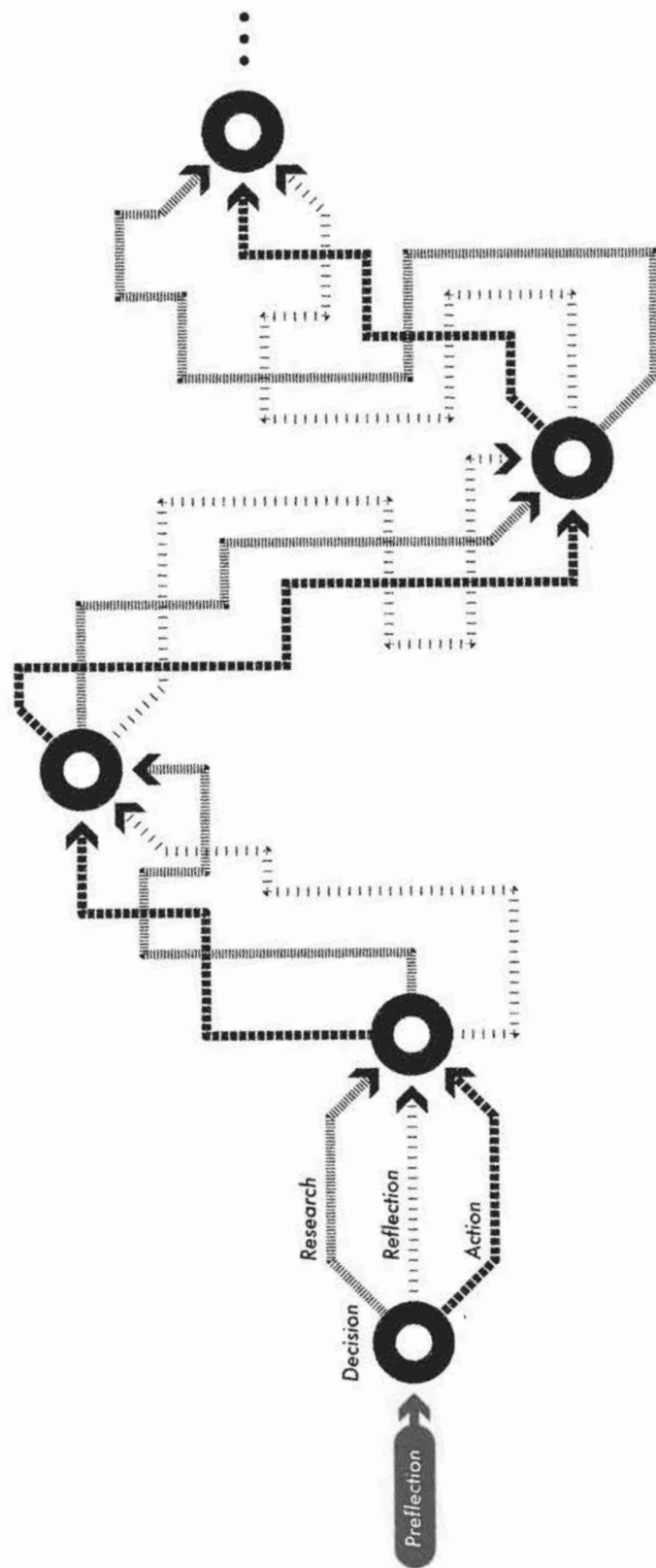
As previously mentioned, the objective of our work is to assess the current status of agroecological expression and its potential as a mechanism for growth and transformation in and around Burlington, Vermont, USA. In our research, we sought to identify and explore local expressions of agroecology, and how to strengthen/deepen urban and peri-urban agriculture utilizing agroecology principles. In line with our PAR commitment, we wanted to examine if this approach holds potential for mutual benefit to both scholars and community actors. The first step for this was to develop a general level of recognition/conceptual acceptance of agroecology, and then help our partner organizations to build confidence through using images to establish 'observational cues' whereby they were able to discern examples of agroecology in practice and opportunities for its future development. To achieve this, we integrated aspects of principles-based evaluation, eco-landscape design, and cultural ecosystems services/relational values frameworks. Each of these is described in greater detail below.

#### 14.3.1 Principles-Based Evaluation and Agroecology

Principles-focused evaluation "...examines (1) whether principles are clear, meaningful and actionable, and if so, (2) whether they are actually being followed, and, if so, (3) whether they are leading to desired results." (Patton, 2018 p. viii) This matches our research objectives, and offers the potential for both quantitative and qualitative data to inform this agroecological assessment project. Given that principles can represent broad aspirations, principles eventually are broken down into sub-principles and/or practices. A scaffolding approach encourages on-the-ground exploration to identify points of strength and weakness that emerge from the data. In this case, and following the PAR cycle, through subsequent validation and reflection (involving researchers and partners) the team works together to identify potential actions to support agroecological transformations, refine the original research questions and/or follow emergent leads.

#### 14.3.2 Agroecology Principles and Landscape Design

The fields of landscape architecture, design and planning offer a wide array of spatial and cultural analytical tools that are seldom explored in the contexts of agricultural systems or agroecology. Combining these fields is one of the innovations of this project, as we incorporate agroecological design processes at multiple socio-spatial scales. The *community scale* includes initial mapping of partner sites and their surrounding land uses, in order to examine relative influence of surroundings upon sites, and sites upon surroundings. We are using a combination of larger-scale geographic information system (GIS) imagery and localized site-scale concept plans and landscape visualizations, which illustrate existing conditions and



**FIGURE 14.1** PAR research cycle with decision points represents the unpredictable path and necessary components that accompany a successful PAR process (some combination of research, reflection, action and moments for consensus around decisions), including steps outlined in Participatory Action Research Toolkit (Pain et al. 2011), integrated with the phases of the PAR cycle as described in Méndez et al. 2017.

proposed alternative future design scenarios (Nassauer et al. 2007; Santelmann et al. 2004; Werthmann and Steinitz 2008). For this, we are considering development density, transportation systems, infrastructure, water, vegetation types, etc., as well as locations of cultural importance. At the *site scale*, design opportunities and interventions are being identified in light of the agroecology principles our partners prioritize. Site plans and landscape visualizations will be developed to receive partner feedback and serve as examples of designs that could be implemented in order to enhance agroecological performance at the site. This represents a move toward 'democratization of design, on a small scale, where community members are encouraged to consider their own spaces and be active participants in envisioning potential changes (Angheloiu et al. 2017).

### 14.3.3 Cultural Ecosystem Services and Relational Values

As the field of agroecology has expanded, consideration of socio-political domains has increased. These domains are especially important for urban agroecology, because in urban areas social factors are arguably more ever-present than biophysical ones. Indeed, in some urban areas, "...food may be the only remaining connection to nature" (Francis et al. 2003 p. 102). Questions about how agroecological activity may differ in urban versus rural contexts engage heavily with the social side of agroecology. One lens on these social dimensions is found in the fields of cultural ecosystem services and relational values. These fields explore non-material dimensions associated with human-ecosystem interaction. Cultural ecosystem services describe "ecosystems' contribution to the nonmaterial benefits (e.g., experiences, capabilities) that people derive from human-ecological relations" (Chan et al. 2011 p. 206). Relational values encapsulate "...elements of human-nature relationships that do not fit into the provider-receiver or stock-flow metaphor of ecosystem services" (Chan et al. 2018 p. A5). Both concepts relate closely to many of the socially focused principles of agroecology, and can provide helpful tools for investigation related to those principles.

## 14.4 The Sites and the Partners

### 14.4.1 Why Urban Agroecology in Vermont?

In a predominately rural state like Vermont, it may seem incongruous that we are exploring examples of urban or peri-urban agroecology, instead of conducting a similar effort in our abundant rural landscape. However, we see Burlington's position as a hub of both food distribution and consumption as an important factor that facilitates the expression of agroecological principles. It therefore lends itself well to research on urban agroecology. We chose to focus on sites involved in food production for this first phase, but are open to expanding to additional realms in the future. As Vaarst articulates, "The deep mutual embeddedness of farming and food systems emphasizes that 'agroecological food' is not only food which is produced using agroecological agricultural methods, but also food going into a system which is built on the basis of agroecological principles, and where resources are part of full cycles, that is, also going from where food is eaten to where food is grown" (Vaarst et al. 2017 p. 704).

Given Burlington's reputation as a 'food city', and the strong connections we observe between farmers and city dwellers, we are keen to learn from our microcosm in ways that could both help to conceptually advance urban agroecology, as well as apply to other contexts. Those who live in larger cities know all too well, that in urban areas the human-nature interaction can feel out of balance (too much human, not enough nature). One opportunity for responding to this gap is through gardens and other forms of urban food production that, in Vandana Shiva's words, maximize 'health per acre' and 'nutrition per acre' (Shiva 2016). Because we use agroecological principles as our lens, we also carefully consider social and cultural factors within our agricultural system. "In the agroecological paradigm of knowledge...food is the web of life. Humans are part of this web as co-creators and co-producers, as well as eaters" (Shiva 2016 p. 13). The combination of cultures and dietary preferences that are present in urban areas reinforces the benefit of sovereign agricultural models. Burlington's history as a site for refugee resettlement



has influenced its food culture, which includes new hyper-local pockets of production, such as a small goat farm and production of culturally preferred corn varieties, African eggplant, bitter melon, and okra (Bose and Laramée 2010).

In 2012, an Urban Agriculture Task Force (UAFT) coalesced in response to a perceived lack of specific policies related to the agricultural activities in Burlington. During a year-long process, the group collected data and facilitated conversations with the goal of providing recommendations to city officials for how urban agriculture could be encouraged and supported in Burlington. When they surveyed residents on their motivations for participating in and/or caring about urban agriculture, responses reflected values focusing "...on the importance (of) place-based food production with the goal of building an environmentally sustainable, resilient, socially just, and secure food supply" (Nihart et al. 2012 p. 22). Additional values of social capital, environmental stewardship, recreational outlets and cross-cultural interactions were also highlighted. A year earlier, the city's own planning document 'Plan BTV' highlighted the importance of Burlington's local food system; it asserted that "... (a) local food supply accelerates economic development, fosters a stronger and more sustainable community, improves the health of those who live and work in Burlington, and supports a system that regenerates and protects our natural resources and the environment" (Plan BTV 2012).

Though Burlington is a city, it has a small-town feel, and there is general familiarity around 'who does what' within certain circles. This is especially true in the urban/peri-urban agricultural sector, as there is overlap not only in the land that is used, but also in professional and social circles. While the UAFT is no longer active, key actors from that effort were included in the first conversations around our explorations of urban and peri-urban agroecology in Burlington. In early spring, 2016, we gathered four organizations working on urban/peri-urban agriculture to explore potential areas of synergy. For the purposes of this chapter we have chosen to highlight the experience with one of the partners for the results section, but descriptions of progress with each of the partners is forthcoming. To provide a sense of the full group, brief profiles of each of the core partners follow:

**New Farms for New Americans (NFNA** - <https://www.aalv-vt.org/farms>) is an agriculture program for refugees and immigrants based in Burlington, VT. NFNA provides plots and support for over 275 farmers and gardeners, primarily refugees from various countries in Africa and Asia, to grow culturally significant crops, increase access to food, land and agricultural resources, and learn about growing food in Vermont. NFNA originally supported their participants in growing food for sale in local markets, but the participants were more interested in cultivating for their own consumption. Now the program focuses on family production, with exception of a few farmers who have found markets and have interest in producing particular crops on a larger scale.

**The Vermont Community Garden Network (VCGN** - <https://vcgn.org/>) leads the state's community garden movement by educating, supporting and connecting garden leaders. Established in 2001, as a non-profit organization, VCGN has helped initiate and sustain hundreds of gardens all over Vermont, and has connected thousands of children, teens, and adults to fresh, healthy food and sustainable food production practices. VCGN gardens are located in both urban and peri-urban settings, and the network serves as an organizing/support body for community gardens across the state of Vermont. One of the unique partnerships that VCGN has established is with the **Champlain Housing Trust (CHT** - <https://www.getahome.org/>). VCGN provides technical support for establishing and maintaining gardens at CHT-managed apartments/coops within Chittenden County. The Champlain Housing Trust is the largest community land trust in the United States. Their mission is to 'support the people of Northwest Vermont and strengthen their communities through the development and stewardship of permanently affordable homes.'

The University of Vermont's Horticultural Research Center (HREC - <http://www.uvm.edu/~hortfarm/>) is a 97-acre university farm, in a peri-urban/suburban setting, within the limits of the city of South Burlington, and about four miles from downtown Burlington. Set behind car dealerships and housing developments, HREC is an oasis of green in aerial maps. **Catamount Farm** is a 12-acre, organically certified area embedded within the HREC. The mission of Catamount Farm is to model sustainable farming practices through a working vegetable and fruit farm that provides educational and research opportunities for the UVM community, including a six-month Farmer Training Program (FTP). The FTP draws participants from all over the country each summer.

The **Intervale Center (IC)** (<https://www.intervale.org/>) is a farm and food non-profit organization in Burlington, founded in 1988 (originally as the Intervale Foundation), with a mission to strengthen community food systems. The IC manages a 340-acre mixed-use campus that includes organic farms, wildlife areas, a native tree nursery, recreational paths, community gardens, a food distribution center (hub), and a suite of other programs and enterprises. They also provide business planning to farms across Vermont, restore riparian buffers in all of Vermont's watersheds and network with groups from across the country and around the world. The Intervale Center operates in a peri-urban context, literally in the backyard of the city of Burlington (about 2 miles from downtown). Sited along the Winooski River, the Intervale is located in a floodplain that was originally an Abenaki sacred site. This land was being used as the city dump before being purchased and rezoned in the mid-1980s. Now the Intervale is an agricultural and recreational destination year-round thanks in part to a calendar of events hosted by the IC, including music and cultural gatherings, educational and volunteer opportunities, a food hub and harvesting/gleaning activities.

The group of partners that we have assembled represent different models of organized urban/peri-urban agroecology that we see around us. NFNA is a critical component of refugee resettlement in our community, which offers a connection to agriculture for many people who come from displaced traditions of agriculture; VCGN is a neighborhood resource with statewide reach; Catamount represents the land grant mission of agricultural education and outreach; and the Intervale is a multi-faceted model of what integrated urban agricultural initiatives can include. While in some ways they are more different than similar, they all operate within a 20-mile radius and are familiar with and appreciative of each other's work.

## 14.5 The Process

### 14.5.1 Preflection

All PAR processes have to begin somewhere. When we are entering either a new geographic or content area, we like to start slow to make sure we have our bearings and are clear that our questions and contributions will be relevant. We call this phase 'preflection', and it essentially amounts to a period of confirming compatibility between research and non-research partners (both in interests and ability to work together) (Méndez et al. 2017). As mentioned above, this project was born from general curiosity, within our research group, related to expressions of urban agroecology in our local context. We perceived there to be ample evidence of urban agroecology in practice, but wondered whether there was familiarity with the term/concept of agroecology, and, if local actors self-identified with, or were using the term to describe their work.

We received a seed grant to explore the differences and similarities between urban agroecology in Havana, Cuba and Burlington, VT, which provided a jump-start to this research initiative. Parallel to international exchanges that accompanied that work, we conducted interviews with representatives of our partner organizations in Burlington, to solicit general opinions and determine topics for further study. The most salient issues that emerged across all of the organizations included: access to land (leasing vs. ownership); soil (erosion and quality); understanding the landscape in order to optimize land use and implement best practices; infrastructure challenges; equipment/appropriate technologies; a lack of economic/financial resources (problems accessing these resources); support from local authorities/government; and a desire for more information on agroecological management practices.

Analysis of these interviews indicated that NFNA and VCGN wanted to better understand and describe the value they provide to their participants and the community at large, whereas Catamount Farm wanted to have a clearer idea of whether and how they exemplify agroecology. The Intervale Center (IC) wanted to test whether they qualify as an 'agroecological organization' and further, if/how this might connect with whether their model could work in other contexts. Confusion persisted about the term 'agroecology.' The Executive Director of VCGN confirmed our perception that agroecology was not a familiar concept, saying "...I'm willing to bet money that most of the gardeners we work with will not recognize

concept, is something totally foreign to me...I'm not sure what I'm supposed to be learning from other people or what I might offer other people under this lens of agroecology." The IC Executive Director hoped that this project might help them to "...communicate, show, demonstrate...the power of peri-urban agriculture in our community. And by power, I mean...the value of it."

Through our repeated interactions, we started to see interest among the group to further understand agroecology, to be able to identify its expressions, and explore if greater alignment with agroecology (theoretically, by changing practices, and/or by linking up with the movement) could create positive change. Recognizing that education around agroecology, especially active or engaged learning can promote transformation (Francis et al. 2003, David and Bell 2018), we responded to a request from the partners to organize a workshop to explore the question, 'What is agroecology?' In April of 2018, the partner organizations all gathered at UVM, where we shared several agroecological principles frameworks, including the FAO Elements, the CIDSE principles and a set of principles ALC had used for previous projects. After a brief theoretical presentation, we divided into small groups where each organization selected one set of principles (we shared the FAO Elements, the CIDSE principles and a set of principles ALC had used for previous projects). The assignment was to see if and where the organizations could identify themselves in what was articulated as agroecology. In the discussion that followed, there was a tangible shift as each group began to identify how and why we saw their work as embodying agroecology.

#### 14.5.2 Decision Point

From this workshop, we interpreted clear commitment for moving forward from each of the partners. We saw articulation of interest not just in the question of 'where/how is agroecology expressed in your context', but also a desire to either incorporate more agroecology or do agroecology 'better' if this project revealed that there were gaps/missed opportunities. In other words, we heard requests for working explicitly to identify potential areas for these partners to enhance agroecology within their current contexts. This articulation of preferences by the partners (for valuation, and then designing future plans/actions) led us to realize that the initial ALC team needed to expand to include other disciplines— including faculty and students with expertise/interest in CES, landscape design, and GIS.

To formalize and fund the subsequent phases of this PAR process, a small group of faculty and staff, representing four disciplines within UVM, applied and received a USDA Hatch award in the fall of 2018. We proposed an exploration of if and how conceptualizing urban/peri-urban agricultural initiatives as 'urban/peri-urban agroecology' (specifically attaching this name to things that might have previously been referred to in other ways), would alter the way stakeholders perceived their actions and impact. In addition, we set out to explore how intentional design, based on agroecological principles, might also contribute to a more ecological, vibrant and just food system in and around Burlington. The proposal centered around the following hypotheses: 1) agroecological principles might be unfamiliar concepts, but associated practices would be familiar, and recognized as beneficial; 2) participatory agroecological design processes could facilitate adoption of additional practices or improvement of existing ones; and 3) principles-based assessments could serve as a useful framework for making strategic choices. Figure 14.2 represents the steps we outlined for the project.

### 14.6 First Research Cycle: Selected Results

#### 14.6.1 Identification of AE Principles of Interest

Once we had funding, we worked with the organizations to identify what specific agroecological principles were of greatest interest to each of them. Based on our partners' feedback and our own deliberation, we decided to use the CIDSE principles framework, which consists of 15 principles that are divided into four dimensions—economic, political, environmental and socio-cultural. Using a common framework helped to support a shared definition of what agroecology looks like and means (CIDSE, 2018). We noted that partners were drawn to the clarity and simplicity of the CIDSE framework, especially as outlined in



## Urban/Peri-urban Agroecology TIMELINE

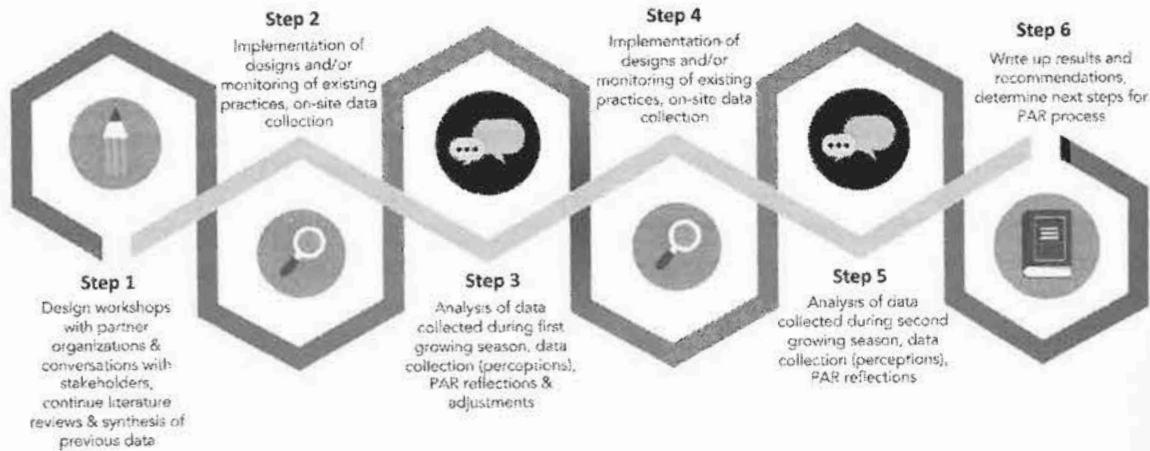


FIGURE 14.2 Project timeline.

their summary infographic<sup>4</sup>, and subsequently decided to use these principles to orient our work. Each organization determined their particular research priorities (represented in Table 14.1 below) and we began to map our individualized plans with each site.

### 14.6.2 Assessing Agroecology at the Intervale Center

We have chosen to highlight our work with the Intervale Center as representative of our project to date, for the purposes of this chapter. The presentation of results is followed by a short discussion section, lessons to date and the opportunities we see as this PAR process continues to unfold. Major project activities with the Intervale to date include: 1) cataloguing previous research, 2) assessing the presence of agroecological principles at the Intervale, and 3) early developments for a participatory design process. We describe these steps in more detail below, categorizing them by the PAR component that they most represent (i.e. research, reflection or action).

#### 14.6.2.1 Action – Cataloguing Previous Research to Avoid Replication





As mentioned above, the ALC's partnership with the Intervale Center goes back many years and includes an earlier study of landscape multifunctionality (Lovell et al., 2010). Because of its proximity to the university, and its unique organizational model and landscape features, the Intervale Center (IC) is a frequent subject of UVM-related research and educational activities. Through reflective conversations with Intervale staff, concerns around duplication in research emerged, due to the lack of a central system for organizing results/publications from previous work. We saw this as an opportunity to complement our first round of research with action. Two members of the research team (graduate students focusing on IC for their dissertations) worked with UVM library staff to create a research repository. The repository's objective was to provide interested researchers and IC staff with an organized resource for exploring past research, and better direct future efforts towards remaining gaps instead of replicating previous work.

This work reinforced the value of building from our earlier study of multifunctionality to identify the expressions of agroecological principles in practice and opportunities for land use optimization. With this foundation, we would then facilitate a participatory design process to enhance current agroecological practices and/or implement new ones. We anticipated that after identifying the presence of agroecological principles, we could then turn to cultural ecosystem services tools to layer on additional assessments of their meaning and relative importance.

<sup>4</sup> [https://www.cidse.org/wp-content/uploads/2018/04/CIDSE\\_AE\\_Infographic\\_EN.pdf](https://www.cidse.org/wp-content/uploads/2018/04/CIDSE_AE_Infographic_EN.pdf)

**TABLE 14.1**  
Selected AE Principles of Focus and Aligning Activities (by organization)

**Selected AE Principles of Focus and Aligning Activities (by organization)**

	Initial activities	Next steps
 <p>Strengthens food producers, local communities, culture, knowledge, spirituality Promotes healthy diets and livelihoods</p>	<ul style="list-style-type: none"> <li>Decision to focus on gardens at Champlain Housing Trust (CHT) sites</li> <li>Participant observation</li> <li>AE design prioritization game</li> <li>Permaculture Course – student designs for pollinator habitat</li> <li>GIS mapping</li> <li>Data collection for pollinator and biodiversity inventories</li> </ul>	<ul style="list-style-type: none"> <li>Plan for assessing gardener motivation and satisfaction</li> <li>Continuing participatory design processes</li> <li>Land use/AE principles mapping</li> <li>Continuing participatory design processes (implement/monitor)</li> </ul>
 <p>Enhances integration of various elements of agro-ecosystems Nourishes biodiversity and soils</p>	<ul style="list-style-type: none"> <li>Landscape Design Course – student designs for pollinator habitat, shade structure and riparian buffers</li> <li>GIS mapping</li> <li>Data collection for pollinator and biodiversity inventories</li> </ul>	<ul style="list-style-type: none"> <li>Continuing participatory design processes (implement/monitor)</li> <li>Plan for assessing gardener motivation and satisfaction</li> </ul>
 <p>Enhances integration of various elements of agro-ecosystems Strengthens food producers, local communities, culture, knowledge, spirituality Nourishes biodiversity and soils</p>	<ul style="list-style-type: none"> <li>Research repository</li> <li>Land use/AE principles mapping</li> <li>Participant observation, photo documentation</li> <li>Educational interventions and CES</li> </ul>	<ul style="list-style-type: none"> <li>First round of participatory designs</li> <li>Network analysis</li> </ul>
 <p>Enhances integration of various elements of agro-ecosystems Strengthens food producers, local communities, culture, knowledge, spirituality</p>		

### 14.6.2.2 Research – Expression of Agroecology (AE) Principles by Land Use

The idea to start by focusing on links between agroecological principles and land-use optimization, was inspired by the recommendation of the optimized performance you can achieve by designing a quilt-like pattern of agroecosystems within particular landscapes (Altieri, 2016). In order to study the various expressions of AE principles by land use, the research team designed an interactive methodology with multiple visual surveying tools to use during semi-structured interviews. The interviews included a short conversation to collect basic demographic information and gauge the participants' general understanding of agroecology. Participants then completed a brief exercise where they reviewed the 15 agroecological principles (numbered for ease of identification) represented in the CIDSE infographic. Participants were then asked to mark the principles they recognized as being expressed within the different Intervale land uses and operational areas, providing at least one example to support each selection. Participants to date ( $n = 30$ ) represent a diverse group of actors associated with the Intervale Center (including Intervale Center staff in the different areas of operation, farmers and community gardeners, among others).

Subsequently, a subsample of key participants ( $n = 15$ ) were asked to mark the locations they associated with the expressions of the principles they had identified in a map of the property delineating various land uses and landscape features (see Figure 14.3).



**FIGURE 14.3** Map-based data collection exercise with IC stakeholders. Participants ( $n = 30$ ) were asked to identify agroecological principles they perceived to be present within the Intervale, using the CIDSE infographic. A subsample of participants ( $n = 15$ ) then located the principles they had identified on a map of the property and surrounding area, categorized by land-use and area of operation. (Photo credits – María A. Juncos-Gautier)

As a follow up to this interview, the lead researcher for this site (María A. Juncos-Gautier), used a modified photovoice exercise (Wang, 1997), where the subsample of key participants were asked to take photos that represented their interpretation of the agroecological principles they had identified. This activity was designed to elicit additional dialogue around each participant's understanding of the principles, and contribute toward a set of images or 'observational cues' that could be used as future examples to help others to 'see' agroecological principles expressed in their own contexts. In a second semi-structured interview, this subsample of participants described their photos and the links with the AE principles to the researcher, writing a short description of their photos and including the number(s) of the principle(s) depicted in a caption area provided under each photo. During this time, Juncos participated in various volunteer opportunities at the IC and engaged in participant observation and photo-documentation so that she could triangulate the perceptions of the actors with her own observations and experiences.

### 14.6.2.3 Reflection – Preliminary Analysis of Results and the Process to Date with the Intervale

In early 2020, the research team facilitated a workshop with the subsample of Intervale study participants, in order to validate the preliminary analysis from this phase. In addition, the workshop served to assess whether the exploration of agroecological principles and their expression at the Intervale had shifted perceptions, understanding and/or motivations around agroecology. As demonstrated in Figure 14.4, the Intervale Center contains expressions of each of the 15 CIDSE principles, albeit with both strengths and opportunities for improvement. Initial analysis shows strengths in the categories of socio-cultural and environmental-related principles (e.g., the principles—"strengthen food producers, local communities, culture, knowledge and spirituality" and "nourishes biodiversity and soils"). The observations provided by the actors (practical perspective) with those of the researcher (academic/theoretical perspective), and the multi-methods approach (semi-structured interviews with visual tools, the photovoice exercise, participant observation with field notes and photo-documentation), provided a robust triangulation to validate common concepts and themes around the principles. The Intervale has also mentioned their

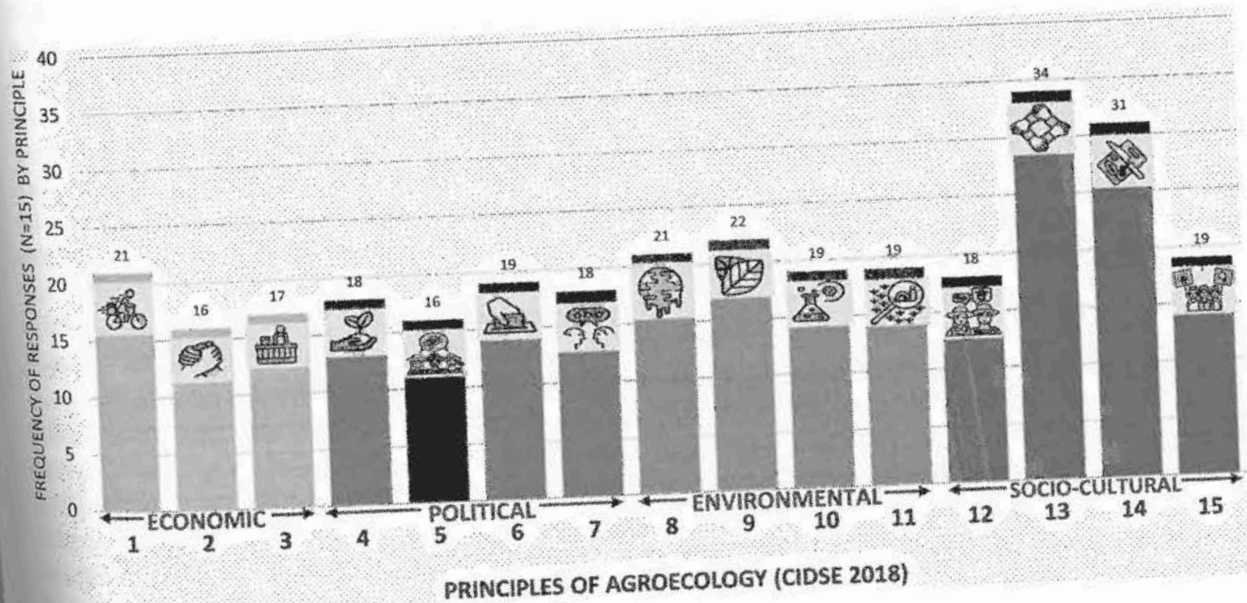


FIGURE 14.4 Frequency of responses related to the presence of the 15 CIDSE agroecological principles. After sorting the responses by CIDSE dimension from the initial mapping exercise, the frequency of responses (x-axis) represents the total number of times each principle was noted by the subsample of actors (n = 15) across the categories of land-use and landscape features in the Intervale map. Single principles may have been signaled more than one time by the same person (i.e. occurrences in multiple locations within the Intervale map or property based on the actors' perceptions).

to identify subsample of area, category



appreciation for the PAR model, noting that Juncos' contributions of volunteer hours and the team's effort to make sure they were clear on the purpose and potential benefits of this research, makes them feel like this is 'their research project' in a more tangible way than they have felt with previous studies.

During the workshop, the subsample of participants identified areas of strength, challenges and opportunities for advancement. Two areas that were identified for additional focus emerged from principles within the political and economic domains. The Intervale Center Land Manager is excited to review the results to assess participant perceptions, both to consider opportunities for land use optimization that are not yet being realized, and also to further their desire for integrating additional practices to advance agroecology. An interesting byproduct of this process has been the increased affinity with agroecology as a concept, exemplified by comments such as:

I now have a really good understanding of this framework and I can see it in the work that we do, and before I didn't...When I was out walking around and I would think ... here's actually an example of how we promote farmer-to-farmer exchanges and it's happening right here in front of me...Before I didn't know the agroecology principles well enough to be able to go out and identify that. (IC staff member)

## 14.7 Discussion

Our work in and around Burlington, demonstrates the potential of using a PAR approach – combined with theory and principles from agroecology, ecological design, and cultural ecosystem services – in an urban agroecology research framework to better understand and support the work of organizations involved in urban and peri-urban agricultural/food contexts. Montenegro (2014) discusses the importance of the transdisciplinary research approach and transformative role that urban agroecology can play in achieving more sustainable urban food systems. Citing an urban agroecology course as an example, she highlights the importance of facilitating agroecological knowledge co-creation, among a diversity of relevant actors, to advance initiatives in the urban context. In this phase of the study, we attempted to provide a holistic framework, through multiple exercises with the CIDSE principles, so that the Intervale actors could 1) better understand where they are currently positioned in terms of agroecological expression; and 2) have a new tool for helping them envision where they might want to focus their attention and efforts as part of a future transformation. The Intervale Center's Executive Director noted that the process of everyone becoming familiarized with the CIDSE agroecological principles contributed to 'different conversations' because now they share a 'common language' and a collective perspective for interpreting their context. Participants also mentioned that once they better understood agroecology, they were interested in using it to guide their work. The next step is using the principles not only as a tool for understanding the current situation, but also as a frame for focusing on how to improve and assess future performance in factors such as land use and opportunities for social engagement.

Holt Giménez and Shattuck (2011) describe a continuum from neoliberal/enterprise to radical/food sovereignty models, and suggest that we must navigate toward the latter for agroecological transformations to occur. Working with multiple groups across Burlington, we see an opportunity for using the principles to create this 'common language' around agroecology in pockets across the city, and are curious to see what happens to the dialogue on a larger scale. Agroecology is only beginning to make its way into research, practice and movement within urban and peri-urban settings (Fernandez et al. 2012; Renting 2017). Hence, we must test and develop promising frameworks to continue to advance agroecological work in cities and their periphery. Instead of only considering production and consumption interactions between urban and rural actors in the agrifood system, reworking these dynamics "...will require processes of negotiation, adjustments and development of common understandings, shared knowledge, and collective action to ensure that everybody at all times will have access to healthy nutritious food" (Vaarst et al. 2017 p. 699). The Intervale Center's tagline is 'Farms, Land, People.' Their educational efforts, multiple food production, distribution and rescue (gleaning) programs, make them in many ways a one-stop shop with the potential to respond to the call made by Vaarst and co-authors. However, there

is still much ground to cover to fully realize an agroecological transformation of the Intervale Center or the other organizations participating in this project.

Parallel to our deep dive with the CIDSE principles, and to contextualize our choice of this particular framework, we conducted a literature review of ten sources that explicitly refer to agroecological principles. We originally planned to use the four CIDSE dimensions (economic, political, environmental, and social-cultural) to sort the themes in the other versions of agroecological principles, but it quickly became clear that additional dimensions were necessary to capture the full range of principles described in the other texts. As a result of this exercise, we plan to explore additional themes in our future work with the partner organizations, to more fully capture urban agroecological expressions and potential as described in other contexts. One area of additional focus will be 'resource management,' and considering what actions are needed to help the environment; for example, lowering/eliminating the use of fossil fuels and looking for other ways to be more efficient in resource use (Anderson et al. 2019). We also want to specifically consider examples of 'localization,' which can be summarized as promoting local ideas, strategies, and resources (Bell and Bellon 2018; Gliessman 2016). This will push us to find examples related to the use of traditional ecological knowledge, efforts to shorten supply and distribution chains, and modifying practices based on the local context. Finally, we will seek out cases where human/nature interactions demonstrate a prioritization of the mental and physical wellbeing of people, and not just a general concern for the environment. We believe modifying CIDSE's categories to consider these three additional dimensions with our partners will result in a more comprehensive assessment of viability and desirability for agroecological transformation.

#### 14.7.1 Next Steps in the PAR Process

As we continue to explore the CIDSE principles and these additional dimensions of resource management, localization and ecological health, we look forward to using tools and concepts from relational values and cultural ecosystem services to help incorporate some of the intangible aspects of these principles into our assessment metrics. An important contribution of these methods is that they offer new ways to determine value. Increasing levels of urbanization around the world have motivated a growing interest in analyzing ecosystem services dynamics in urban contexts (Gómez-Baggethun et al. 2013). Research also demonstrates that the cultural ecosystems services lens can help to inform conversations about what is meaningful in urban agricultural settings (Riechers et al. 2016). As our experience with the Intervale Center demonstrates, we see potential for inquiry that uses cultural ecosystem services and relational values approaches to contribute to new "...ways of 'knowing landscapes'" (Chan et al. 2016 p. 1464). This expanded suite of valuation tools may increase "local appreciation for systematic, science-based approaches, and vice versa" (ibid. p. 1464). In our next phase we will move beyond the circle of actors with direct responsibilities (jobs, farms or garden) within the Intervale, to the wider public who access this space. Especially within that broader population, we anticipate that discussions of cultural ecosystem services may provide a potential 'foot in the door' that awakens interest in the environment, since, particularly in urban areas, the nonmaterial and social benefits of agriculture are often more obvious and sometimes appear more meaningful, than the biophysical benefits of the food produced (Camps-Calvet et al. 2016).

One of the innovations of our project was to explore the potential of ecological design in agroecological participatory action research, both as critical for conceptualization, and as a tool for action/application. In all of the sites, the need for shared understanding of space has emerged as a critical theme. This surfaced early on, when we requested maps from our partners and found that many of them were relying on coarse or outdated versions of maps to visually represent the land they manage. We have since worked to update satellite imagery maps for each of the partner organizations. By encouraging further precision in the maps, we have been affirmed in the power of looking at something together and the utility of visual forms to enrich conversations (Schattman et al. 2019). Our examination of the Intervale's land, and the activities it supports, was complemented by internal Intervale conversations interrogating the differences between restoration and rehabilitation, and what it implies for design and ecosystem benefits. As we discussed how this related to our work with the agroecology principles, we were reminded of the value of holistic and creative exercises to teach ourselves to think differently (Orion 2015). During the

recent results validation workshop with the subsample of interviewees, we used examples of the maps and photos from the exercise to convert their observations into tools for identifying needs and actions. Continuing to use the agroecological principles as a frame, our next step is to use these maps as a basis for designing interventions that either reinforce current expressions of agroecology, or support new efforts. We will then track these developments and their impact over time.

#### 14.7.2 Lessons/Conclusions

The integration of agroecology, cultural ecosystem services and ecological design proved to be an effective approach from a conceptual perspective. Each one of these fields provided unique contributions to make our approach truly transdisciplinary, and pertinent, for urban and peri-urban contexts. As expected, none of the organizations we are working with knew about agroecology, and aligning concepts and definitions around the topic proved to be a critical first step. The principles framework has facilitated a shift from the initial focus on characterizing urban/peri-urban landscapes from an agroecological lens, to catalyzing stakeholder interest and action in strengthening agroecological dimensions. The principles also provide an opportunity to monitor and assess performance of agroecology over time, which we will be analyzing as the process evolves.

In addition, the use of participatory action research (PAR) proved pivotal to our process. PAR principles provide a guide on how to establish successful relationships between research and non-research actors (Méndez et al. 2017), which have resulted in strong partnerships, yielding both important academic and actionable results. Successful PAR processes move at the speed of trust, which can cause impatience in a world accustomed to immediate results. PAR requires time, and can generate a high level of complexity that requires skillful management from the research team. Besides learning with and from each other, this PAR process has offered a regular forum for these partners to gather—something that they mentioned as a strength, and which was not happening prior to this project. In our experience, PAR also often leads to the need for inter- or transdisciplinary work, since most people outside of academia do not limit their thoughts or work to particular disciplinary silos.

Through building a shared vocabulary and developing observational cues that help people connect with the principles, we see exciting potential for urban agroecology to become more recognized and recognizable in and around Burlington, Vermont, and beyond. This is related in part to the enthusiastic community engagement we have seen so far in the early stages of this work. In addition, we also see explorations around agroecology helping to connect dots among people and ideas in our small city. We continue to observe new work emerging that ties in directly with food sovereignty, land reform, and protection of native species. Through our PAR process, we hope to support and amplify these efforts. Ideally, by reinforcing its presence and relevance, agroecology can become a unifying catalyst for broad food system transformation in Burlington.

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