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## **Amplifying Agroecology in Vermont: Principles and Processes to Foster Food Systems Sustainability**

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# Amplifying Agroecology in Vermont: Principles and Processes to Foster Food Systems Sustainability

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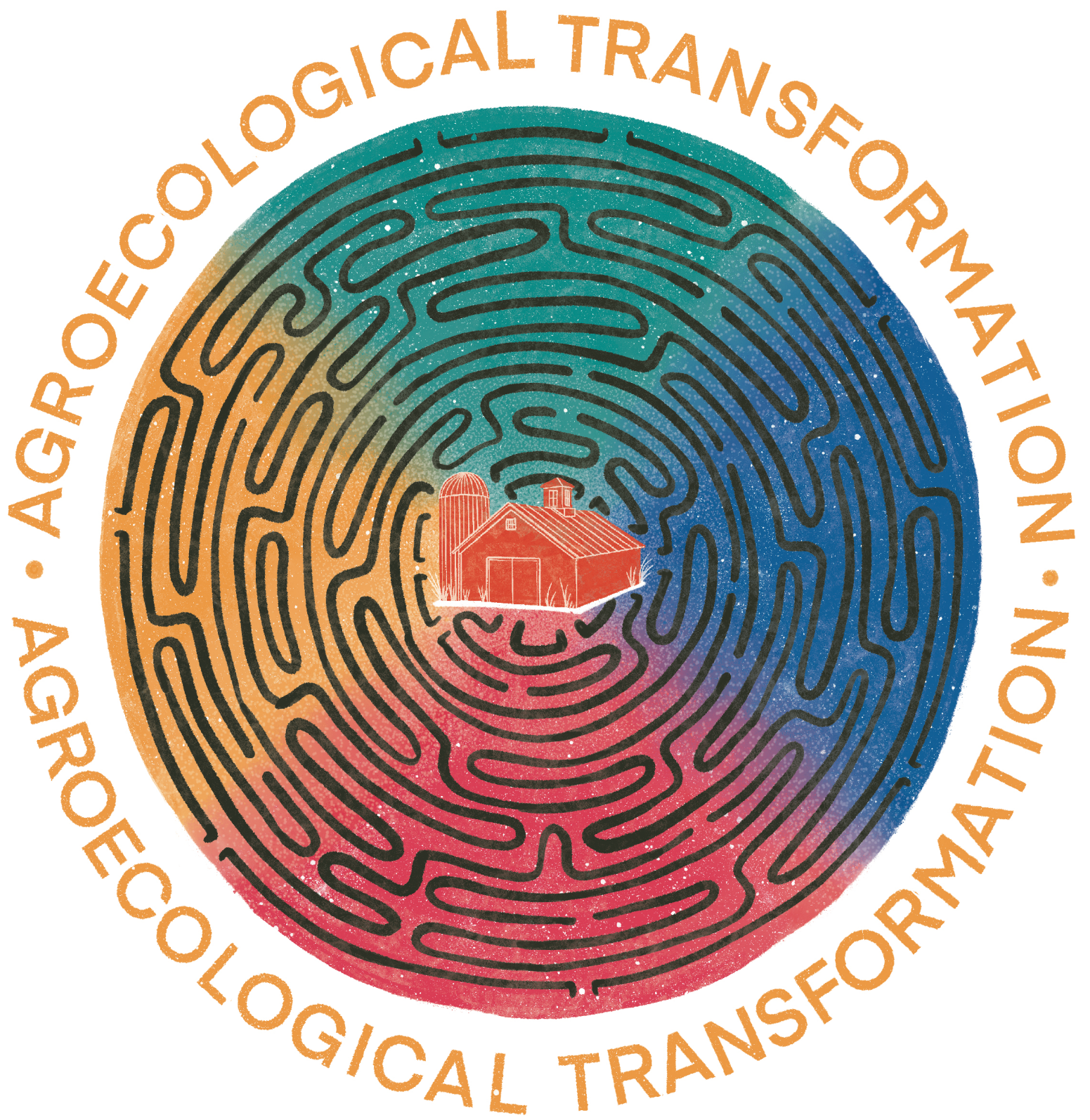
*January 2021*



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*This work took place in, and the University of Vermont is based on, unceded Abenaki Territory. Agroecology is rooted in Indigenous practices of food production, some of which are still practiced by the original inhabitants of this land. Truly creating the vibrant and sustainable food system we aspire to requires that we seek to understand the inextricable ties between people and places; that we not only learn the histories of those who have been displaced, enslaved, and invisibilized in the name of agricultural production, but also are accomplices in redressing past wrongs, and ensuring that we do not repeat them.*

# Amplifying Agroecology in Vermont: Principles and Processes to Foster Food Systems Sustainability

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# Introduction

Agroecology is grounded in principles that support transitions toward economic, social and ecological sustainability and proposes that real and lasting change will require a significant transformation of our agri-food systems. Evidence for agroecology's potential continues to grow, both through word of mouth by farmers and social movements, and through recent scientific assessments of its performance. With endorsements from the Food & Agriculture Organization of the United Nations (FAO), national governments in both the global north and south, and social movements, it is developing the web of 'thick legitimacy' required for even broader adoption (Montenegro de Wit & Iles, 2016). "...Agroecology represents a system that works with nature instead of against it and offers an approach to food production that boosts biodiversity, creates ecological resilience, improves soils, cools the planet and reduces energy and resource use. It has been shown to be highly productive, to provide highly diverse dietary offerings and to support the process of community building and women's empowerment" (Anderson et al., 2020, p. 3). However, agroecology is an approach that is not yet recognized as being actively practiced in Vermont and the USA, despite its significant potential for supporting transitions to sustainable food systems in different contexts.

The University of Vermont is home to researchers and practitioners at the forefront of agroecological research and learning. The objectives of this white paper are to demonstrate the importance of agroecology for the future of sustainable food systems in Vermont, and as a framework to assess and advance transformations towards sustainability. In this paper we will:

- a) Demonstrate the global evidence base for agroecology and the potential of agroecology in the United States, and Vermont.
- b) Present the case for an agroecological principles-based approach to assess food and farming sustainability which can capture the multifunctional dynamics and benefits of agroecology to economic, social and ecological sustainability.
- c) Present examples based on our newly developed Agroecological Assessment for Sustainability framework to existing initiatives in Vermont that represent constituencies across a range of farm types and scales.
- d) Demonstrate the importance of participatory and transdisciplinary approaches for research and development that move us toward the future of sustainable food systems and beyond.

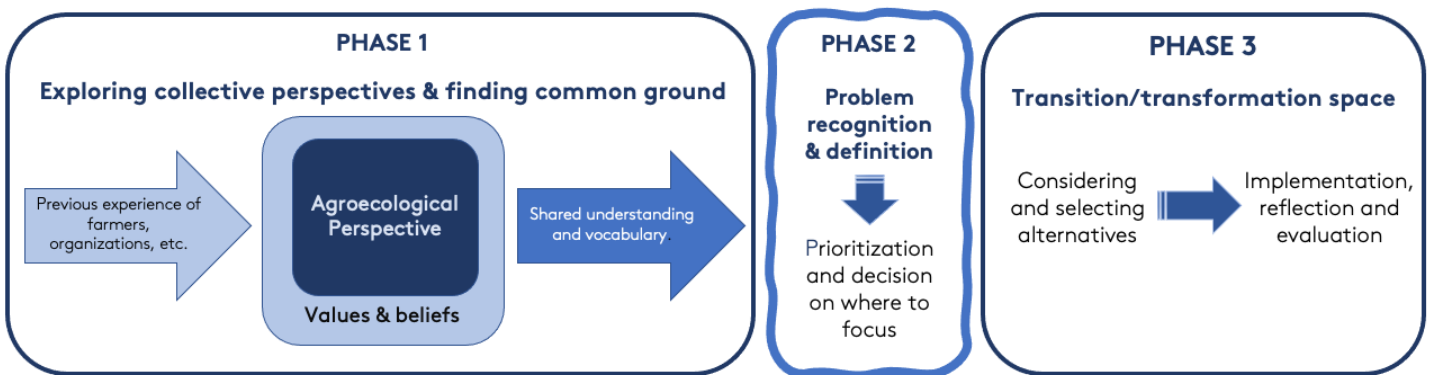


## Summary of Approach and Results

### 1.1. Agroecology, values and participatory action research

Agroecology is a science, agricultural practice, and global movement (Wezel et al., 2009). It has been developed by farmers, researchers, and food system activists, resulting in diverse sets of principles and transition frameworks that recognize and integrate the complexity of human, social, cultural, economic, and environmental dimensions within food systems (HLPE, 2019; Kapgen & Roudart, 2020). As it continues to develop as a field, new attention is being paid to the future of agroecological research both in terms of methods and its potential for revealing effective solutions (Mason et al., 2020). Attentive to metrics, the field emphasizes the importance of processes that are in and of themselves pathways to change. “The core principle of co-creation of knowledge [within agroecology] requires a very different approach to research: one that places farmers and stakeholders at the centre of defining research questions and developing solutions alongside scientists” (Wezel et al., 2020, p. 10). Since sustainability is not a static end state, but instead a dynamic process itself, we are proposing that sustainable agri-food systems should be centered on values, organized around agroecological principles, and facilitated through participatory action research processes, which center the voices of those who are most affected (Figure 1).

Figure 1. Agroecological Assessment for Sustainability Framework (AASF) - our framework for pathways toward sustainable agri-food systems



Modified from Biggs et al 2011

Our approach toward food system sustainability is grounded in our previous research in agroecology and agroecological social processes (e.g. Méndez et al., 2013). Building from those experiences, we are proposing the Agroecological Assessment for Sustainability Framework (AASF), which has four basic principles:

- **Holistic frameworks:** Frameworks that consider how component parts are integrated within agricultural and food systems, and how to measure multifunctional benefits that are vital to sustainability, yet have often been overlooked by conventional metrics.

- Relational values: Values that exemplify and infuse sustainability-promoting relationships with nature, the human/agricultural landscape, and how community influences individual and group priorities around sustainability.
- Participatory processes: Bringing together diverse experiences and perspectives can help to build common vocabulary, reveal shared outlooks related to challenges and opportunities, and highlight options for transition/transformation.
- Democratizing the debate: Listening to the people who are directly involved in our agrifood system is the best route for identifying the area(s) that will motivate committed and sustained action toward sustainability goals.

As we will demonstrate in this paper, we believe that agroecology is still an underutilized approach within Vermont and the wider context of the United States, with great unmet potential to support a more ecologically sound, economically viable and socially just food system.

## 1.2. Context

Agroecology is organized around principles, allowing flexibility when shaping its application in response to critical characteristics of any given time and place (Wezel et al., 2020). This white paper is focused on Vermont, and uses examples that are relevant to this particular moment. However, because agroecology is an approach that is practiced and endorsed across the globe, what we describe below incorporates aspects that can easily translate to other contexts, and in some cases have been derived from other contexts.

2020 has been a year of reckoning and hard truths. COVID-19 has taken hold of the world and stripped away what we recognized as normal. This has exposed vulnerabilities on multiple fronts. Barren shelves in grocery stores and empty pantries at home have revealed a food system with insufficient redundancy, processing and distribution networks that are too centralized and fragile to withstand disruption. Black, Indigenous and People of Color (BIPOC) communities continue to bear the disproportionate burden of providing ‘essential work’ even as they suffer the effects of persistent structural racism. All the while, the severe effects of climate change continue to wreak havoc across the globe as fires, droughts, and floods increase in both frequency and severity. This is a moment of multiple crises, which underscores the urgent need for transitioning to a more sustainable, resilient, and just food system. Steps of transition then serve as groundwork for more significant transformations to come.

It is natural in moments like these to seek solace in the familiar, but crises also make space for transformation. The search for alternatives, when combined with a sharper definition of what is *not* working, opens opportunities for us to consider new possibilities. Researchers have noted that crises have been one of the key drivers to bringing agroecology to scale (Mier y Terán Giménez Cacho et al., 2018). This reinforces the importance of clearly articulated, and actionable ideas for what we want to see in our agrifood system. Most definitions of sustainable food systems focus primarily on instrumental



values<sup>1</sup>: they emphasize priorities that include “...(ensuring) food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised” (FAO, 2018). Though critically important, this conceptualization stops short of considering the intrinsic<sup>2</sup> and relational<sup>3</sup> values that are woven into agricultural landscapes and production systems (Díaz et al., 2015). Agroecology strives to center these values via its focus on knowledge generation, cultural expressions and spiritual connections, and developing communities’ agency and collective power to challenge corporate control of the food system (Anderson et al., 2019; Nyéléni, 2015). Through both social and scientific processes, agroecology offers a countervailing agenda for a food system based on ethics of solidarity and reciprocity, which is economically viable, socially just, and environmentally sound (Gliessman, 2015).

Although Vermont is recognized for areas of strength within its agricultural economy, it is not isolated from the larger, systemic problems in our food systems and environment. As a state, Vermont faces wicked problems (Rittel & Webber, 1973) including “the loss of dairy farms, rising energy and feed costs, the volatility of commodity markets, global trade wars and fierce competition, water quality concerns, and climate change” as major threats and problems (VAAF & VSJF, 2020). These multifaceted, interlocked challenges stem from the growing “metabolic rift” (Foster, 1999), in which we start to lose connection with our intrinsic relationships with nature and land. This loss can erode relationships among people, and negatively affects soil, food, and landscapes. In a push for more production, value is extracted from local ecosystems, and highly consolidated value chains mean that profits feed the growth of the financial sector instead of being reinvested locally (van der Ploeg, 2009). These problems “...involve multiple interacting systems, are replete with social and institutional uncertainties, and [each are challenges] for which only imperfect knowledge about their nature and solutions exist” (Mertens, 2016, p. 3).

Agroecological systems can be established and strengthened step by step, through transitional processes. Agroecological transition levels offer an ‘on-ramp’ towards a transformation to more sustainable food systems. This path provides options for navigating around the “lock-ins” of the current agrifood system (Frison et al., 2016) such as dependence on chemical pest control or pressure to sell food “cheaply.” Agroecology is driven by the motivation of farmers and food system actors to forge this path, with

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<sup>1</sup> Instrumental values are associated with the benefits that nature provides to people. They are relevant in situations wherein people value nature (as an “instrument”) for what it provides them (Pascual et al., 2010). Examples include value of the storm protection services that mangroves provide to coastal areas, value of the water purification services of wetlands, and value of the sustenance that food provides. Most ecosystem services research and practice focuses on instrumental value (Himes & Muraca, 2018).

<sup>2</sup> Intrinsic value is value that nature holds independent of its impact on or relationship to humans. It is the value of nature in and of itself (Rolston 1988). Examples include the values that underlie efforts to conserve “nature for nature’s sake” and the desire to conserve biodiversity for its inherent worth (Díaz et al., 2015).

<sup>3</sup> Relational values are embedded in relationships between people and relationships between people and more-than-human aspects of the world (Chan et al. 2018). Care provides a prominent example; people may value a relationship with an ecosystem infused with care (Jax et al. 2018). Relational values are often associated with moral values (e.g., generosity) (Diaz et al. 2015).

evolving steps that support transitions toward improved livelihoods, communities, and ecologically sound environments.

The goal of this paper is to offer a map towards a sustainable future for the Vermont agrifood system, rooted in the holistic, systems-based analysis provided by agroecological approaches. We are advocating for conceptual shifts and intentional processes that uncover root causes, align with rights-based frameworks, integrate multiple knowledge systems, and promote participatory democracy (Anderson et al., 2020; Nyéleńi, 2015). In developing our proposal, we reviewed twelve of the most recognized principle-based agroecology frameworks and four agroecological transition frameworks. We compared these with the cited priorities of three organizations working on food system reform in Vermont, using policy documents and interviews with leaders and staff of the Northeast Organic Farmers Association of Vermont (NOFA VT), Rural Vermont, and Farm to Plate. Our proposed framework incorporates what we learned from the agroecological literature and the experiences of Vermont-based actors. We draw from best practices for participatory processes, namely that clear structure and skilled facilitation are critical for creating horizontal exchanges of ideas that explore both what is possible and what matters.

We will anchor our process in methods that help to understand, articulate, and characterize values. This foundation in values serves two main purposes. First, it provides insight into communities' normative orientations and desires (i.e., perceptions of how and what the world 'should be'). Second, recognizing the ways in which values are related to motivation and action (Schwartz, 1992), this approach highlights sources of motivation that will serve as drivers of change later on in the process (Ganz, 2015). In this step we will look for 'boundary objects', or "...conceptual tool(s) that enable collaboration and dialogue between different actors whilst allowing for differences in use and perception" (Enqvist, 2017, p. 17). Following Phase 1, where we explore collective perspective and vocabulary, we then move on to Phases 2 and 3, which are oriented around a set of guiding conceptual questions:

1. How do articulated priorities match up with agroecological principles?
2. What is the appropriate scale for action?
3. What are the lock-ins that are barriers to change?
4. What are the opportunities and existing resources?
5. How can values be integrated to contribute toward and sustain motivation for social actors?
6. Which practices will lead to desired change, and what effort/support is required to achieve this?
7. How can we establish social processes that build capacity, encourage innovation, and generate shared learning?
8. What indicators will provide evidence of adherence to principles and notable progress?
9. How can we best facilitate participatory analysis and dissemination of findings to broad audiences?

The following section presents a synthesis of core concepts related to agroecology, values-based frameworks and the participatory processes mentioned above, and how they relate to transformation

toward a sustainable food system. We then present three examples to illustrate how our proposed approach works, and its potential for real change. These examples are meant to demonstrate how participatory action research (PAR) processes, based on agroecological principles, can uncover shared values, which are the first step toward addressing myriad wicked problems. Our approach intentionally incorporates both flexibility and specificity, in order to include the necessary principles and indicators for any given context.

## 2. Background and frameworks

### 2.1. Agroecology

#### 2.1.1. What is it?

Agroecology has undergone an important evolution, since the term first appeared in academic documents in the late 1920s. In the 1970s the notion of agroecology aimed towards the integration of the field of agronomy with the field of ecology, focusing on the application of ecological concepts and principles to agricultural systems (Altieri, 1987; Gliessman, 1990). As agroecologists became more committed to supporting farmers and rural communities, the field expanded to include more social, economic and cultural issues. In addition, the realization that food systems had become complex, far reaching networks of a diversity of actors (i.e. farmers, distributors, consumers, etc.) led to a redefinition of agroecology as ‘the ecology of food systems’ (Francis et al., 2003). Since then, more holistic agroecological approaches have led the field into a more intentional integration of transdisciplinary approaches, which are also more inclusive (Mason et al., 2020; Méndez et al., 2015). Along these lines, Méndez et al. (2017) defined agroecology as “an approach that seeks to integrate ecological science with other academic disciplines (e.g., agronomy, sociology, history, etc.) and knowledge systems (e.g., local, indigenous, etc.) to guide research and actions towards the sustainable transformation of our current agrifood system” (Méndez et al., 2017 p. 1). An important aspect of agroecological approaches is their emphasis on rights-based frameworks rather than reliance on neoclassical economic mechanisms for determining resource allocation (De Schutter, 2010). A continuation of this rights-based work has also placed considerable focus on incorporating food, social and racial justice into agroecological work (Alkon & Agyeman, 2011).

There is ongoing debate about how values are incorporated into or excluded from the scientific endeavor (Elliott & Resnik, 2014). In a field like agroecology, which actively engages within both practical and political spheres, values are central to both its academic and applied expressions. As we elaborate in this document, agroecology has a long history of utilizing principles to guide its conceptual and empirical work. However, as the field has become more transdisciplinary, increasingly incorporating a variety of knowledge systems, the importance of understanding and aligning with the value systems from the diversity of cultures with which it engages, has also emerged. There is a very long history of traditional ecological knowledge systems that pre-date agroecology as a science, which must be acknowledged as the

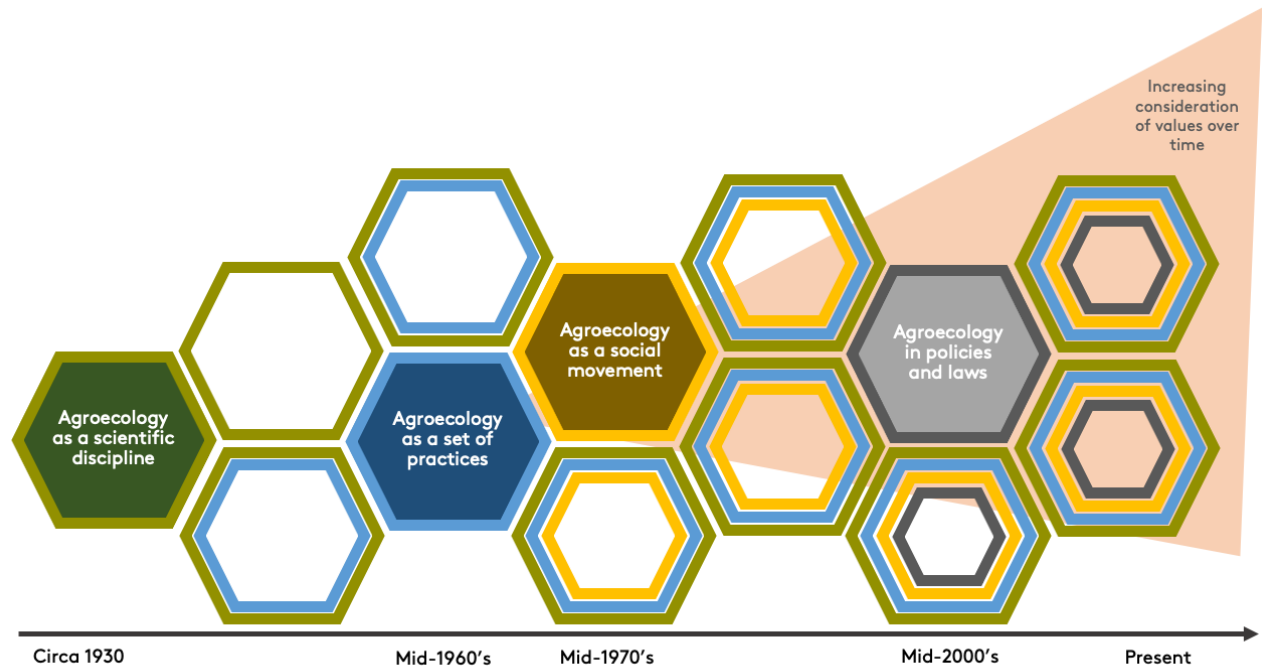
first expression of what we now call ‘agroecology’. A recent example from our work in the Andes region of South America illustrates this notion. During a workshop on agroecological transformation with projects in several South American countries, participants observed that many of the agroecological principles aligned with core values of Andean cosmovision. Some of the values mentioned included reciprocity, equity, complementarity and sustainability (Méndez, Bucini and McCune, personal observation). Once the participants made this connection to their own experience and context, they were better able to understand and were more interested in engaging with agroecology as a framework. This example illustrates the importance for principles-based work to intentionally engage with cultural and local values, as part of the work to identify and define the most appropriate principles to use, as part of any agroecological monitoring and assessment effort.

A key contribution of agroecology has been to gradually replace the reductionist, component-focused perspective in the agricultural sciences with a holistic, system-focused perspective (Méndez et al., 2016), which can be applied at both a hyper-local or a global scale. At its most basic, conventional agronomy uses Liebig’s law of the minimum to identify the limiting factor for plant growth, and its studies typically conclude with recommendations about specific mineral, water, or light inputs that can result in higher yields. This narrow focus leaves aside other critical factors including the complex needs of soil microbes, and potential impacts on farm workers, or pollinators. In other words, it does not account for the complexities of, or the negative externalities caused by these production systems. The dominance of industrial agriculture has also eroded the technical assistance that is available to farmers (Warner, 2008). Instead of extensionists or advisors, who are available to field questions about a range of topics, available support and information is often dictated by what is specifically allowable under grant funding and/or is limited to what can be delivered by input suppliers or other technicians who are able to make semi-regular visits to the farms (Maden, personal communication).

Similar to trends in Vermont (Chapin et al., 2019), a recent Canadian example describes steady decline in inter-generational farm succession, but cites interest in more ecologically-based farming approaches like agroecology by those who are entering farming from non-farm backgrounds (Laforge & Levkoe, 2018). A shift from the dominant model towards agroecology depends more on knowledge and less on external resources: whereas inputs are finite, knowledge continues to grow (Altieri, 2016). With agroecological approaches, the basic unit of analysis is the agroecosystem—any place of production, or farm, is seen and studied as an ecosystem (Gliessman, 2015). To date, agroecology has been promoted more widely in the global south, which has contributed to some doubt about the applicability of the approach in the global north. However, recent examples from Canada (Isaac et al., 2018; Laforge & Levkoe, 2018), Australia (Iles, 2020) and Europe (van der Ploeg et al., 2019) describe multiple benefits of agroecology, including results that shows agroecological approaches delivering yields equal or better to conventional systems, while “... also creat[ing] employment and considerably improv[ing] farmers’ incomes as well as the total income generated by the agricultural sector at regional and national levels” (Anderson et al. 2020 p. 18).



Figure 2. Additions to the focus and expression of agroecology, increasing its reach and legitimacy while maintaining core elements that form its foundation. Represented by colors representing addition of new dimensions/complexity over time. (Timeline date estimates from Wezel et al. 2020)



### 2.1.2. Why is agroecology based on principles?

Since its early days as an emerging scientific field, agroecologists proposed the use of 'principles' to guide research and applications in agroecology. As stated above in one of the first definitions of the field, agroecology is referred to as 'the application of ecological concepts and **principles** to the design and management of sustainable agroecosystems' (Altieri, 1987; Gliessman, 1998, emphasis added). However, there are many definitions and interpretations of what qualifies as a principle, and a review of the use of principles in agroecology aligns well with recent scholarship on the history and evolution of the field (Mason et al., 2020). Early work in agroecology focused solely upon the application of ecology, and the use of **ecological principles**, to agricultural contexts (Altieri, 1987; Gliessman, 1990). Subsequently, as work in agroecology advanced and evolved, the field began to deepen its interdisciplinary content and approach. In 2003, a review article by several recognized agroecologists explicitly proposed the need to broaden the application of agroecological research and applications to the scale of the food system (Francis et al., 2003; Gliessman, 2006). These developments also pushed the needle, in terms of the scope of agroecological principles, to include new ones focused on social, economic, cultural and political issues. Since then, many authors and organizations have worked to 1) develop and refine an expanding set of **agroecological principles** (Wezel et al., 2020), and 2) critically explore how best to apply a 'principles-based' approach (Méndez et al., 2020; Patton, 2017). There is now a strong recognition that it is essential to include social justice considerations, such as access to land, seeds, and water, local knowledge, gender equality, and cultural diversity, as well as maintaining key biophysical aspects such as energy efficiency, water efficiency, nutrient cycling, etc. (Barrios et al., 2020).

Since agroecology crosses science, practice and social movements (Wezel et al., 2009), principles-based approaches have been developed within all of these dimensions. As expected, principles proposed by scientists tend to be more tied to biophysical measurements (e.g. Nicholls et al., 2016), whereas principles developed by actors in civil society tend to be more practical (e.g. CIDSE, 2018) and values-driven (Nyeleni, 2015). Our literature review of the different principles-based approaches revealed many similarities, however there is a notable difference between those that include social/political indicators (e.g. Barrios et al., 2020), versus those that focus more heavily on biophysical processes (e.g. Nicholls et al., 2016). Based on a belief that sustainability hinges on the ways in which social and ecological systems interrelate, we are best positioned to support positive change through transdisciplinary work that combines diverse expertise and perspectives for comprehensive understanding, including the evaluation of tradeoffs (Mkwara, 2018). Because of this, for this paper we focused on the more holistic principles frameworks, which include social/political and biophysical facets, and we reviewed each for its perceived applicability and compatibility for the Vermont context.

Agroecological principles have been embraced by organizations, researchers and decisions-makers at local, regional and international levels to monitor progress along agroecological transitions (e.g. Nyeleni, FAO, CIDSE, LUME, MESMIS). Trusting in the expertise and knowledge that is embedded in agricultural communities and indigenous foodways, community members should be active in the definition and selection of relevant principles that guide farming life and food production practices (Pimbert, 2017). Despite the recognition that transitions towards sustainable agriculture can only happen with the active engagement of local communities, principles used in local agricultural research are often chosen and/or developed by academic institutions instead of farmer organizations. Through our PAR processes, applying multiple agroecological frameworks with local communities in multiple countries (Anderzén et al., 2020; Caswell et al., 2020; Méndez et al., 2016; Yumbala et al., 2020), we have learned that principles are most relevant to a farmer or an organization when they can both relate directly to their experience of farming and life, and be expressed in a form that has meaning for them.

When working with farmers and the organizations that support them, our experience has shown that frameworks that are able to clearly communicate and visualize agroecological principles are the preferred option. We believe that the agroecology principles framework serves as scaffolding to build the base for deepening or expanding the work in the directions of science, practice or social movements, or some combination of these, based on the priorities and preferences that are most relevant in the context and moment. While some international organizations and scientists' efforts are directed at harmonizing agroecological principles for the sake of unifying the discipline's knowledge and avoiding co-optation, the existence of multiple 'agroecologies' (Méndez et al., 2016) allows each group to find its home within the field. Cultures and history have enriched the number of frameworks testifying regional needs and understandings of farming as well as food systems. In a recent seminar organized by the Swift Foundation (Swift Foundation, 2020), A-dae Romero-Briones, Director of Programs at the First Nations Development Institute, pointed out that technical jargon and terminology can lead us to focus so much on the practices that we forget the people. Embracing this call, agroecology can open to the power of social movements to remind us that people are the essential engine for transformation. Agroecology principles

are therefore representative and relevant when they are grounded in the culture and history of the people and their land.

For this paper, we chose to use the 15 principles that CIDSE<sup>4</sup> refers to in their infographic (Appendix A), since this visual presentation has proven to be a straightforward tool for presenting the multiple dimensions that comprise agroecology (CIDSE, 2018). While the framework is directed to non-governmental organizations and civil society, and does not necessarily prioritize research outcomes (e.g. statistically sound experiments), we have tested its application with a variety of non-research focused actors (Caswell et al., 2020), with promising results for both research and actions. We recognize the tensions between the desire for cohesion in order to scale agroecology, and the need for radical change expressed in the variety of agroecological principle frameworks that have been developed. We have chosen a pragmatic approach, and based on our experience, found the CIDSE framework to be a good starting point. It conveys a desire to find just solutions, maintaining a strong emphasis on environmental and social sustainability and sovereignty. In addition, this framework clearly conveys concepts because it has a transparent and natural description of its principles and is accompanied by a simple and intuitive infographic. The CIDSE framework can also be a direct mobilizing option to develop assessment tools and evaluate principles-based agroecology. The stories presented by CIDSE, both in their literature and CIDSE website provide examples for the applications of agroecological principles across different contexts. Rather than systematizing farming practices within a single knowledge system, we are using the CIDSE principles as a tool to inform the transformation process towards sustainability using agroecology and its richness of views. Our Agroecological Assessment for Sustainability Framework leaves room for making additions and adjustments to the CIDSE framework based on the context in which it is being applied.

Patton (2017) reflects on the utility of principles and refers to their ability to provide direction and adapt to different contexts. Importantly, he writes that “...principles must be interpreted and applied contextually and situationally to ensure relevance” (p. 368). Their effectiveness depends on the decision-making processes that underlie how principles will be selected, interpreted, possibly rephrased, applied and evaluated by the actors. We experience this directly in our work - centering attention on *who* makes the decisions and *for whom*, as a core consideration throughout our PAR processes (Anderzén et al., 2020; Caswell et al., 2020; Méndez et al., 2016, 2017; Yumbla et al., 2020). For this reason, we have worked with our partners during this planning stage to identify producers’ needs in Vermont, and choose agroecological principles that speak to those needs. We see principle-based agroecology as a way to take people, environment and farming beyond terminology. Social, environmental, economic and political sustainability are deeply intertwined and necessary domains of action for a truly sustainable agriculture. Within this perspective, we believe that integrating agroecological principles that carry in themselves the power of people’s choice to these domains is the driving force that will promote the transformation towards food systems that are ecologically sound and socially just.

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<sup>4</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)

## 2.2. Cultural ecosystem values

Throughout human history, cultural practices have mediated ecological disturbance regimes. Intermediate levels of landscape disturbance, such as those involved in traditional agrifood supply systems, have been shown to increase alpha and beta biodiversity, as new niches open and evolutionary opportunities arise (Rivera-Núñez et al., 2020). In this sense, human cultures have not only been a part of, but have actively created, the biodiversity that is today threatened by the expansion of extractivist economies. Globalization, fossil-fuel-driven development and the processes of privatization and commodification of seeds, water, land, forests and seas actively threaten many human cultures, as well as millions of animal and plant species. In much of the world, agrobiodiversity hotspots coincide with Indigenous territories (Zimmerer et al., 2020). First Nation and Indigenous cosmovisions emphasize a continuity, rather than a divide, between sociocultural practices of human life and ecological processes (Sheridan & Longboat, 2006). As part of this integrated cosmovision, Indigenous Peoples and local communities have long defended the commons, territorial sovereignty, and collective institutions for governing common property (Ostrom, 1990). As urbanization and mechanization further separate people from the land, scholars are studying the multiple potential implications of this divide. This is critical, given that diverse ontological perspectives on “nature” and human-nature relationships influence both our values and actions (Merçon et al., 2019; Muradian & Pascual, 2018).

Understanding and addressing beliefs and values (and considering the human-nature relationships that underlie them) is central to approaches, like agroecology, “...that envision transformed social and environmental relations based on values like respect for the natural world, solidarity, and justice” (Jones & Tobin, 2018, p. 71). Scholars in the field increasingly discuss values as intertwined with agroecology, yet to date the field of agroecology has not systematically engaged with values scholarship. In this project, we begin to fill this gap (see Figure 3).

Ecosystem services (ES) have emerged as a frame for characterizing the benefits nature provides to humans. The category of cultural ecosystem services (CES), one component of the ES conceptual framework, includes “...‘ecosystems’ contribution to the nonmaterial benefits (e.g., experiences, capabilities) that people derive from human–ecological relations” (Chan et al., 2011, p. 206). Commonly studied CES include cultural heritage, identity fulfillment, recreation, and aesthetic experience (Milcu et al., 2013). Relational values (RV) consider reciprocal relationships between humans and nature. Relational values (defined above) explore “...embeddedness, collective meaning, flourishing, heritage, beauty, self-transformation, sense of place, spirituality, livelihoods, justice, conviviality, care, and kinship” (Himes & Muraca, 2018, p. 3). These concepts provide a language and framework to investigate how human relationships with land and nature are more than just a means to an end -- rather, those relationships can be integral components of a “good life” and a holistic sense of well-being. Specifically, both CES and RV scholarship work to develop ways to articulate and characterize values that are difficult (or perhaps impossible) to express in economic frameworks. This non-economic value is often central to agroecosystem management, but dominant modes of incorporating values into decision-making do not facilitate their inclusion. In addition, scholarship on CES and RV recognizes the deep intertwining of



material and nonmaterial aspects of relationships with nature; especially in agricultural systems, it can be nearly impossible to disentangle these tangible and intangible elements (Jones & Tobin, 2018). This project aims to develop techniques and tools to allow better integration of these complex, important, and under-discussed values.

The idea of farmers as stewards of the land who are exercising their relationships with nature through agency, care and knowledge speaks to both the interdependencies and complexities of human/nature connections (Enqvist, 2017; West et al., 2018). In trying to be ‘good farmers,’ individuals are juggling how to stay afloat with considerations about how their actions will impact the biophysical landscape and be received by the broader community of food systems actors. Relational values tend to align more closely with the low-intensity agricultural systems that follow ‘land-sharing’ models, which endorse multifunctional landscapes, than with the ‘land-sparing’ models that advocate explicit separation between agricultural and natural areas (Allen et al., 2018). Both CES and RV are highly consistent with the socio-cultural and political dimensions of agroecology; they align directly with ‘food sovereignty’ and ‘farmer-to-farmer learning processes’, as well as other principles.

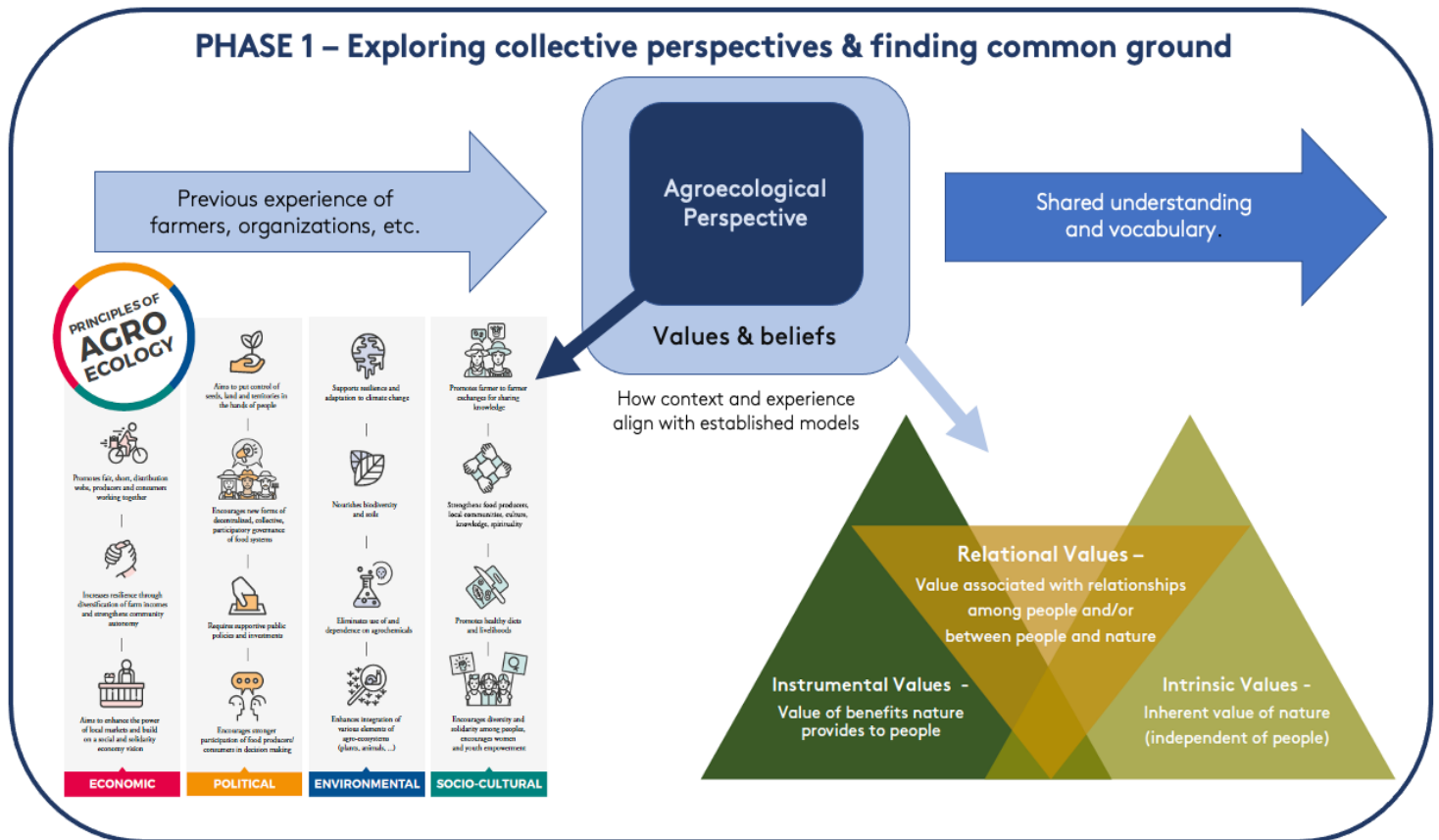
Despite being ubiquitous, these concepts are very complicated to measure for many reasons, including their inherent subjectivity, their context-sensitivity, and, perhaps most crucially, the difficulty of quantifying values such as spiritual fulfillment. Since “...these relationships are not something [that many people] commonly think about...being prompted to consider and articulate (values) can shed light on the non-material connections...with nature” (Gould et al., 2020, p. 264). Both CES and RV are modern articulations that mirror long-standing valuation traditions in Indigenous and other cosmologies (e.g., biocultural values) (Pascua et al. 2017, Sterling et al. 2017). Qualitative and ethnographic methods can be used to facilitate conversations around CES and RV to explore and clarify values, elicit understanding of where there is common ground and where divergence in perspective and/or priorities exist (Chapman et al., 2019). Through this process, collective vocabulary emerges to facilitate future communication with shared understanding.

When diverse groups of actors from the agri-food system are engaged in a process of stating and prioritizing values, nuanced positions can be considered. This avoids the creation of monolithic ‘farmer’ narratives about human/nature relations. Including voices from multiple farm types, land-owners, renters, laborers, consumers, and others along the food chain can serve as a strategy for reducing the potency of historically dominant value systems, dismantling oppressive power structures and making space for the integration of multiple perspectives (Rawluk et al., 2019). “Transforming people’s relations towards nature [and agriculture] first requires addressing how (and why) humans cognitively frame their relationships with it, and the intricate mechanisms involved in changing such framings” (Muradian & Pascual, 2018, p. 13). Some of this is likely already articulated in farm planning documents (personal communication with Mark Cannella, UVM Extension), or other work the farms have done in previous efforts to secure funding or through work with technical advisors. The expectation is not that everyone shares the same opinions about what is most important, but instead that we encourage discussion about what matters and collaboration towards perceived improvements, even when actors view the issue(s) from distinct perspectives (Kenter et al., 2019).

### 2.3. Collective perspectives and common ground

In participatory, transdisciplinary processes where multiple ways of knowing and areas of expertise are brought together, there is space for rich conversation and also real risk of misunderstanding. Using simplified versions of existing frameworks to establish collective perspectives and language (see Figure 3) can serve as critical tools for “translating basic concepts and facilitating communication, and assisting the formulation of fundamental understanding that is transparent, salient, credible and legitimate to all parties involved” (Díaz et al., 2015, p. 12). Introducing concepts that are both flexible enough to allow for individual interpretation, and robust enough to provide an anchor for comprehension across different perspectives, can also contribute toward identifying indicators that resonate with, and reflect the beliefs of, all participants in a given process. This will also lead to developing and embracing metrics that are meaningful to all actors.

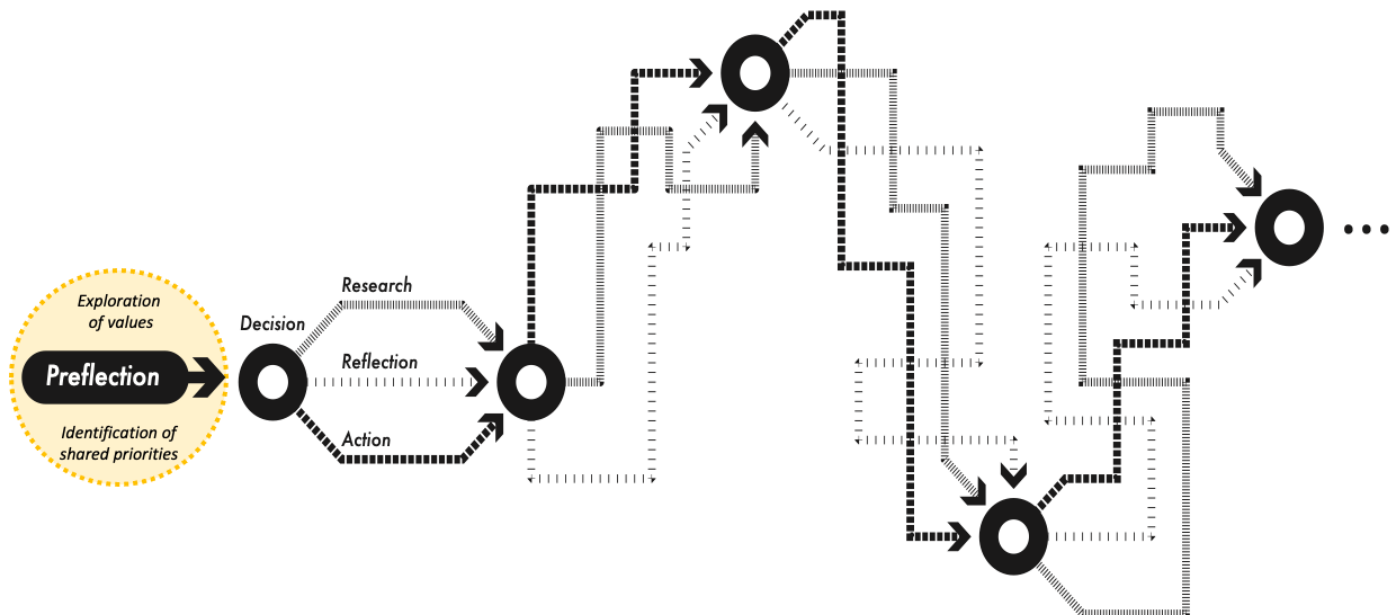
Figure 3. Details related to Phase 1, including the exploration of collective perspectives and finding common ground (values graphic modified from Chan et al. 2018 and agroecological principles infographic from CIDSE, 2018 used with permission). See appendix A for larger versions of CIDSE infographic.



## 2.4. Participatory Action Research (PAR)

Challenges of communication, integrating multiple types of knowledge and/or perspectives, and insufficient agency and sense of ownership of processes (Biggs et al., 2011) are each obstacles that have been noted in conservation processes. These same issues emerge in a variety of fields, from public health to sustainable agriculture (Castellanet & Jordan, 2002; Minkler & Wallerstein, 2008). We propose that participatory approaches, which are grounded in agroecology and relational values are well-suited to address these barriers. 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). Research, reflection and action are each critical threads, which are woven through iterative cycles, where there may be greater or lesser emphasis on any one thread, but ideally each is present (see Figure 4, below). The stage of reflection below is similar to the ‘forming’ stage in Tuckman’s group development model (Tuckman & Jensen, 1977), whereby actors are building trust and understanding, determining what interest they have in working together, and identifying potential common areas of interest and priority. Decision points throughout the PAR process are important moments for determining where to invest attention and resources to continue momentum toward the end goal, while reflection throughout ensures that emergent ideas and trends can be incorporated midstream if/when appropriate. The best PAR processes result in knowledge co-creation and/or transformation that is not only interesting, but also useful, improving the rigor, reach and relevance of research efforts (Balazs & Morello-Frosch, 2013). Mimicking community development processes, PAR works best “... when we focus on the structure of how we gather and the context in which the gatherings take place; when we work hard on getting the questions right; when we choose depth over speed and relatedness over scale” (Block, 2018, p. 73).

Figure 4. Iterations of Participatory Action Research Cycles including explicit exploration of values and identifying shared priorities (modified from Caswell et al. 2020)



### 2.4.1. PAR and Farmer-to-Farmer methods

Participatory Action Research and farmer-led research share many values in common. Farmer-to-farmer (FtF) methods are yet another variant of the suite of approaches that value co-creation of knowledge and focus on responding to articulated needs by providing context-specific and highly practical interventions (Heleba et al., 2016; Holt-Gimenez, 2006). Ingenuity and experimentation are embedded in the daily practices of agricultural and food systems work, but often without the protocols recognized by the formal scientific establishment, which are expected in order to call something “research.” This can result in researchers dismissing observations without supporting data as anecdotal. However, data sets without practical examples to support them can also be minimally convincing to non-researchers. A framework that matches researchers with counterparts who work on the ground in the food system responds to the ‘research-implementation gap’ (Knight et al., 2008) by offering a social process that supports validation through peer-to-peer encounters, and data collection and analysis that provides empirical, and hopefully applicable, evidence.

Because of the need to establish relationships and trust, PAR and FtF approaches take time to unfold.

*“When technology is introduced slowly by overcoming limiting factors one by one, farmers have a chance not only to test, implement and share the innovations, they also build up strong “circles of knowledge” amongst themselves... Agriculture is always changing: crops change with respect to markets, seeds degenerate, new inputs come and go... Therefore, it is much more important to develop the local capacity for innovation than to concentrate on the innovations themselves. If farmers are capable of innovating and sharing, they will always be able to respond to change and crisis” (Kruger, 1995, p. 30).*

However, spending time up front to determine the values and principles that will guide the effort pays off later on and for the long-term, as it provides a strong base from which it is possible to change direction when stakeholder priorities or needs change. Typically based in root cause analysis and directed action, these approaches endorse investing effort into understanding broader ecologies, using all five senses, and relying on “...observations and sense-making activities...carried out in real-life situations – in the field and in vivo. Careful observations and inclusive conversations help map, analyze, understand and respond to complex and ever-changing natural and social phenomena in place-specific situations.” (Pimbert, 2018, p. 274)

The Kruger quote above reinforces the value of iterative processes. The key here is protagonism by the people most affected, which leaves room for maneuvering to make context-specific adjustments that will lead to better outcomes. Through reflection and ongoing situational analysis that ensures relevance, PAR and FtF processes encourage actors to learn from their own experiences. Participants can then collectively create dynamic solutions that respond to emerging trends. Ideally, there are coordinated but parallel processes where farmers (or other food system actors) disseminate their findings through social networks, while researchers work to better understand, analyze and translate the findings for other audiences. A functional version of this from our local context is the highly successful Vermont Vegetable



and Berry Growers Association (VVBGA) listserv. Recognizing the expertise of growers themselves, this resource serves as a crowd-sourced web of knowledge that responds to questions and provides recommendations that are highly context-relevant. UVM Extensionists have used this information to shape educational content and to direct funding in response to the topics and needs discussed in the listserv (Schattman et al., 2015). This design is highly compatible with an agroecological approach, where there is clarity around a desired outcome but not prescriptive logic about how to get there.

## 2.5. Transition and transformation frameworks

Holistic, multifaceted approaches become necessary when the scientific community, along with other social actors and institutions, begins to discuss food system transformations. In general, by food system *transformation*, we refer to the multidimensional, system shift from one state to another. The unsustainable agricultural model that has been largely consolidated in the decades since World War II is based upon mining and petrochemical industries, as well as international transportation of farming inputs, workers, and food (J D van der Ploeg, 2009). Agrochemical inputs and food processing allow monoculture agriculture and feedlot animal production to be profitable, but only at the cost of despoiling and polluting the surrounding landscape and creating dependency on the global petrochemical industry (Gliessman, 2015). In the long term, this model depletes biodiversity, does not provide significant employment in the countryside, and thus can be linked to massive global human migrations. The global food system causes at least 30% of all greenhouse gas emissions, and transitions to lower input and lower-waste agricultural models are among the proposed solutions for achieving the climate targets set by the Paris Agreement (Clark et al., 2020).

### 2.5.1. Existing transition frameworks

There are many ways to configure agroecological principles into pathways toward agroecological transformations. Along these paths, *transitions* are the steps taken to improve on current conditions (making small changes to navigate around problems within a system), whereas transformations are significant changes that respond to the underlying causes of dysfunction within systems. Some researchers rely upon more biophysical approaches and data-based strategies for understanding how food can be shifted from the petrochemical complex, in order for food systems to be re-localized. Others incorporate lessons from social sciences and transdisciplinary studies, often recognizing the unique role of women in food and agriculture, as well as actors and/or social movements that push for the democratization of food systems (Anderson et al., 2020; IPES Food, 2018; Kapgen & Roudart, 2020; Ong & Liao, 2020).

Transition frameworks offer diverse kinds of narratives to explain what takes place during agroecological transitions. The “classic” framework is that of Gliessman (1998) which consisted of three phases for implementation at the agroecosystem level, and mostly from a biophysical perspective: (1) minimizing the use of conventional inputs, (2) substitution of conventional inputs with alternative inputs, and (3) system redesign upon a new ecological basis. These three phases grew to four, and then five, in order to

include a change in values and the construction of local circular economies, and finally a global systems transformation toward sustainability (Gliessman, 2015). These changes in the proposed agroecological transition/transformation processes aligned with the evolution of the field of agroecology, from mostly having a biophysical focus to one of transdisciplinarity (Mason et al., 2020).

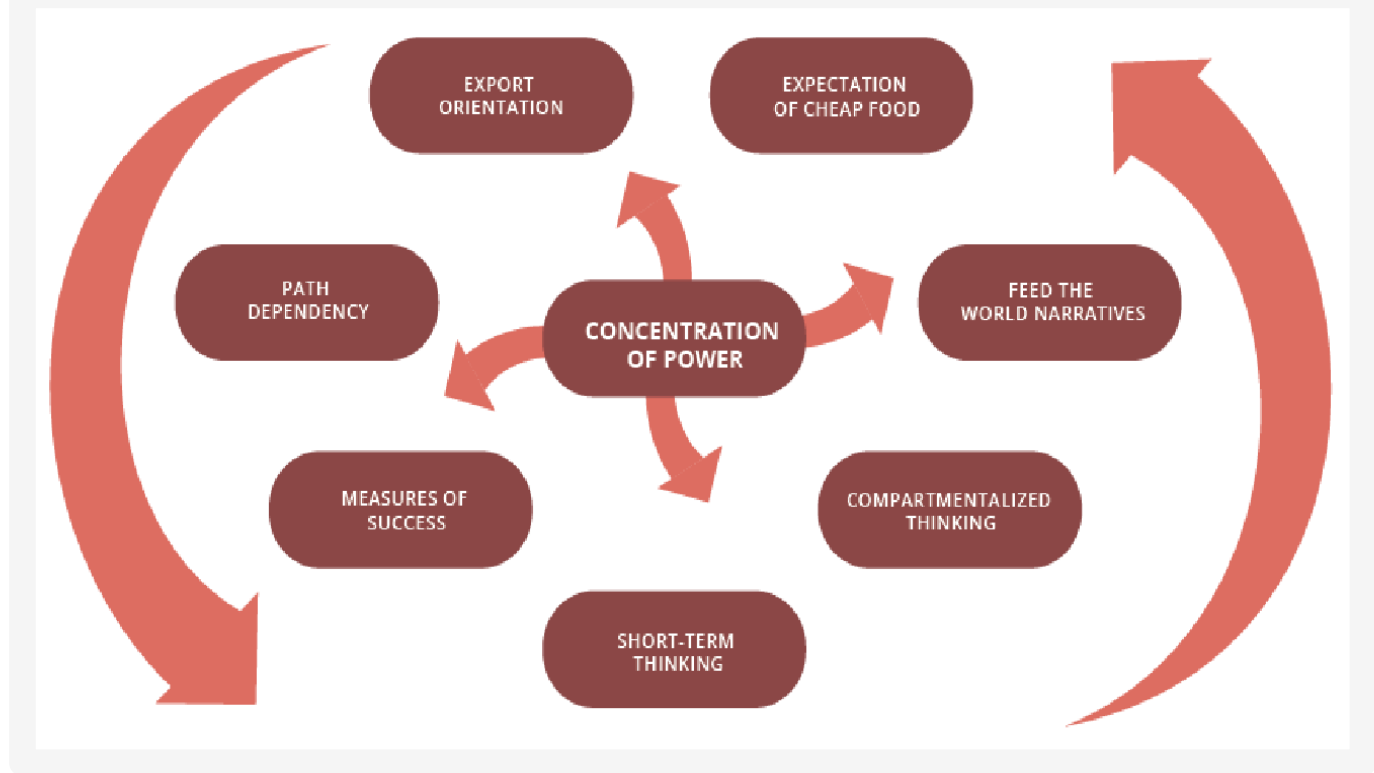
A diversity of transition frameworks have been developed since first proposed by Gliessman (1998). The 2009 publication of the IAASTD report, *Agriculture at a Crossroads*, provided a highly visible proposal stemming from a participatory process that included hundreds of scientists from across the world. Some of these frameworks use the resilience concept as a way to understand the thresholds that agroecological transitions must cross in order to become stable systems (Ong & Liao, 2020; Tiftonell, 2020; Vandermeer & Perfecto, 2012). Others focus more on sociological (Collado et al., 2013) or constructivist learning aspects (Meek, 2015; McCune et al. 2016) of agroecological transformations (Méndez et al., 2013). The recently published LUME framework (Petersen et al., 2020), bridges critical insight from social metabolism theory and the framework of agroecological transitions. The selection of a transition/transformation framework should follow decisions about the scale and scope of change that is desired and perceived to be possible. Ideally, the goals are ambitious but attainable, so that there is a long-term plan, with intermediate points where gains can be realized. Some would say that the final transformation may be no more than an aspiration, but what is valuable is the socio-ecological **process**, along with the lessons and advancements that it may provide (Méndez, 2020, personal communication).

### 2.5.2. Barriers to transition

In one way or another, all of the transition/transformation frameworks have to respond to the forces that prevent or delay the desired changes. IPES-Food (2016) refers to these obstacles as “lock-ins” of industrial agriculture (see figure below) and highlights eight of them: 1) the expectation of cheap food, 2) the orientation of agriculture toward exports, 3) technological path dependency, 4) the limitations of conventional measures of success, 5) short-term thinking, 6) compartmentalized thinking, 7) “feed the world” narratives, and, more than anything else, 8) the phenomenal concentration of power maintained by the current industrial food system, described by some as the ‘food regime’ (Giménez & Shattuck, 2011). This last lock-in refers to the ownership and control of seeds, land, water, and other natural resources and the commons, as well as access to decision-making, in the hands of a small minority of individuals and transnational corporations.

In Vermont, for example, producers who are interested in seeds that have not been treated with neonicotinoids encounter lock-ins when they are unable to source untreated seeds or pay a premium because of their relative scarcity (Unangst-Rufenacht, personal communication), and dairy farmers suffer from commodity markets delivering milk prices that are insufficient to cover even the costs of production. As the industrial food regime gets stronger, and consolidation leads to fewer voices having even more power, approaches like agroecology must become even more effective in demonstrating their relative advantages. Agroecology challenges the status quo by promoting relationships over transactions, culture over commerce and people over profit (IPES-Food, 2016).

Figure 5. The Eight Key Lock-ins of Industrial Agriculture. Used with permission from (IPES-Food, 2016).



### 3. A participatory agroecological and relational values approach

Our research team has developed an approach inspired by multiple agroecological principles and transformation frameworks.

Recalling Figure 1 (p. 1), the initial phase creates a shared space to explore values and establish common language to be able to work together across diverse experiences and perspectives. This first phase asks participants to articulate values they hold related to visioning work they might have completed as part of their farm or transition plans, and share ideas about the future they hope to see. Conversations with other farmers will center on prompts, including open-ended questions like “what are you most excited about on your farm?”, “name your top three big picture concerns; top three immediate concerns?”, “describe your farm as it is and as you’d like it to be,” and, “what do you most want to change and what is stopping you?” (Maden, personal communication). These questions can also generate dialogue about what the farmers identify as mistakes, and by bringing them forward in dialogue these lessons can help to educate other farmers. After collecting initial responses on experiences and values from Phase 1, Phase 2 begins with the research team using agroecological principles as a frame for sorting the responses into

categories. A follow-up conversation with all contributing participants reviews the initial responses in this new format (in this case, grouped by the CIDSE agroecological principles).

CIDSE categorizes agroecological principles into four basic dimensions - economic, political, environmental and socio/cultural. The following descriptions for each dimension are adapted from CIDSE (2018) (see Appendix A).

**Economic** - Agroecology considers gender equality, soil health, cultural significance, youth interest in farming, and other issues that are not given value by the market, which means short term profitability is not a reliable tool for channeling motivation into agroecological transformations. However, improvements in farm income, reduced debt, greater added value as a proportion of total revenue, reduced risk, increased consumer demand and other economic variables are extremely important factors of farmer viability and can be employed strategically in agroecological transformations. The principles included in this dimension refer to fair distribution webs; diversified farm incomes and community autonomy; and enhanced local/solidarity economies.

**Political** - The political dimension of agroecology focuses on power dynamics and paths toward greater agency for those who are directly engaged in food production, especially the smaller scale producers who supply the majority of food around the globe. This is in direct response to the increasing consolidation of corporate actors within the food system, challenging the domination of a few powerful players with an approach that is based on the right to food and pursues food sovereignty. “When part of a food sovereignty approach, agroecology represents a democratic transition in food systems that empowers peasants, pastoralists, fisherfolks, indigenous peoples, consumers and other groups, allowing their voice to inform policy making from community to national and international level” (CIDSE, 2018, p. 9). The principles included in this dimension refer to local control of seeds, land and territories; decentralized, participatory governance of food systems; supportive public policies and investments; and stronger participation of food producers/consumers in decision-making.

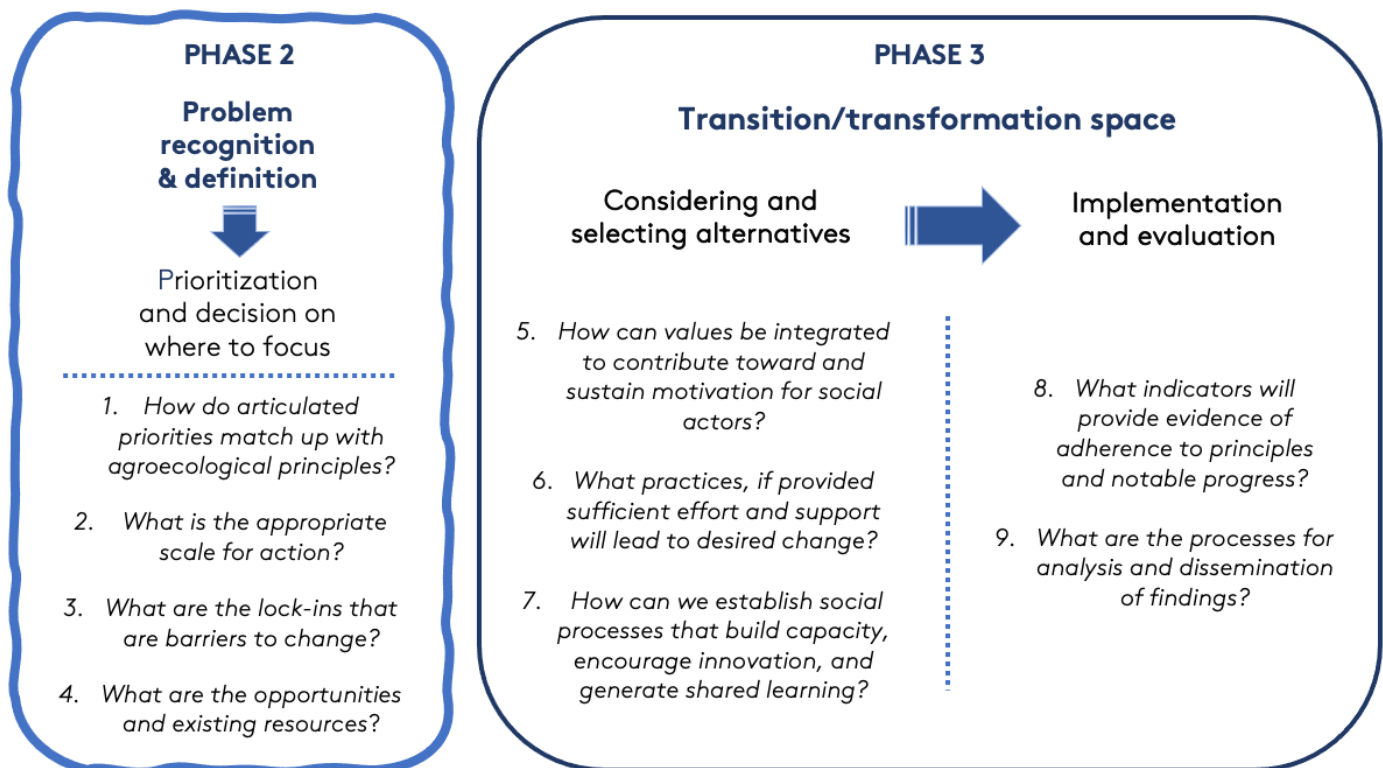
**Environmental** - The environmental dimension of agroecology focuses on mimicking natural ecosystems and reproducing natural ecological processes in agricultural settings. One example of this is working toward healthy soils through increasing levels of organic matter and using composts and other applications that replicate the microorganisms found in undisturbed soil ecology, so as to create self-perpetuating cycles that are less reliant on external inputs. Agroecology is seen as contributing towards building more complex and ecologically resilient agroecosystems, with a strong capacity to confront biophysical challenges, such as climate change. The principles included in this dimension refer to resilience and adaptation to climate change; nourishing biodiversity and soils; eliminating dependence on agrochemicals; and enhancing the integration of elements within agroecosystems.

**Socio/cultural** - Agroecology values and integrates local and Indigenous knowledge with the skills and traditions of farmers and food producers, which serves as a strong foundation for pursuing the right to food. This allows for the development of socially, ecologically and culturally appropriate technologies and approaches, closely tailored to the needs and circumstances of specific communities of small-scale



farmers, peasants, Indigenous People, pastoralists, fisherfolks, herders, and hunter-gatherers, based in their own environment. The principles included in this dimension refer to farmer to farmer knowledge exchanges; strengthening cultural and spiritual connections within local communities; promoting healthy diets and livelihoods; and encouraging diversity and solidarity among peoples (especially women and youth empowerment).

Figure 6. Details related to Phase 2 and 3, identifying priorities, considering alternatives and making plans for transition steps toward transformation. The wavy line around Phase 2 reminds us that the process of recognizing and defining the ‘problem’ is dynamic, and can be accomplished through different approaches.



To recap, in mapping out this process, Phase 1 represents surveying the lay of the land; gathering values and general thoughts about what is working well and what needs more work. Subsequently, Phase 2 is designed to establish the general path forward by using the CIDSE principles to organize what has been shared into categories that can be compared/considered within a recognized framework. When we experimented with this process with representatives from Rural Vermont and NOFA-VT, we found this recategorization sparked new ideas, observations, and led to a recognition of overlap and connections, both across priority areas and actors (see Appendix B) This then leads into further prioritization and action in Phase 3.

Phases 2 and 3 (see Figure 6) focus on identifying what to do, how to do it, and how to identify progress/success. The following questions serve as a guide, and are answered through participatory processes with researchers and farmer/food system actors.

Each of these questions aligns with the PAR, Farmer to Farmer, and other frameworks described in Section 2. To justify this approach, in the next section we focus on what we consider to be the fuel of agroecological transformations—the motivations of people to push forward with change and the evidence that is required to select what options are the best fit for the given context. We then briefly describe steps for implementation and evaluation of our multi-dimensional approach before sharing three example cases.

### *3.1. Process & motivation*

We see motivation as the single most important factor in agroecological transformations, and which has been recently discussed in our work with agroecological projects in East Africa (Bucini, personal communication). In this section, we 1) identify the forms that motivation may take, and 2) how the distinct motivations of different actors can combine to create a self-sustaining process of change. Sustaining interest and support are necessary to challenge the powerful forces that have vested interests in maintaining the extractive food system model. Conventional agronomic approaches have typically not required a lot of active engagement from farmers, because they have focused on replacing, rather than integrating, local farmer knowledge with external technologies and knowledge. Typical solutions are purchased inputs, chemical recipes and “cookie-cutter” formulas that have usually been developed in agricultural research stations far from farmer realities. The only real task of the farmer is to adopt the technological package. In practice, top-down agricultural research and extension systems have not tried or shown any significant ability to achieve broad adoption of agroecological farming. This is in large part due both to an intentional exclusion and an incapacity to harness farmer participation and knowledge into agricultural research, development and extension.

Agroecological transformations are different. They seek and require active, creative participation by farmers, as solutions are context-specific, multi-faceted and reliant upon local knowledge that farmers hold. Identifying and engaging with other actors in the food system who can contribute additional

*McCune et al. (2014) argue that:*

*Methods in which the extensionist or agronomist is the key actor and farmers are passive are, in the best of cases, limited to the number of peasant families that can be effectively attended to by each technician, because there is little or no self-catalyzed dynamic among farmers themselves to carry innovations well beyond the last technician. Thus, these cases are finally limited by the budget, that is, by how many technicians can be hired. Many project-based rural development NGOs face a similar problem. When the project funding cycle comes to an end, virtually everything reverts to the pre-project state, with little lasting effect.*

perspective and context enriches this process, but it needs to be a complement, not a substitute for farmer participation. As such, developing the autonomous social process that unleashes farmer enthusiasm, know-how, and protagonism is by far more important, and a more direct investment in resilience, than the technological solutions themselves. This explains why the farmer-to-farmer method has proven more effective in amplifying agroecological practices than any top-down approaches (Rosset et al., 2011).

As the basic scale of agroecological transformation is at the farm level, farmers, farm families and farmworkers become the key actors of this transformation, on their farms and also in their community or social contexts. In this sense, a major objective of our approach is to explore the motivations of small and medium-sized farmers throughout the stages of transformation. What motivates farmers to consider agroecological transformation (and thus work toward strengthening agri-food systems that are truly sustainable)? What are the optimal scales for farmer experimentation? How can this initial motivation be unpacked into actions that give positive results, creating feedback loops within farmers' own practices on their farms, as well as in their interpersonal relationships? What kind of community dynamics and organizational structures support agroecological learning? What is the proper role for external actors, such as researchers, in supporting farmer-led processes in agroecology? What are the risks and trade-offs that farmers weigh when making these decisions? While here we are describing this framework using farmers as the identified actors, a similar process could be employed for farmworkers or stakeholders along the distribution and consumer side of value-chains, encompassing any component or process of the broader food system.

### *3.2. Implementation & evaluation*

Our proposal creates a process that collects and organizes the concerns of farmers and other food systems actors (as mentioned above, in this report we primarily refer to farmers, but this approach applies to actors across the food system). It looks for areas of shared interest/priority, provides a process for identifying shared values and common ground, and bases any action in the knowledge of frontline actors in the agrifood system. We are interested in the ways that incremental steps of transition can contribute to food systems transformation, and recognize that *"...what is needed is a method for evaluating change, a method that – unlike the current evaluative methods available today – can lead those with conflicting values to converge on actions that are agreed to improve unacceptable situations."* (Muradian & Pascual, 2018, p. 8). This process aims to help farmers and other agrifood system actors to assess where they are now, define where they want to go, and offer guidance and support to get there. For example, if a farm has exemplary soil health practices (Gugino et al., 2009) but wants to explore ways to engage the social and political dimensions of agroecology, our approach would offer them that guidance. In colloquial terms, this framework is a "choose your own adventure" for the actors that choose to engage in the process. One of the reasons to start with values is so that we can identify common ground. Moving from there to priority areas and then to metrics also serves the dual purpose of tapping into motivating factors and ensuring that metrics have meaning for the actors themselves. This does not

mean that scientific expertise is left out, but rather it is a process of ‘co-creation’ of knowledge to achieve mutually defined goals.

The initial conversations from Phase 1 are then tied to an identification of priority areas and plans for implementation and evaluation in Phases 2 and 3. A rapid assessment during a farm visit serves as an initial self-assessment that the researchers and farmers conduct and review together. This provides baseline information in order to identify “...co-benefits and tradeoffs of different agricultural management options, particularly as they relate to environmental and equity outcomes” (DeLonge & Basche, 2017). The next step is determining how to track progress. Following Patton’s recommendation, the important criteria for principles-based evaluation, is to be practical, relevant to small-scale farmers, values consistent, contextually adaptable, scientifically credible and that it effectively leads to desired outcomes and impacts (Patton, 2017).

### *3.3. Participatory development of metrics*

There are many different ways to explore metrics in an inclusive and participatory way. Most of these methods involve researchers or facilitators meeting actors at their farms or work sites, engaging in conversations to better understand their social and cultural realities, visualizing their farms and landscapes and discussing the challenges that they face. Farmer or community focused approaches such as participatory rural appraisal (PRA) (Chambers, 1994) and participatory rural development (Geilfus, 2008) offer a multi-faceted, and well-tested toolbox, with strong grounding in the social sciences, to engage in these activities. These methods include a variety of techniques ranging from different types of mapping to focus groups and informal interviewing. Newer methods, such as photovoice, and a diversity of participatory techniques also offer myriad possibilities (Kindon et al., 2007). One of the key components of this framework is that the co-creation of knowledge needs to be centered. This means that what and how to measure is determined through participatory processes that include researchers and other actors involved in the process (Reed et al., 2008). Once the priority area(s) are identified, researchers and farmers explore together what metrics to use to assess and monitor the trajectory of the process, resulting in monitoring and assessment tools that are useful for everyone involved in the PAR/transformation process (i.e. farmers, researchers and policy makers, etc.).

The emphasis here is on the participatory process of determining indicators based on principles instead of a priori determination of indicators before researchers and farmers have assessed the particular context, together. Patton (2017) warns that, too often, those interested in evaluating projects get obsessed with indicators and measuring, and forget why they are doing it. In this quest to quantify impact, we sometimes lose track of the essence of what is important. Successful execution of such processes, though challenging and time consuming, are vital for sustainable transformation as farmers are much more likely to adopt agroecological practices and indicators if they have participated in their selection and development.

In section 4.2, we provide descriptive examples of what a participatory process could look like for the co-

creation of indicators and metrics on three hypothetical Vermont farms. Here we demonstrate the selection of priorities, their categorization by agroecological principle, and then describe appropriate potential indicators. Under a typical participatory process such indicators would be selected in concert with participating farmers/stakeholders, using Patton's criteria for principle-based evaluation.

## 4. Applications in the Vermont context

As a research team embedded in Vermont, but with connections to regional and international projects that use agroecological approaches, we see alignment between global efforts to apply agroecological and environmental valuation frameworks and our local context. Using an agroecological framework for assessing sustainability on small and medium-sized farms in Vermont will provide farmers, researchers, and service providers, both in Vermont and beyond, a template that is rich with opportunity for agroecological transformation. While there is a perception that Vermonters are engaged with the working landscape and theoretically supportive of the local food system, small and medium farms in Vermont are still subject to the same pressures, or "lock-ins" as are farmers worldwide (e.g., consumers' expectation of cheap food, lack of skilled labor, land access and affordability, scale-appropriate regulations, and climate change). However, because of our state's small size and close-knit agricultural and food systems network, Vermont is uniquely positioned to explore sustainability metrics through the lens of agroecology.

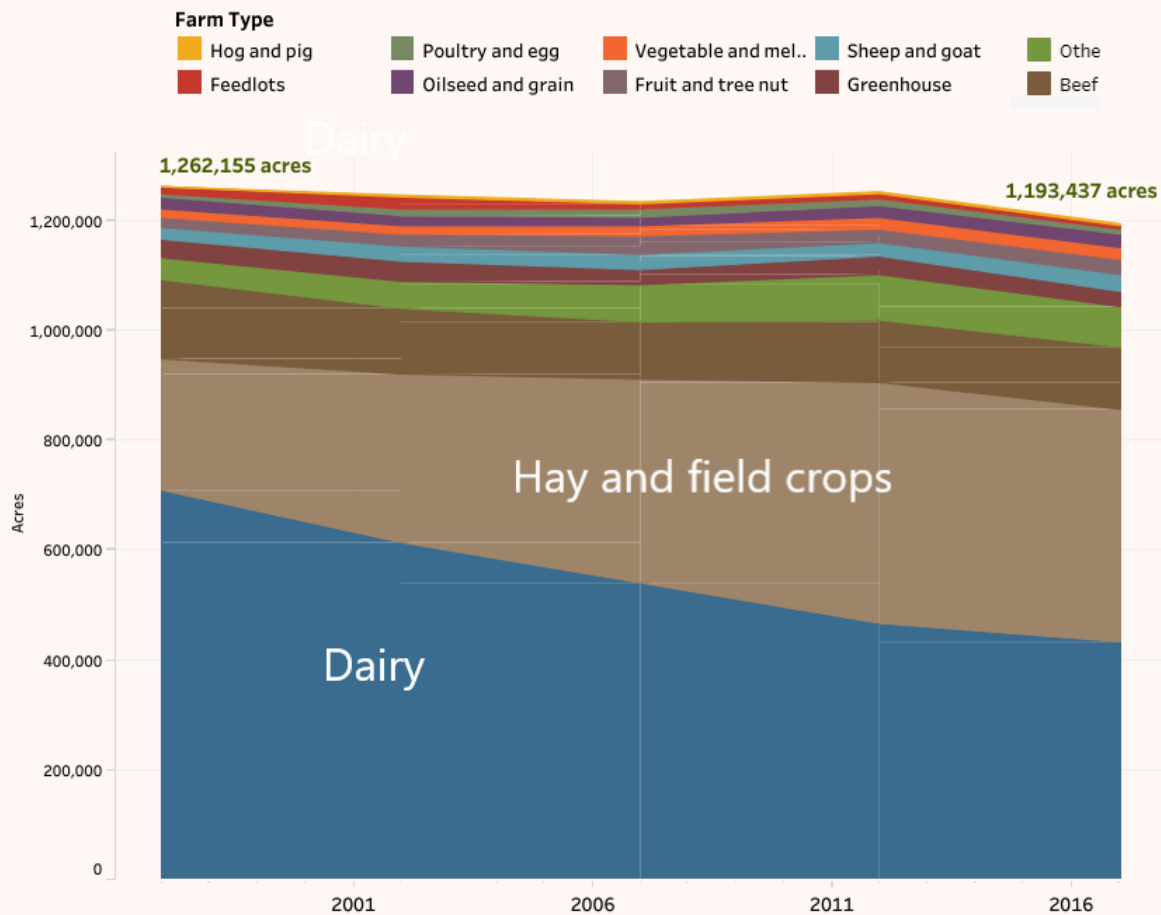
This paper focuses on farmers, with full recognition that the Vermont agrifood system will never be sustainable if we discount the role of other actors within the food system and along the value chain, including consumers. Domino effects from the global pandemic caused significant disruptions in the dynamics of both food supply and demand this past year, pointing toward the need to revisit what it would take for Vermont to reach higher levels of food self-sufficiency and food security. This includes questions related to land use, but also distribution systems, processing facilities, people's willingness and ability to pay for food, among myriad other considerations.

The Vermont landscape is made up of a mix of farm types as evidenced in Figure 7 below, with a trend of decreasing acreage in production overall, with the biggest reductions coming from the loss of dairy farms (shown here over the period of 2000-2016). In addition to concerns that the potential development of acreage formerly dedicated to dairy farms constitutes a major risk for both Vermont's agricultural community and economy, there is insufficient data about the distributed economic impact of non-dairy agricultural entities across the state. This is an area of opportunity both for the potential application of this proposed framework.



Figure 7. Population Indicators: Decrease in Land in Agriculture by Farm Type Shows that Dairy Accounts for Most of Decline from 1997 to 2017. Used with permission from Farm to Plate 2020 Strategic Plan.

The decrease in total land in agriculture from 1997 to 2017 in Vermont reflects decreases in dairy farming, beef cattle ranching, feedlots, and greenhouse, nursery, and floriculture production. **Every other type of farm increased their acreage from 1997 to 2017.** Dairy farms still operate the largest amount of land in agriculture (433,587 acres, 36% of total), even as the number of dairy farms has decreased 60% and land in agriculture operated by dairy farms decreased 39% (-274,805 acres) from 1997 to 2017.



Source: USDA Census of Agriculture, multiple years, <http://www.agcensus.usda.gov/>

To assess the current state of Vermont’s agrifood system, among other resources, we turned to Farm To Plate’s *Vermont Agriculture and Food System Plan: 2020 - Part 1*. After a thorough review of the report, we found close alignment with its general vision and agroecological principles (as described by CIDSE, 2018; see Appendix A). In particular, the report highlights the importance of strengthening direct and local markets (reflected in all of the principles within the economic dimension), making local food accessible to more Vermonters (relating to economic and socio-cultural principles), and keeping agricultural land in agricultural use or conserving it as protection against overdevelopment. Aligned with this, and with socio-cultural principles, the report recommends facilitating farm succession and removing barriers to accessing farmland, emphasizing the importance that there be special attention toward new/young farmers and farmers from underrepresented groups. The recommendations that align with the environmental dimension of agroecology include climate change adaptation, soil health, and water

quality improvements. According to the report, climate change adaptation measures ought to include education on climate change and best management practices, funding for the implementation of these practices, and monetary compensations for mitigation efforts. Support for farmer-to-farmer learning was also highlighted as an important component in advancing the environmental goals. In-depth conversations with representatives from NOFA-Vermont and Rural Vermont provided additional perspectives, and we have categorized the activities of all three organizations using CIDSE’s agroecological principles, to show organizations can use this framework as a tool for considering strengths, gaps and priority areas.

Figure 8. Alignment of selected Vermont organizations’ activities with CIDSE’s principles. See the full version with examples in Appendix B.

Principles		NOFA VT	RURAL VERMONT	FARM TO PLATE	Principles		NOFA VT	RURAL VERMONT	FARM TO PLATE
ECONOMIC	Promotes fair, short, distribution webs, producers working together	●●●●	●●●●	●●●●	POLITICAL	Aims to put control of seeds, land and territories in the hands of the people	●●	●●●●	●●
	Increases resilience through diversification of farm incomes and strengthens community autonomy	●●	●●●●	●●●●		Encourages new forms of decentralized, collective, participatory governance of food systems	●●	●●●●	●●
	Aims to enhance the power of local markets and build on a social and solidarity economy vision	●●●●	●●●●	●●●●		Requires supportive public policies and investments	●●●●	●●●●	●●●●
				Encourages stronger participation of food producers/consumers in decision making		●●●●	●●●●	●●●●	
ENVIRONMENTAL	Supports resilience and adaptation to climate change	●●●●	●●●●	●●●●	SOCIO-CULTURAL	Promotes farmer to farmer exchanges for sharing knowledge	●●●●	●●●●	●●●●
	Nourishes biodiversity and soils	●●●●	●●●●	●●●●		Strengthens food producers, local communities, culture, knowledge, spirituality	●●●●	●●●●	●●●●
	Gradual outphasing of and dependencies on agrochemicals	●●●●	●●●●	●●		Promotes healthy diets and livelihoods	●●●●	●●●●	●●●●
	Enhances integration of various elements of agro-ecosystems (plants, animals, ...)	●●	●●●●	●●		Encourages diversity and solidarity among peoples, encourages women and youth empowerment	●●●●	●●●●	●●●●

#### 4.1. Metrics associated with Vermont-relevant ‘critical factors’

We sought feedback and perspective from farmer organizations, statewide food systems organizations and technical service providers to assess whether other actors engaged in the Vermont agrifood system considered our proposal to be relevant for this context. In conversations with food systems leaders from statewide organizations, we were affirmed when a theme emerged around the importance of holistic consideration of farm systems within a community context. These organizations also helped to identify several ‘critical factors’ (described in more detail below), on which sustainable food systems depend. Just as in an ecological context keystone species influence system health and their absence can throw systems out of balance, the organizations pointed to several factors that have critical capacity for improving the health of the system when they are sufficiently present, and put the system health at risk when they are missing. Four critical factors that emerged for the Vermont context are:

- Circulate money locally to maintain a thriving rural economy;
- Maintain healthy pollinator and wildlife habitat;
- Transfer land-based knowledge across multiple generations;
- Political representation of farmers’ voices through farmer-led organizations.

Other important factors that were mentioned include access to land and capital; sufficient access to healthcare, childcare and other safety net systems as critical considerations for farm viability and the wellbeing of rural communities as a whole; appropriate and regionally distributed infrastructure; and a hesitancy to reach out to regulatory/certifying agencies for fear of punitive actions, when what farmers need is help to do things right. We interpret these observations as signals that there are structural barriers that must be addressed, and that clear communication and more collaboration are needed to further sustainability efforts.

Below, you will see how these 'critical factors' can be categorized under the four CIDSE dimensions for agroecological principles, and how we then work toward co-creating metrics and indicators. In bold letters, we highlight reference to potential metrics.

***Circulate money locally to maintain a thriving rural economy*** (categorized under economic dimension) - As noted above, conventional economic indicators have not always performed well in explaining the economies of small and medium farms, where local knowledge and know-how is a crucial factor. The LUME framework (Petersen et al., 2020) incorporates the **care economy** by calculating what portion of the labor within a farm unit is paid and what portion is unwaged labor. Other authors, such as Kelly et al. (2014) have developed methods for quantifying the recirculation of, and equity produced by **money spent in local economies**. We have decided to focus on this latter aspect-- local monetary circulation-- by asking farmers to quantify their **production costs**, and calculate what portion of their income immediately leaves their local community, and estimate what portion recirculates locally. Using this data, collected through a telephone survey or farm visit, we will **compare farm profitability** with a **value-added metric** for each farm, as well as a **resource use efficiency metric**, such as value-added per acre.

***Maintain healthy pollinator and wildlife habitat*** (categorized under environmental dimension) Insect pollinators play a vital role in the production of a vast number of important non-grain crops and products. Native wild pollinators are particularly important as they are both more efficient pollinators (i.e. higher pollination success than non-natives) and better adapted for pollinating a wide variety of vegetables and fruits. Furthermore, pollinator diversity is directly related to increased agricultural yields especially on small farms (Garibaldi et al., 2016). **Native pollinator counts** both within crop fields and in the surrounding farm margins can be used as a direct estimate of potential pollination services and may also be indicative of agroecosystem biodiversity and health (Parys et al., 2020; Wilson & Lovell, 2016). Similarly, **parasitoid wasp counts** using sticky cards within agroecosystems can be used as a biodiversity indicator for total arthropod diversity (Anderson et al., 2011). **Crop and weed diversity measures**, through direct counts, can also serve as effective indicators of both pollinator and insect natural enemy abundance and diversity (Haddad et al., 2009; Schaffers et al., 2008). Finally, **potentially mineralizable soil nitrogen** can have meaningful effects on plant phenology, morphology, and nectar and pollen production; therefore, it has been proposed that this indicator of soil health could significantly influence pollinator diversity and populations (David et al., 2019).

**Transfer land-based knowledge across multiple generations** (categorized under socio-cultural dimension) - Patterns of global migration away from rural areas and into urban centers have been increasing, such that by 2018, 82% of the US population were living in what qualifies as an urban area. This has further separated the large majority of the population from direct connection to how food is produced and/or processed (Bricas et al., 2013). Maximizing the opportunities for intergenerational knowledge exchange in both formal and informal settings (within farm families, through school visits to farms, organized programs such as 4-H or farm-school models like the Regeneration Corps, apprenticeship/mentor relationships like the NOFA Journey Farmer program, etc.), support both current and future generations of farmers. Proponents of ‘social learning’ argue that both formal and informal encounters with new ideas, places and people can be transformative (Rogoff et al., 2003; Wals et al., 2009). The **vitality of knowledge transmission** (Sterling et al., 2017) can be evaluated through indicators related to expressed interest in learning, retention and application/innovation, including the duration and type of involvement of the new farmer population in existing farmer networks, percent of successful business transfers to a younger farmer (compared with farms that close due to retiring lead farmers), and the duration of farm transfer process during which active knowledge transfer or mentorship occurs. Tracking how people acquire and share **place-based ecological knowledge** (Zent & Maffi, 2009), can be achieved through surveys of plant and tree identification, familiarity with local soil types, etc.

**Political representation of farmers’ voices through farmer-led organizations** (categorized under political dimension) - Active involvement in farmer-led organizations is critical to supporting farmers’ political voices and advocacy on a state and national level. Farmer-led organizations are also incredibly effective at supporting farmer-to-farmer transfer of knowledge (Rosset et al., 2011) and can contribute to an increase in agricultural literacy among policy makers and the general public. These organizations may also revitalize farmer engagement in the community and support a positive public image, while creating an active support network for the farm families within the organization itself. Metrics for farmer involvement in, and potential political influence by such organizations can be quantified through a **survey of farmer-led organizations**, including the constituencies represented by each, and the number of farmers/ farms represented in these organizations, the diversity of farm type represented, and changes in beliefs and/or practices that were influenced by membership in the organization (ex: adopting recommended best management practices, issues of justice and equity, etc.). Other aspects of participation can then be qualitatively assessed, including **outcomes of advocacy efforts by these organizations in policy decisions and agency rulemaking, etc.**

#### 4.2. Hypothetical farm scenarios

Piloting the process described in this framework was beyond the scope of this paper. However, we synthesized our combined experience, what we gleaned from conversations with our collaborators, and a review of literature, to create three hypothetical farm scenarios that provide a glimpse of the Vermont context. Our goal is to have these serve as proof of concept of what our process could look like with Vermont farmers. Though simplified and representative of blended examples, these three cases

demonstrate some of the different farm types and business models that exist in Vermont. These examples are not representative of the breadth of farm types that sustain the agricultural community in Vermont, but are designed to ground our proposed framework in examples that will be familiar to many, and show additional details about what this process would look like in practice. Relating this model to perennial production systems (orchards, etc.), farms with H2A and migrant farmworkers, cheese or other value-added products, are each cases that could be explored with this framework.

In Table 1 we present the dimensions, themes and principles from the CIDSE framework. They are accompanied by hypothetical and simplified scores for agroecological principles present in each of our hypothetical farm scenarios. The calculation of our hypothetical values was inspired by the FAO's Tool for Agroecology Performance Evaluation (TAPE) instrument (Mottet et al., 2020). More specifically, we used a similar approach as TAPE's Step 1: Characterization of Agroecological Transition (CAET). In this first step of the process, we evaluated each CIDSE principle to generate a score, using a scale from 0-3 scale. Given that we did not have real data, we chose this scale for its simplicity and the possibility to use our collective knowledge to come up with realistic scores that would represent 'absent (0)', 'weak (1)', 'medium (2)' or 'strong (3)' expressions of the agroecological principles.

A similar approach was used by Juncos et al. (forthcoming) in her work with Burlington's Intervale Center (IC), also based on the CIDSE framework, in a case study where actors identified the presence of principles and then described their expression and potential performance within the land base of the Intervale (Caswell et al., 2020). In the Intervale case, the authors used the frequencies of the agroecology principles present in each land use category, as reported by the IC actors, and no scores were produced. However, participants did prioritize principles based on the information. Also of relevance to our exercise is the experience of the Cuban farmer to farmer movement, which has been refining a process for agroecological transitions that includes a farmer self-assessment focused on the agroecological practices they implement. Farmers' responses are then scored and placed into the following categories: 1) 'on the path toward agroecology'; 2) 'transitioning to agroecology'; or 3) 'agroecological.' Once categorized, the farms are supported in taking steps to increase their use of and/or the effectiveness of agroecological practices within their farm operation, with the goal to reach an agroecological state or transformation (Sosa et al., 2013). We mention these different approaches here to reinforce the importance of familiarity with multiple principles-based agroecological frameworks (i.e., FAO, CIDSE, LUME, etc.). These provide a diversity of options to choose from, in order to prioritize and select what is most appropriate for a particular socio-ecological context.



*Table 1:* Scoring reference table for hypothetical farm scenarios in Vermont, using the CIDSE agroecological principles framework. Scale is from 0-3 (0=absent, 1=weak, 2=medium, 3=strong).

Dimension	Theme	Principle	Label	Score
<b>ECONOMIC Dimension</b>	Distribution	Promotes fair, short, distribution webs, producers working together	E1	0-3
	Resilience	Increases resilience through diversification of farm incomes and strengthens community autonomy	E2	0-3
	Solidarity economy	Aims to enhance the power of local markets and build on a social and solidarity economy vision	E3	0-3
<b>POLITICAL Dimension</b>	Resource Sovereignty	Aims to put control of seeds, land and territories in the hands of people	P1	0-3
	Participatory governance	Encourages new forms of decentralized, collective, participatory governance of food systems	P2	0-3
	Requires supportive policies	Requires supportive public policies and investments	P3	0-3
	Producers/consumers decision making	Encourages stronger participation of food producers/consumers in decision making	P4	0-3
<b>ENVIRONMENTAL Dimension</b>	Climate change	Supports resilience and adaptation to climate change	EN1	0-3
	Biodiversity and soils	Nourishes biodiversity and soils	EN2	0-3
	Agrochemical free	Eliminates use of and dependence on agrochemicals	EN3	0-3
	Integration	Enhances integration of various elements of agro-ecosystems (plants, animals, ...)	EN4	0-3
<b>SOCIO-CULTURAL Dimension</b>	Knowledge sharing	Promotes farmer to farmer exchanges for sharing knowledge	SC1	0-3
	Local values	Strengthens food producers, local communities, culture, knowledge, spirituality	SC2	0-3
	Health	Promotes healthy diets and livelihoods	SC3	0-3
	Solidarity and justice	Encourages diversity and solidarity among peoples, encourages women and youth empowerment	SC4	0-3

For each of the hypothetical farm scenarios below, we have developed 1) a depiction of the farm and landscape; 2) a table describing key aspects of the farm; 3) a table showing scored agroecological principles, based on our assumption of performance for each particular case; 4) a graphic representation of agroecological performance for the farm as categorized by the CIDSE principles, based on the scores presented in the table; and 5) a short discussion of the ‘agroecological transition context’. The descriptions and amoeba graphs provide a snapshot of the data that would be collected to inform the selection of priority areas, and the tables reflect selected metrics related to the questions from Phase 2. These cases are designed to show how the framework captures critical information and leads to the development of measurable progress toward identified goals.

4.2.1. Farm 1: 600 cow conventional dairy, managed by a family who has been farming this land for multiple generations.



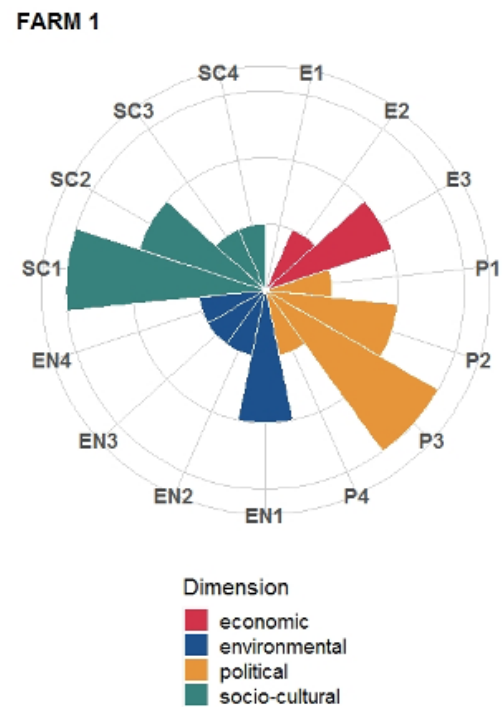
Phase 2 Snapshot for Farm 1	
Values	Strong land ethic and soil stewardship; family farming is honorable; high quality product (milk); local community
Practices/activities	No-till and cover crops, serves on farmer coalitions, respects guidance of service providers
Lock-ins	Commodity milk prices with no local control, corporate consolidation of the dairy industry, targeted interventions (dictated by grant funding and/or government regulations) that lead to compartmentalizing problems/only contributing to part of the necessary solution, scale and cost of solutions and tools being driven by much larger farms elsewhere in the country
Priorities	To maintain cash flow and keep farm in family; to implement practices for compliance with farm regulations (water quality, labor, food safety, etc.); use fewer chemical inputs; improve public image of dairy farms

**Farm 1 Agroecological Transition Context:** According to the results of the Phase 2 participatory farm-assessment process, Farm 1 suffers from lock-ins in each of the four dimensions. The absence of diversified farm production (E2) and the dependence on large-scale distribution webs (E1), make this farm vulnerable to market crises and unpredictability. This also means a strong dependence on public policies or investments to stay in business (P3). Although, Farm 1 has committed to both decreasing their use of agrochemicals and build healthy soils and biodiversity (EN2 and EN3), it still needs to increase its resilience and adaptive capacities to climate change (EN1) and enhance integration and synergies in its agroecosystems (positive interactions among plants, animals, trees, soil, water, etc.; EN4). Active participation in farmer committees and other peer networks that promote horizontal (farmer-to-farmer) sharing of knowledge (SC1) position this farm well for taking advantage of opportunities to learn new

skills and access innovations, ultimately providing ways to navigate through or around some of the lock-ins. Despite several low scores, areas of strength could be put to use to make additional progress within both the environmental and socio-cultural dimensions, each of which are priority areas for this farm. Based on this, we could foresee the owners choosing to **strengthen their practices linked to the principle of reducing the use of agrochemicals (EN3)**, since this could potentially contribute additional benefits toward being in compliance with farm regulations and improving the public image of dairy farms. This choice implies tradeoffs, and at least in the near-term would likely need to be accompanied by monetary incentives to offset the costs of new equipment, and potentially some sort of crop insurance/yield guarantee against potentially lower yield while the system becomes established.

Figure 9. Farm 1 scores for selected agroecological principles, based on CIDSE (2018) (scale: 0=absent; 1=weak; 2=medium; 3=strong).

Dimension	Theme	Label	Farm 1 Score
<b>ECONOMIC</b>	Distribution	E1	0
	Resilience	E2	1
	Solidarity economy	E3	2
<b>POLITICAL</b>	Resource sovereignty	P1	1
	Participatory governance	P2	2
	Supportive policies	P3	3
	Producers/consumers decision making	P4	1
<b>ENVIRONMENTAL</b>	Climate change	EN1	2
	Biodiversity and soils	EN2	1
	Agrochemical free	EN3	1
	Integration	EN4	1
<b>SOCIO-CULTURAL</b>	Knowledge sharing	SC1	3
	Local values	SC2	2
	Health	SC3	1
	Solidarity and justice	SC4	1



**Selected intervention that reflects priorities:** Transition from glyphosate herbicide to roller-crimping for cover crop termination, in order to better support pollinator populations and soil health.

Table 2. Example of metrics and indicator(s) for selected agroecological principles in Farm 1

AE principles	Metrics	Indicators	Data collection plan
Eliminates use and dependence on agrochemicals	Arthropod biodiversity	Natural enemy abundance (e.g. parasitoids) & plant diversity (within field and outside of field)	Insect biodiversity assessment via passive trapping (e.g. sticky cards, timed observations, etc.) & direct plant biodiversity counts;
Nourishes biodiversity and soils	Soil active carbon	Improved soil health	Soil health testing that includes active carbon on a biennial basis



4.2.2. Farm 2: 60 cow organic dairy and sugaring operation



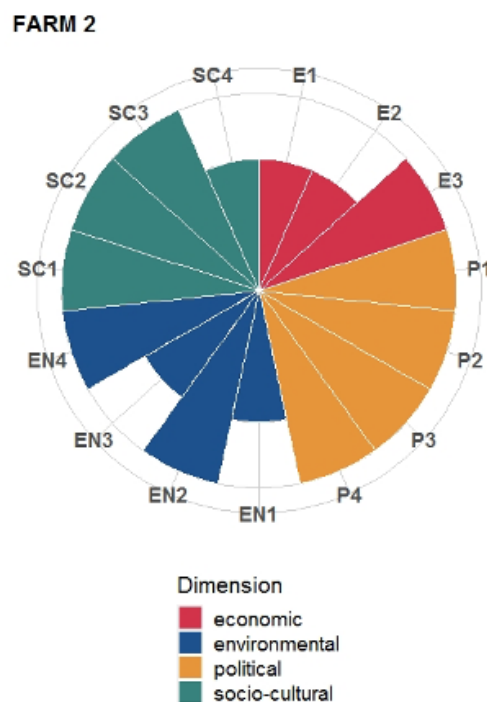
Phase 2 Snapshot for Farm 2	
Values	Ecological management of farmland and forest; low-/no-debt; farm is a community resource where family and friends are welcome
Practices/activities	Following organic standards for dairy and sugaring operations; rotational grazing; neighbor farmers as the most accessible resource for information (through observation and conversations), also seek input from professionals (equipment dealers, breeders, vets, etc.)
Lock-ins	Commodity market pricing, regulatory limits (raw milk, on-farm slaughter, etc.), emphasis on farm profitability instead of other non-monetary benefits, instability of safety nets (eg. health insurance, retirement, etc.)
Priorities	More support for local food systems (farm to school/institution, etc.); land accessibility for small-scale farmers; more small-scale processing facilities

**Farm 2 Agroecological Transition Context:** According to the results of the Phase 2 participatory farm-assessment process, Farm 2 has many areas of strength, but it also faces lock-ins from policies designed to support industrial agriculture instead of family farms (P3), commodity pricing structures for both milk and maple products, and measures of success that focus on profit instead of on livelihoods, which result in bountiful non-monetary benefits (SC2 and SC3). The global pandemic has led the owner/operators of Farm 2 to be even more committed to a long-term goal of figuring out how to connect their production with demand within local institutions such as schools. They would love to make sure that milk from local farms is staying close to home, perhaps through making connections with local schools, childcare centers or even emergency food suppliers (E1, E3). They also see opportunities for the good quality beef from their cull cows to fill demand along these same supply chains. They understand that this requires policies and aggregation systems that are not currently in place (P3) but would like to explore opportunities like this that would support food sovereignty (P1) and ensure food security (SC3) within their local context. Based on this, we could foresee Farm 2 choosing to **strengthen their practices linked to the principle**

of promoting fair, short, distribution webs with producers working together (E1) and encouraging stronger participation of food producers/consumers in decision making (P4), since this could potentially address a challenge and leverage an on-farm strength. Investing time in this pursuit would mean a trade-off in available time to dedicate toward other farm operations, so either this would have to be compensated or would be limited to the amount of time that can be allocated to volunteer work on this issue.

Figure 10. Farm 2 scores for selected agroecological principles, based on CIDSE (2018) (scale: 0=absent; 1=weak; 2=medium; 3=strong).

Dimension	Theme	Label	Farm 2 Score
ECONOMIC	Distribution	E1	2
	Resilience	E2	2
	Solidarity economy	E3	3
POLITICAL	Resource sovereignty	P1	3
	Participatory governance	P2	3
	Supportive policies	P3	3
	Producers/consumers decision making	P4	3
ENVIRONMENTAL	Climate change	EN1	2
	Biodiversity and soils	EN2	3
	Agrochemical free	EN3	2
	Integration	EN4	3
SOCIO-CULTURAL	Knowledge sharing	SC1	3
	Local values	SC2	3
	Health	SC3	3
	Solidarity and justice	SC4	2



**Selected intervention that reflects priorities:** Working toward on-farm slaughter policies that support responsible herd management and contribute toward local food security and vibrant local food system.

Table 3. Example of metrics and indicator(s) for selected agroecological principles in Farm 2

AE principles	Metrics	Indicators	Data collection plan
Promotes fair, short, distribution webs, producers working together	Active local distribution networks	Active local distribution networks; Innovations based on ideas generated in producer/consumer forums	Periodic semi-structured interviews with both farmers and distributors
Encouraging stronger participation of food producers/consumers in decision making	Forums that facilitate dialogue among producers and consumers, and producers and policymakers	Actions taken based on ideas from these forums	Collection of ideas generated during forums and periodic surveys to participants to check application/viability of ideas



### 4.2.3. Farm 3: Diversified organic production of vegetables and eggs



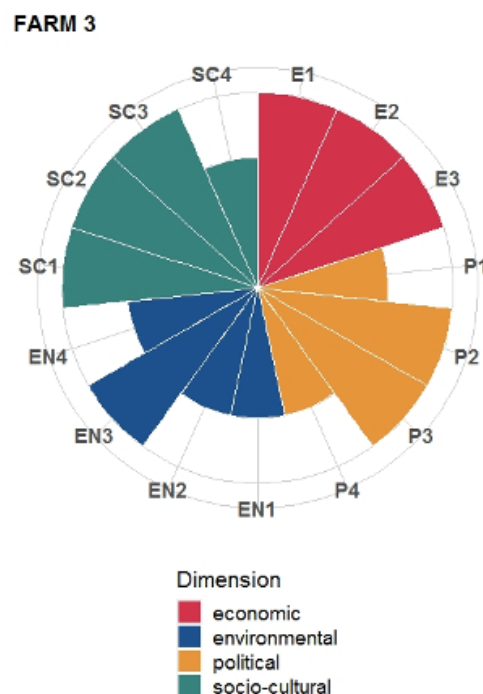
Phase 2 Snapshot for Farm 3	
Values	Appreciation for fertility of land and feeling that it should be cultivated, selection of practices that are appropriate to conditions, high quality products, low-impact environmental ethic, commitment to sustainable agriculture education (hosts local school visits and collaborates with university research projects), soil and natural resources conservation
Practices/activities	Organic practices, high diversification of crops and products, low resource consumption, care for ecosystem (pollinators, wildlife, etc.)
Lock-ins	Expectation of cheap food, tight markets, lack of skilled labor; pressures of direct marketing (CSA and farmer's markets); scale of operation requires a lot of time and energy from farmers
Priorities	Generate enough income to support family; build soil health and reduce tillage; reduce use of plastics on farm; focus on local customers and markets;

**Agroecological Transition Context:** According to the results of the Phase 2 participatory farm-assessment process, Farm 3 has worked diligently to overcome the lock-ins of finding sufficient on-farm help to maintain their growing operation and the expectation of cheap food, but high-quality products and positive relationships with consumers have established this farm as highly regarded both by consumers and within farmer circles. The Farm has steadily increased its resilience through diversification of farm crops and incomes (E2), supported community food autonomy (P1) and reached independence from agrochemicals (EN3). This farm's products also promote healthy diets and livelihoods (SC3). Farm 3 has built a strong community network through partnerships with local markets, schools, and university researchers (SC2). However, Farm 3 sees an opening for connecting with youth who are unfamiliar with farming, or who are limited in their ability to take part in food production/processing to **create opportunities for leadership for young people and women (SC4)**. This would also potentially

contribute toward other benefits under the socio-cultural dimension, through promoting diversity and solidarity among people and cultivating the sharing of their knowledge with other producers (SC1). Investing time in this pursuit would mean a trade-off in available time to dedicate toward other farm operations, so ideally development of this program would be led by someone else and the farmer time would be compensated at a mutually agreed upon rate.

Figure 11: Farm 3 scores for selected agroecological principles, based on CIDSE (2018) (scale: 0=absent; 1=weak; 2=medium; 3=strong).

Dimension	Theme	Label	Farm 3 Score
ECONOMIC	Distribution	E1	3
	Resilience	E2	3
	Solidarity economy	E3	3
POLITICAL	Resource sovereignty	P1	2
	Participatory governance	P2	3
	Supportive policies	P3	3
	Producers/consumers decision making	P4	2
ENVIRONMENTAL	Climate change	EN1	2
	Biodiversity and soils	EN2	2
	Agrochemical free	EN3	3
	Integration	EN4	2
SOCIO-CULTURAL	Knowledge sharing	SC1	3
	Local values	SC2	3
	Health	SC3	3
	Solidarity and justice	SC4	2



**Selected intervention that reflects priorities:** Connecting with food and social justice organizations and academic allies to develop an on-farm experiential summer program for the farm.

Table 4. Example of metrics and indicator(s) for selected agroecological principles in Farm 3

AE principles	Metrics	Indicators	Data collection plan
Knowledge sharing	Engagement with education organizations and farmer networks	# and type of active projects with education organizations; Pre-post program surveys re: identification of relevant terms, activities, etc.	Periodic semi-structured interviews with farmers, students, staff and participants of summer program; Focus groups for discussion with all actors
Solidarity and justice	Success of summer program(s)	# of women, youth and BIPOC actively participating, and % from these groups within total participant population; Participant testimonies; Wages and other benefits provided to employees	Analysis of farm records; Periodic anonymous surveys with farmers, students, staff and participants of summer program

## 5. Future Implications

In Vermont, we see strong potential for agroecological transitions within the landscape, and have been affirmed that several of the food system actors we consulted with, as part of the creation of this framework, expressed interest in exploring the viability of local pilots for this approach. Our proposed process is dynamic and multifaceted, but adaptable to the unique diversity of farms and farmers in the Vermont landscape. We see the refinement of this process as a way to continue identifying what matters, what is and what is not already monitored, and to use participatory methods to define metrics that will represent change over time, and how to track them.

### *5.1. From theory to practice: piloting our framework*

Agroecological transitions, as steps to a full transformation, require both individual and collective action. Actors have to be interested in examining their present condition, articulating their desired state, and being willing to take part in a process that provides tools and practices to move them along the path of agroecological transition. Since commitment and shared process are key to agroecological transitions (and ultimately agroecological transformations), we propose piloting this framework with groups that already have strong farmer constituencies and a desire to engage in transition conversations. In this way, we can contribute to and leverage their ongoing work as we refine this proposed process through a round of exploratory projects.

#### 5.1.1. Pilot testing the agroecology principles framework process

The next logical step to our proposed framework is to test it through 1-3 pilots. The objectives of the pilots would be to co-learn with our partners and, since one of the key, potential strengths of using principles is that they can be applied in different contexts, it would be ideal to test this notion by conducting pilots in different settings. Hence, if the necessary resources are available, we would propose one to two pilots in the U.S. Northeast (potentially with producers linked to NOFA-VT and/or Rural Vermont), and another pilot that would build on developing relationships from within our existing network either in the southern US or in Puerto Rico. Each of these pilots would involve multiple farms. Outreach for pilot participants would begin with groups that are already engaging with sustainable agriculture, but we also hope to address assumptions about who this framework might work for (eg. perceived viability for small organic farms, but not bigger conventional farms), by intentionally including a wide variety of farm types and multiple farm scales among the pilot participants.

As practitioners of PAR projects and actors within the Vermont agrifood system, we recognize the ongoing challenges of coordination among academics and non-academics. We are clear-eyed about the hard work of coalition building (Reagon & Smith, 1983) and understand the requirement for careful, skilled facilitation. We are also aware that many farmers lack free time and are underpaid for the food

they produce. Because we value farmer time and knowledge, we will do our best to ensure that any pilots of this framework provide sufficient resources to fairly compensate farmers for their participation.

Pilots would be conducted over two years, in order to include two full growing seasons. We would do monitoring and assessment throughout, with in-depth reflections every 6 months. After Year 1, we would hold a workshop to discuss challenges and opportunities, extract lessons learned and refine the process. Year 2 would culminate with a second reflective evaluation workshop that would lead to a deeper analysis. Over the term of these pilot projects, we would produce farmer, policy and academic publications, practical tools for farmers and NGOs, an inventory of training/capacity building needs to scale the approach, and at the close of Year 2 would facilitate a dynamic, public summit to share our findings and reflections.

## *5.2. Potential challenges*

This past year has been a stark reminder that there are challenges we can anticipate, and others that may emerge as complete surprises. One of the first areas of resistance we anticipate is confusion around jargon and/or resistance to ‘yet another framework’. There is understandable fatigue among the farming community to the various ideas of the moment. In recent years, there has been an onslaught of alternative “sustainable” agricultural movements, leaving some farmers feeling fatigued by the seemingly endless ideas of the moment. For many farmers in the US, [USDA Organic certification](#) remains the most common way to distinguish their practices from conventional. However, as organic farming has become more industrialized under the USDA label, some farmers and activists are increasingly wary of the opportunities for big agriculture to co-opt the organic trademark. In recent years, there has been particular disgruntlement among farmers when the USDA ruled that hydroponic (soilless) crops could be labeled as certified organic and some confined animal feeding operations passed as certified organic farms. As the organic label has become “diluted” by industrial agriculture, other approaches have emerged, some that are more closely aligned with agroecology, and others already heavily influenced by industrial agriculture actors. These include [Regenerative Agriculture](#), the [Real Organic Project](#), permaculture, and conservation agriculture. Simultaneously, there has been a push for industrialized farms to adopt more “sustainable” methods, such as no-till and cover cropping.

Although this flurry of alternative systems could be perceived as intellectually exciting, there may be hesitancy among farmers to interface with yet other discipline or well-meaning service provider. The earliest writings about agroecology as a science go back to the 1930s, but even those first publications neglected to mention the foundation of agroecological approaches in the production practices of Indigenous Peoples and subsistence farmers across the globe (Anderson et al., 2020; Hernández Xolocotzi, 1977). While BIPOC farmers have been foundational to the knowledge and practices associated with sustainable farming, they have been ignored in much of the discourse about the legacy and future of the movement. Finding ways to highlight, and continue to learn from, the rich traditions that precede agroecology’s current articulations as science, movement and practice is essential. Though Vermont farmers may not currently identify themselves as using agroecological approaches, the principles are



likely alive in their work. In our efforts to develop and implement a useful framework, we want to always acknowledge the value of farmers' knowledge, perceptions and practices. It is our hope that by using an agroecological framework to address tangible problems in Vermont agriculture, we will bring forward the ongoing work of farmers who are already engaging along the spectrum of agroecology and use tools to help them better understand and assess their relative performance. We hope to use this project to learn with them about how we can deepen agroecological approaches in the U.S., and more specifically in the Vermont landscape. We envision using our local context as a learning laboratory that contributes to a more sustainable local agrifood system here at home, and using lessons learned to inform broader agroecological transformations globally.

## 6. Conclusions

This paper has explored the potential for assessing sustainability within an agroecological principles and values-based framework. We have proposed that in addition to performance metrics that serve to demonstrate our progress toward where we want to go, we must prioritize the social processes that will buoy our momentum toward the constantly moving target of sustainability. This is important, whether we are exploring the cycles of dollars in local economies from smaller-scale diversified production, what people need in order to get into or stay in farming, or looking for ways to bring forward the role of farmers as key actors in maintaining the social fabric of Vermont. Though the first version of our Framework is directed at farmers (necessary leaders in food system sustainability transitions), it is easily adaptable to other food system actors.

Our intent to reimagine sustainable food systems based on agroecological approaches grows from a sincere desire to revitalize the social and ecological potential that exists within our landscapes and communities. We need to advance toward integrated value chains, alternative land access and ownership models, and programs that offer farmers a sufficient level of support to survive short term losses on the path toward longer term gains. Unless we do this, we will be limited in the progress we can make toward our sustainability goals, regardless of the model. We take the position that dismantling lock-ins means reconnecting values and practices, enabling us to navigate the maze of options that will lead us toward food system transformation.

Our framework is based on the idea that we will not make the progress we hope to see without changing the way we do research, in addition to the data we are collecting. We perceive PAR as *doing research with people, for people*, and this is at the core of the framework presented here. We propose that these participatory processes, linked to globally endorsed frameworks, provide an opportunity to recognize both what is unique about the Vermont context and what we have to learn from and offer to agrifood system actors across the rest of the world.



# Appendix A – CIDSE agroecological principles infographic



<p>Promotes fair, short, distribution webs, producers and consumers working together</p>	<p>Increases resilience through diversification of farm incomes and strengthens community autonomy</p>	<p>Promotes fair, short, distribution webs, producers and consumers working together</p>	<p>Requires supportive public policies and investments</p>	<p>Encourages stronger participation of food producers/consumers in decision making</p>	<p>Aims to put control of seeds, land and territories in the hands of people</p>	<p>Encourages new forms of decentralized, collective, participatory governance of food systems</p>	<p>Supports resilience and adaptation to climate change</p>	<p>Eliminates use of and dependence on agrochemicals</p>	<p>Enhances integration of various elements of agro-ecosystems (plants, animals, ...)</p>	<p>Supports resilience and adaptation to climate change</p>	<p>Nourishes biodiversity and soils</p>	<p>Eliminates use of and dependence on agrochemicals</p>	<p>Enhances integration of various elements of agro-ecosystems (plants, animals, ...)</p>	<p><b>ENVIRONMENTAL</b></p>
<p>Promotes farmer to farmer exchanges for sharing knowledge</p>	<p>Strengthens food producers, local communities, culture, knowledge, spirituality</p>	<p>Promotes healthy diets and livelihoods</p>	<p>Encourages diversity and solidarity among peoples, encourages women and youth empowerment</p>	<p><b>SOCIO-CULTURAL</b></p>										

## THE 3 FACETS OF AGROECOLOGY IS:

1. A scientific research approach involving the holistic study of agro-ecosystems and food systems;
2. A set of principles and practices that enhance the resilience and sustainability of food and farming systems while preserving social integrity;
3. A socio-political movement, which focuses on the practical application of agroecology, seeks new ways of considering agriculture, processing, distribution and consumption of food and its relationships with society and nature.

## WHAT ARE THE PRINCIPLES OF AGROECOLOGY

THESE PRINCIPLES ARE A SET OF BROAD "GUIDELINES" THAT CONSTITUTE THE BUILDING BLOCKS OF AGROECOLOGY, ITS PRACTICE AND IMPLEMENTATION.

- » Agroecology promotes principles rather than rules or recipes of a transition process.
- » Agroecology is the result of the joint application of its principles and the values that lie behind them to the design of alternative farming and food systems. It is therefore acknowledged that the application of the principles will be done progressively.
- » The principles are valid across the diversity of territories and lead to various practices in different places and contexts.
- » All principles should be interpreted in the context of improving integration with the natural world, and justice and dignity for human and non-human actors and processes.

There is no food sovereignty without agroecology. And certainly, agroecology will not last without a food sovereignty policy that backs it up.













*Luciana Courty*



Find out more:  
<https://agroecologyprinciples.cidse.com>

## Appendix B – VT organizations’ activities by CIDSE principles

Alignment of selected Vermont organizations’ activities with CIDSE’s principles. Expanded version of Figure 8.









PRINCIPLES		NOFA VT <sup>5</sup>	RURAL VERMONT <sup>6</sup>	FARM TO PLATE <sup>7</sup>
<b>ECONOMIC</b>	 <p>Promotes fair, short, distribution webs, producers working together</p>	 <p>Examples: farmers markets; direct food access channel; farmer-to-farmer forums, cohorts and workshops</p>	 <p>Examples: Increasing access to local markets; participation in local, national, and international food web networks (Farm to Plate, NFFC, USFSA, NYFC, etc.); advocating, organizing, educating towards economic equity and racial justice; reducing regulatory barriers to direct sale; producer working groups; food sovereignty campaigns</p>	 <p>Examples: Supporting local/regional market development efforts and developina co-marketina</p>
	 <p>Increases resilience through diversification of farm incomes and strengthens community autonomy</p>	 <p>Examples: farm viability and technical assistance</p>	 <p>Examples: Food Sovereignty and Food Democracy advocacy, education, and organizing (OFS, Raw Milk, Compost foraging, poultry, etc.); Advocacy and Activism Training and support; advocating for equity in agricultural policymaking; supporting local markets and food system infrastructure</p>	 <p>Examples: increasing support for business planning and assistance; funding for the Working Lands Enterprise Fund to leverage and accelerate innovation and sustainability in Vermont food system businesses.</p>
	 <p>Aims to enhance the power of local markets and build on a social and solidarity economy vision</p>	 <p>Examples: farmers markets; direct markets; farm-to-school</p>	 <p>Examples: Intersectional Community and movement building; increasing access to local markets; participation in local, national and international food web networks (Farm to Plate, NFFC, USFSA, NYFC, etc.); producer working groups; advocating, organizing, and educating towards economic equity and racial justice; reducing regulatory barriers to direct sale; mutual aid</p>	 <p>Examples: strengthening local markets, including CSAs, direct farm sales, farmers’ markets, as well as school, college, and hospital procurement.</p>

<sup>5</sup> Based on conversations and self-evaluation













<sup>6</sup> Based on conversations and self-evaluation

<sup>7</sup> Based on the “Vermont Agriculture and Food System Plan: 2020 - Part 1” -report; the examples represent recommendations presented in the report













Alignment of selected Vermont organizations' activities with CIDSE's principles. Expanded version of Figure 8.

POLITICAL	 <p>Aims to put control of seeds, land and territories in the hands of people</p>	 <p><i>Examples: Abenaki Land Link; High Mowing seed donation during COVID; Funds to support TA and land access for BIPOC producers; farm transfer planning work</i></p>	 <p><i>Examples: Anti-Corporate Land Grab work; land, food, seed sovereignty work; Alternative Farmland Ownership work; Intersectional Community and movement building; increasing access to local markets; participation in local, national, and international food web networks (Farm to Plate, NFFC, USFSA, NYFC, etc.); producer working groups; advocating, organizing, educating towards economic equity and racial justice; anti-gmo advocacy and organizing</i></p>	 <p><i>Examples: increasing state resources for conservation efforts that support farmland access and succession planning; considering options to encourage multiple tenants/owners on larger conserved farms; partnership with Abenaki Land Link in the "Rooted in Vermont" -project.</i></p>
	 <p>Encourages new forms of decentralized, collective, participatory governance of food systems</p>	 <p><i>Examples: NOFA-VT's vision for the future of VT food systems/Ag stimulus plan; sharing farmer stories with legislators</i></p>	 <p><i>Examples: Tax and Regulate of Cannabis Coalition Advocacy; Internal Horizontal leadership / Sociocratic Staff and Org Structure; F2P Network involvement; Citizen advocacy trainings; Alternative Farmland Ownership Brief (cooperative land access); community surveys every few years to gauge constituency's priorities and invite participation; food sovereignty campaigns</i></p>	 <p><i>Examples: Developing new funding/financing mechanisms to promote Alternative Ownership Models (one of the priority recommendations in the new Strategic Plan). Enhancing local and regional food sovereignty by developing a state food security plan that involves diverse stakeholder participation and mapping statewide land, infrastructure, distribution etc. assets to assist municipal land use decision making. Developing a policy roadmap that includes participation and input from the public and farm community. Involving farmers and business assistance providers in the development and implementation of state and federal regulatory, conservation, and financing</i></p>

Alignment of selected Vermont organizations' activities with CIDSE's principles. Expanded version of Figure 8.













ENVIRONMENTAL	 <p>Requires supportive public policies and investments</p>	 <p>Examples: policy leadership; supporting farmworker organizing; COVID response - assistance with VCAAP applications; PES working group</p>	 <p>Examples: Advocacy for scale appropriate regulations; food democracy and food sovereignty advocacy, organizing, and education; advocacy for strong social safety net (universal healthcare, childcare, eldercare, housing, etc.); work at the intersection of environmental integrity, farm and food system viability, and social justice and economic equity; meat processing bottlenecks; BIPOC Land Access and Opportunity; collaboration with Migrant Justice on Immigrant Relief funding; advocacy for equitable COVID relief aid</p>	 <p>Examples: Numerous proposals to strengthen existing programs and allocate funding to new ones to support VT agricultural sector.</p>
	 <p>Encourages stronger participation of food producers/consumers in decision making</p>	 <p>Examples: annual producer meeting; farmer cohorts and focus groups; needs assessments, Statehouse to Farmhouse/Small Farm Action Days; farmers on NOFA-VT Board of Directors; solidarity and support for farmworkers; "Farmer Voices" project with the Dairy-Watershed collaborative</p>	 <p>Examples: policy watchdog and informational role; citizen advocacy training; directly soliciting input regularly from Grassroots community; Educational / organizing events; farmer working groups; advocating for agricultural voices in appointed roles; farmer-led membership organization</p>	 <p>Examples: Conducting nearly 1,200 surveys with members of the public and 13 focus groups with farmers from various industries/associations as part of the process of creating the next strategic plan. Having around 160 contributors to the policy briefs, many of whom were farmers/food business owners. Developing a policy roadmap that includes participation and input from the public and farm community. Increasing support to farmer organizations and networks (e.g. The Farm Viability Network).</p>
	 <p>Supports resilience and adaptation to climate change</p>	 <p>Examples: grant funding for farmer resilience; farmer emergency fund; technical assistance/farm viability; Winter Conference workshops and other education; policy work on climate/soil health legislation; GWSA implementation</p>	 <p>Examples: Outreach to and participation with Youth groups; advocacy for policy and education supporting farming practices and outcomes positive to water quality, soil health, biodiversity; La Via Climate Collective; advocacy for community scale ag and local democratized food economies and infrastructure; community partner of Regeneration Corps</p>	 <p>Examples: supporting climate change adaptation through education and various funding mechanisms; promoting compensation for mitigation efforts.</p>

Alignment of selected Vermont organizations' activities with CIDSE's principles. Expanded version of Figure 8.





 <p>Nourishes biodiversity and soils</p>	 <p>Examples: organic standards; technical assistance; partner conversations on ecological policy (Audobon etc.); work on PES/potential additional soil health and climate legislation</p>	 <p>Examples: National Healthy Soil Coalition, and other broad ag coalitions; advocacy for policy and education supporting farming practices and outcomes positive to water quality, soil health, biodiversity; advocacy for community scale ag and local democratized food economies and infrastructure; broad education in communities and Statehouse about soil health and "regenerative agriculture"</p>	 <p>Examples: Funding research that monitors field-scale water quality performance of practices post-installation, and will inform a Payment for Ecosystem Services program that provides incentives to farmers for reducing P losses; allocating funds to measuring and continuously monitoring soil health across the state of Vermont, building a statewide database, benchmarking specific soil types, and correlating changes with specific BMP</p>
 <p>Gradual outphasing of and dependance on agrochemicals</p>	 <p>Examples: organic standards; education (workshops etc); policy advocacy regarding pesticide use</p>	 <p>Examples: Pesticides, RbGH, and GMO work; water quality work (trying to bring water quality beyond Phosphorous language); supporting grass-based agriculture and agriculture that requires fewer inputs; Farm and Water Coalition</p>	 <p>Examples: Supporting efforts to reduce runoff, nutrient loss, and erosion. Objective to reduce total annual pesticide usage in Vermont by 20% in 10 years.</p>
 <p>Enhances integration of various elements of agro-ecosystems (plants, animals, ...)</p>	 <p>Examples: technical assistance; farmer mentorship programs</p>	 <p>Examples: Agroforestry Brief; education; WG; general support for diversified farms and community scale agriculture; grazing work; poultry compost foraging; scale appropriate regs (making it easier often to integrate things at small farm or economy scale); Vermont Healthy Soil Coalition; National Healthy Soils Coalition</p>	 <p>Examples: "Vermont farm stewardship is increasing ecological diversity and improving soil and water quality, and farm stewards are supported, compensated, and recognized for their positive contributions to the environment and public good." (one of the 15 goals in the new Strategic Plan); Incentivizing agricultural diversification, e.g., by offering financial support for on-farm diversification that includes goats.</p>



Alignment of selected Vermont organizations' activities with CIDSE's principles. Expanded version of Figure 8.

SOCIO-CULTURAL	 Promotes farmer to farmer exchanges for sharing knowledge	 Examples: NOFA conference; cohort-based learning; farm beginnings; journey farmer; CRAFT; on-farm workshops	 Examples: Farmer-based policy working groups; educational workshops (farming conferences, on farms, etc.); participation in farmer networks and listserves; connecting farmers looking for information with farmers who have experience/knowledge to share; advocacy trainings and testimony opportunities; farmer skill share and social events	 Examples: Reinvigorating farmer cohort learning groups by funding a position that can coordinate meetings between farmers of different scales and in varying regions to share their specialized knowledge and allow farmers to connect with each other to broaden skill sets while providing social outlets; supporting alternative ways to encourage farmer learning including peer-group-based education, workshops, and farmer-to-farmer programming
	 Strengthens food producers, local communities, culture. knowledge, spirituality	 Examples: NOFA conference; cohort-based learning; farm and food guide; ag literacy week; pizza oven (social event); virtual policy roundtables	 Examples: Scale appropriate regulations; increasing access to direct sales; advocating for traditional food practices; advocating for equity, access, etc. in food system and land ownership; participating in collaborative networks and relationships and amplifying non-hierarchical relationships and structures; on-farm educational and social events (on farm slaughter, etc.)	 Examples: Supporting succession efforts and the entry of young/new farmers; keeping agricultural land in agricultural use (or in conservation); strengthening economic viability of farm operations.
	 Promotes healthy diets and livelihoods	 Examples: Farm to school; farm share program; crop cash; senior farm share; marketing support for farmers; consumer education - farmers as climate change mitigators	 Examples: Increasing access to farm fresh local foods; advocating for direct market access for producers and scale appropriate regulation; educational workshops on providing and preparing foods; advocacy for farming practices that improve soil health long term and contribute positively to the surrounding ecology (nutrient density, reduced pesticides and toxics, etc.); advocating for short and long term just and dignified livelihoods in ag; Healthcare and Childcare advocacy	 Examples: Supporting programs/initiatives that are at the intersection of food access and farm viability, e.g. funding to organizations in the charitable food system to enable them to source food directly from Vermont farmers (e.g., Vermonters Feeding Vermonters). Enhancing local and regional food sovereignty by developing a state food security plan.

Alignment of selected Vermont organizations' activities with CIDSE's principles. Expanded version of Figure 8.

 <p>Encourages diversity and solidarity among peoples, encourages women and youth empowerment</p>	 <p><i>Examples: food access work, farm viability, farm beginnings; un/learning process around equity and power</i></p>	 <p><i>Examples: Intersectional and solidarity work (La Via Campesina, Migrant Justice, work for racial equity, etc.); farm unity work (working to bring farmers together across differences) - working towards social and economic well-being for everyone vs. particular demographics (healthcare, childcare, housing, land access and ownership, racial equity, etc.); Regeneration Corps and working to engage more with youth; amplification and dissemination of materials; events, etc. for historically disadvantaged communities (women, BIPOC, poor folks, youth); farmer stipends for advocacy events, BIPOC stipends for working on soil health</i></p>	 <p><i>Examples: Lowering entry barriers and supporting a diversity of farmers (young/beginning, female, minorities), improving farmers' ability to access suitable, high-quality farmland, and ensuring they develop successful farm businesses.</i></p>
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