Swette Center for Sustainable Food Systems
Arizona State University

Seeds of Success

Rooting Farm-Based Education and Research Centers in Evidence-Based Best Practices

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As a research team of sustainable food systems scholars, we are inspired and energized by the work of farm-based educators and researchers. We hope our research and recommendations provide helpful guidance to further the outstanding and impactful work already being done in this space.

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Executive Summary

In a world intricately connected by agriculture, farm-based education and research holds an important role at the crossroads of this complex network. Amid declining agricultural literacy rates and a growing interest in the origins of sustainably produced food, farm-based education and research centers emerge as crucial bridges, providing experiential, interdisciplinary learning rooted in local contexts. Challenges posed by the continued development of natural spaces and the volatility of a changing climate underscore farm-based education and research centers' significance in cultivating knowledge and resilience. By nurturing both education and community ties, these centers become agents of change. They foster enduring impacts on local and regional food systems while acting as laboratories for sustainable practices to drive a transition to a more informed and adaptable food future.

This report explores what makes these types of institutions successful. It examines these organizations' impact on food systems through a combination of primary and secondary research, and identifies gaps and opportunities within these organizations' sphere of influence. Ultimately, it puts forward a "Framework for farm-based research and education centers" to help inform and inspire leaders of these organizations.

To design this report, the researchers examined the existing literature concerning place-based, agricultural educational organizations to understand themes, trends, and evidence-based approaches for this type of education. Additionally, the team conducted extensive research on 16 farm-based education and research centers, meticulously analyzing publicly available information from organization websites, media, tax records, and other relevant sources. The selected organizations represented diverse locations across the United States, acreage, staff size, budgets, and disciplines. This comprehensive review, referenced throughout this report as the 'organizational review,' encompasses centers with a wide array of programmatic offerings, including agriculture and culinary programs, on-site research, education, farmer training, wildlife conservation, and more. The researchers supplemented the organizational review with interviews with 10 of the 16 organizations. These first-hand accounts from the centers' leaders regarding operations, structure, and policies helped contextualize the wealth of data collected from secondary sources through the organizational review.

This report presents the results of this research. This research seeks to understand the attributes of more inclusive and impactful approaches to farm-based education and research centers. It also offers insights into best practices in farm-based education that can catalyze transformational food systems change by delivering a framework of actionable components designed by, and for, food system educators.

Introduction

Agriculture profoundly impacts the daily life of every individual on the planet. With its extensive scope, the agricultural sector encompasses a multitude of practices and management techniques. Each entity within this vast network functions like a gear, varying in shape and size but collectively contributing to the world's functionality. Although these gears may not always directly interact, their teeth occasionally align, propelling each other to turn the next gear in the chain.

Operating at the intersection of these distinct gears are farm-based education and research centers. These organizations operate working lands and function as place-based entities, both producing food and educating their communities about food systems. They engage in educational programming, food production, networking, research, and resource distribution.

The research makes clear that there is a need for farm-based education and research. Agricultural literacy rates are decreasing, yet at the same time there is a growing desire from consumers to understand where their food comes from and how it is produced. These challenges are exacerbated by the continued urbanization of the United States and industrialization of the food system. Both factors are increasing the distance between consumers and farms, both physically and through the supply chain. Despite efforts to improve food and farming knowledge, agricultural illiteracy persists, posing a significant obstacle to understanding and anticipating disruptions to the food system. As climate volatility intensifies these disruptions, farm-based education and research centers will play an increasingly important role in fostering a continuous understanding of food production and encouraging active participation in creating an adaptable, resilient food system.

In response to these hurdles, farm-based education and research centers have emerged to play a crucial role in increasing agricultural literacy through civic-minded, experiential, interdisciplinary, and problem-based learning opportunities. This approach is deeply rooted in the centers' physical space, while engaging both food producers and consumers alike. However, emerging discussions on "land-based" versus "place-based" learning and the need to address equitable power relations within farm-based education underscore the importance of refining and optimizing these education models.

Farm-based education and research centers not only provide valuable education on food production, but they also engage and serve their local communities in various ways. By cultivating a sense of place, strengthening community, and advancing food

sovereignty, these organizations have demonstrated an ability to create a lasting impact that extends throughout local and regional food systems.

Moreover, as organizations operating at the nexus of working lands and education, farm-based education and research centers can collaborate with partners in their community to conduct research on sustainable farming practices and holistic land management techniques. Their land becomes a living laboratory and classroom for building a more regenerative and resilient food system. With their existing infrastructure for education and resource-sharing, these centers can significantly broaden their impact on how food is produced and consumed.

Methodology

The research team undertook a multi-pronged research approach to develop its "Framework for farm-based research and education centers." At the start of the study, a literature review was conducted to answer the question: What are evidence-based approaches for improving outcomes of non-profit farm-based education and research centers? The majority of the team's research and analysis centered on an extensive organizational review. This included a review of publicly available data on farm-based education and research centers to both select the organizations for review and to conduct a thorough analysis on each selected organization. Interviews were also administered with staff from the majority of selected organizations to supplement publicly available information. Additional details on each phase of research are below.

Literature review methodology

For this portion of the research, Google Scholar and ASU's library database were searched for the following terms[1]:

- Farm-based education
- Farm tours
- Land-based learning (in relation to agriculture, farming and/or the food system)
- Place-based learning (in relation to agriculture, farming and/or the food system)

While the vast majority of articles identified were from the United States, research conducted and/or published internationally was also reviewed. Only articles published in English were included. Most articles were published in peer-reviewed journals. However, given the limited research in this space, several articles written in partial

[1] Search string: (((“farm-based education”) OR ((“place-based learning”) AND (“agriculture” OR “farm*” OR “food system*”)) OR (“farm tour*” AND educat*)) OR ((“land-based learning”) AND (“agriculture” OR “agricultural” OR “farm*” OR “food system*”))

fulfillment of academic degrees were also considered, as were other academically-grounded papers.

Although this study's overarching research focus is on farm-based education and research centers, the literature review was specific to farm-based education and did not include farm-based research. This is because the literature on farm-based, or on-farm, research is incredibly broad and lacked the focus on public outreach and engagement that farm-based, education-centric research had.

Organization selection methodology

In addition to the client partner, Stone Barns Center, it was determined that 10 -15 farm-based education and research centers would be analyzed. Desk research was conducted to identify non-profit farm-based education centers in the United States.

A rubric was developed to ensure a mix of both relevant and diverse organizations were selected for reviewing. In terms of selecting relevant organizations, it was important that all organizations included in the study conduct at least one of the following activities key to farm-based education and research:

- Provide public access to and public education programming about the farm/ranch
- Conduct on-farm sustainability research
- Host interns, apprentices, and/or school groups

In terms of diversity, the researchers sought to include a mix of organizations varied by location, total revenue, and size (acres).

Twenty-five potential organizations were identified and scored against this rubric. Of these 25, 16 were ultimately selected for review, including Stone Barns Center. See table 1 for how the selected organizations fared against the rubric criteria.

Table 1: Organizations reviewed

Name	Location	Total revenue[2]	Size (acres)	Year founded	Interview conducted
Angelic Organics Learning Center	Caledonia, IL	$1,069,053	35	1999	N
Bill White Farms	Park City, UT	$63,135.00	2,000	N/A	N
Calypso Farm & Ecology Center	Fairbanks, AK	$780,768	30	2000	N
Cibolo Center for Conservation	Boerne, TX	$176,710	160	1988	Y
Glynwood Center for Regional Food and Farming	Cold Spring, NY	$4,685,878	225	1997	Y
GRuB	Olympia, WA	$1,220,628	3.18	2001	N
Hidden Villa	Santa Cruz, CA	$4,592,652	1,600	1924	Y
Liberty Prairie Foundation	Grayslake, IL	$1,003,268	5,000	1993	N
Rodale Institute	Kutztown, PA	$12,528,365	386	1974	Y
Shelburne Farms	Shelburne, VT	$7,988,197	1,400	1972	Y
Soul Fire Farm	Petersburg, NY	$7,785,569	80	2010	N
Stone Barns Center for Food and Agriculture	Pocantico Hills, NY	$8,885,685	100	2004	Y

[2] From each organization's most recent publicly available Internal Revenue Service (IRS) Form 990.

Name	Location	Total revenue[2]	Size (acres)	Year founded	Interview conducted
Stonewall Farm	Keene, NH	$685,004	120	1994	Y
The Land Institute	Salina, KS	$8,636,977	~600	1976	Y
TomKat Ranch	Pescadero, CA	$4,660,042	1,800	2009	Y
Wolfe's Neck Center	Freeport, ME	$5,656,149	600	1998	Y

Organization analysis methodology

Each selected organization was reviewed using a mix of secondary research (organization annual reports, websites, tax documents, etc.) and primary research, pending availability of staff for a virtual interview. Findings of this research were collected in a spreadsheet, or "Organizational Tracker." The Organizational Tracker included key information, such as each organization's:

- Background (location, year founded, years in operation, mission statement, organization's "north star," key audiences served, acreage, website)
- Programmatic areas (public access/education activities, on-site research, training programs [interns, apprentices, etc.], seed keeping, culinary [programming, dining], community supported agriculture [CSA] programs, events, policy advocacy, animal integration)
- Financial information (tax exempt status, total revenue, net assets, Charity Navigator rating, funding streams, top funders, cost of entry, support options)
- Operations (qualities looked for in board members, number of staff, volunteers, and board members, facilities of note)
- Strategy (annual reports/measurement, lessons learned/strategies for success)
- Public presence (number of visitors, community support/partnerships, communications channels, examples of media coverage and sentiment, awards)
- Additional observations

Sources for the Organizational Tracker are available upon request.

The Organizational Tracker is available for viewing at https://bit.ly/3PckfZZ.

Interview methodology

Based on the Organizational Tracker, an interview guide (see Appendix D) was developed and formally submitted through the ASU Institutional Review Board (IRB). The IRB-approved interview guide consisted of five topical sections which included:

- Organization background/purpose
- Communications/public engagement
- Fundraising
- Board/organizational leadership
- Peer organizations

Outreach to the 16 selected organizations to request an interview was done via email and through website request forms. Between June - August 2023, 12 interviews were conducted with 14 individuals representing various roles, responsibilities, and levels of management within the organizations (see table 1). The interviews were conducted and recorded via the Zoom platform. An IRB-approved consent form was provided to each interviewee to provide consent for the interview to be recorded, along with verbal confirmation prior to starting. IRB approvals are available upon request. Interview responses were anonymized to ensure that interviewees could speak freely about their organization.

Literature Review

This section explores the current literature on farm-based education. It first discusses the need and potential for this method of learning as a way to support local food systems and close agricultural literacy gaps. It then illustrates how farm-based education is brought to life on farms across the country. It closes by documenting farm-based education's benefits and how impact is measured. This literature review serves to both ensure a thorough understanding of the key terms and concepts shaping farm-based education and to ground the research team's proposed Framework in evidence, where available.

Why the need for farm-based education?

Farm-based education exists in a world of decreased agricultural literacy rates, increased industrialization and homogenization of the food system, and growing consumer desire to be reconnected to food amid concerns over how it is produced (Johnson et al., 2016).

As the United States continues to urbanize, fewer people have connections with farms (Randall et al., 2017). This has resulted in an overall decline of agricultural literacy

(Ferris et al., 2020). Despite efforts to improve food and farming knowledge, agricultural illiteracy persists (Kovar & Ball, 2013). Failure to address this knowledge gap will hinder society's ability to understand, anticipate and solve food system disruptions and insecurities (Cosby et al., 2022). Cosby et al. (2022) note that "by addressing this issue, the next generation will be encouraged to aspire to a career in agriculture which is vital to attracting and retaining the future workforce" (p. 1).

Rising urbanization and declining connection to agriculture also drive increasing industrialization of the food system. Johnson et al. (2016) characterize the food system as shifting from "smaller scale, place-based, and diverse food systems to a global, mechanized one" (p. 1). This shift results in "distancing production from consumption, disrupting communities, and obscuring awareness, understanding, and care" (Johnson et al., 2016, p. 1).

Within this homogenized and industrialized system, consumers are growing increasingly interested in where their food comes from and how it was produced (Ferris et al., 2020; Johnson et al., 2016). Half (52%) of Americans stated that their interest in knowing where their food comes from increased over the prior year (Linkage Research & Consulting, 2020). This, in part, is driving higher demand for local food. Nearly two-thirds (60%) of Americans believe supporting local agriculture would help reduce agriculture's contribution to climate change (Whetstone, 2021). The United States Department of Agriculture (USDA) Economic Research Service (2022) found that direct-to-consumer farm sales saw an almost $3 billion increase from 2019 to 2020, 35% year-over-year.

These conditions make farm-based education extremely relevant to the public—a public interested in making conscious decisions when it comes to food purchasing and how they interact with food and agricultural systems, but in many cases lacking the agricultural literacy to do so.

What is farm-based education?

Attributes of farm-based education

As a method of place-based or land-based learning (both of which are described in the next section), farm-based education can be characterized by several attributes. In its ideal form, farm-based education is:

- **Civic-minded and community-oriented** - Farm-based education embodies the spirit of "civic agriculture" (Johnson et al., 2016, p. 6; Randall et al., 2017, p. 8). This is because it encompasses community-based food system activities "that not only meet consumer demands for fresh, safe, and locally produced foods but

create jobs, encourage entrepreneurship, and strengthen community identity" (Johnson et al., 2016, p. 6; Lyson, 2004, pp. 1–2). The learnings from farm-based education are also reflective of the land and community where the farm is based (Smeds et al., 2015).

- **Experiential** - The differentiator of farm-based education is that it happens on a farm. The farm "classroom" facilitates a whole body, hands-on, sensory experience—the give of dirt under foot, a crisp and bitter bite of radish pulled straight from the ground, birdsong overhead. This sets the stage for an "authentic" (Randall et al., 2017, p. 4; Smeds et al., 2015, p. 381), "engaging" (Mindel, 2014, p. 7) and potentially even "transformational" (Johnson et al., 2016, p. 3) learning experience.
- **Interdisciplinary and transdisciplinary** - Farm-based education provides an opportunity to connect dots across multiple disciplines (Choi & Pak, 2006; Randall et al., 2017), such as agriculture, biology, culinary studies, ecology, and health (i.e., interdisciplinary). At the same time, it gives way to learning "unbound by traditional disciplines" (McKim et al., 2019, p. 173) (i.e., transdisciplinary).
- **Problem-based** - Farm-based education facilitates the adoption of potential solutions to globally- and locally-felt problems, such as climate change, food access, or food waste (McKim et al., 2019; Randall et al., 2017).
- **Systems-focused** - Farm-based education enables a food systems approach to addressing real-world problems. This means an approach that "considers the food system in its totality, taking into account all the elements, their relationships and related effects" (Nguyen, 2018, p. 2). Trade-offs and unintended consequences of on-farm actions can be witnessed first-hand and adjusted accordingly.

Key concepts

One emerging area of discourse relevant to farm-based education pertains to "land-based" versus "place-based" learning. Both are pedagogical approaches, but land-based learning is gaining traction as an evolution of place-based learning (McKim et al., 2019). It embraces positive aspects of place-based learning (i.e., "community-centered, problem-based, transdisciplinary" [McKim et al., 2019, p. 175]). But, proponents of land-based learning seek to avoid what they see as a shortcoming of place-based learning, namely its heavy reliance on "dominant cultures and traditional, Western Eurocentric educational models" (McKim et al., 2019, p. 175).

McKim et al. (2019, p. 176) point to four steps that can help practitioners successfully implement land-based learning:

- Identify "local phenomenon and partners"
- Demonstrate "understanding [of] place and interconnected systems"

- Implement “place-based intervention to enhance sustainability”
- Evaluate “changes in place, systems and community”

Although limited in the literature, this school of thought reveals opportunities for farm-based education. It can embrace the positive attributes of place-based learning, but avoid “the continuation of settler-colonialism over an appreciation of indigenous knowledge” (McKim et al., 2019, p. 175). This builds on research that has linked farm-based education to a perpetuation of “unequitable power relations that cleave along categories of gender, class and racialization” (Classens & Sumner, 2021, p. 2).

Farm-based education can also take the form of agritourism and environmental tourism. These tourism practices are broad in scope, but take place in an agricultural setting and seek “to engage directly with some aspect of a local community’s relationship to its environment” (Johnson et al., 2016, p. 8; Whyte, 2010, pp. 75–76). Like place- and land-based learning, these tourism experiences should be reflective of their home community and rely on that community’s support and engagement. Research in this space indicates an opportunity to leverage farm-based education as a means of “transformational place-based awareness and environmental education” (Johnson et al., 2016, p. 8).

How are farm-based education efforts brought to life?

Farm-based education efforts can be actualized in several ways. Most often, they involve a farm opening its doors for tours or special events, for ongoing, “farm-as-a-classroom” programming and/or apprenticeships. Agricultural centers, or working farms that exist to educate the public on food production, encompass many—if not all—of these offerings.

Farm tours or on-farm special events

On-farm events can be important means of increasing agricultural literacy. Two studies included in the literature review conducted in-depth examinations of special educational events held on farms. Though the events varied in their approaches, they were both impactful in driving awareness and interest in local/regional food production.

Ferris et al. (2020) analyzed the Breakfast on the Farm (BOTF) events held across Michigan farms since 2009. BOTF events are coordinated by a statewide council, which finds the farms, solicits funding, and helps with the planning (Ferris et al., 2020). Each individual event is planned by a committee consisting of “the MSU [Michigan State University] Extension BOTF coordinator, host farm member(s), local Extension educator(s), farmers, local business owners, and individuals from agribusiness” (Ferris

et al., 2020, p. 1). This committee is responsible for planning all on-ground aspects of BOTF, including what food is served, what educational activities will take place for children and adults, as well as coordinating logistics, and promoting the event.

At each event, attendees are invited to enjoy breakfast on-site at the farm, followed by a self-guided tour. According to Ferris et al. (2020), “Events have been held on commercial dairy, beef, crop, and fruit farms. Displays and stations along the tour route through the farmstead allow visitors to learn about various aspects of animal and crop production and management” (p. 2). Topics discussed include animal housing, water quality, food safety, pollination, and more. Ferris et al. (2020) explained that the events take a significant volunteer commitment, with between 150 to 300 needed per event. To-date, attendance has steadily doubled from 1,500 to 3,000 (Ferris et al., 2020).

Another examination was conducted by Johnson et al. (2016), focusing on the Blue Ridge Women in Agriculture High Country Farm Tour. The authors explain that the “tour aims to highlight those farmers and community members who are fighting for the community economy, preservation of natural and cultural landscapes, sense of place, and sustainable agriculture” (Johnson et al., 2016, p. 11). Unlike the Michigan BOTF events, this two-day tour focuses on small-scale farming. While the event is billed as a tour, the participants do not travel farm-to-farm together. Instead, the participating farms open up to attendees during the afternoon and evening of the two days, and then attendees can visit any of the participating farms during those periods. Passes for the two days were sold at $25 prior to the event or $30 day of. Individual farmers were generally allowed to conduct the programming on their farm during the event as they saw fit. This led to some that “scheduled on-the-hour tours or provided special workshops on topics such as seed saving or biodynamic agriculture, while others gave more informal tours once a group gathered, engaging in unstructured conversations with visitors” (Johnson et al., 2016, p. 11). Some farmers focused their programming on children, while others used the opportunity to sell their farm products to attendees (Johnson et al., 2016).

“Farm-as-a-classroom” learning

Classroom learning in an on-farm setting can be an effective way to reach students. In providing that on-farm setting, however, it is important that it be “authentic” (Smeds et al., 2015, p. 384). According to Smeds et al. (2015):

> In farm education, authentic learning environments allow pupils to learn the subject being taught in its genuine and original surroundings, including the actual actors and activities, with their interactions. All three parts must be present for an authentic learning environment to be present. For example, a farm with no

> farming activity or a cow and a farmer in the schoolyard cannot be seen as an authentic learning environment. (p. 384)

Rymanowicz et al. (2020) provide an example of this sort of program, specifically related to early childhood education. The program, known as Farm Sprouts, occurs on MSU's Tollgate Farm and Education Center and welcomes 60 participants one day a week for eight weeks in the spring and fall and 30 participants for four weeks in the winter (Rymanowicz et al., 2020). Students typically stay in the program for two or three years, and the program caps participation to 20 students with a child-teacher ratio of 5-6:1 (Rymanowicz et al., 2020).

Rymanowicz et al. (2020) explain that "the Farm Sprouts program's central purpose is to engage young children with local food and the natural world through hands-on experiences in the outdoors, building a foundation for future learning and stewardship" (p. 49). The program focuses on getting children outdoors and engaged with agriculture. Activities include hiking, caring for animals, completing chores, helping produce maple syrup, pretending to host a farmers market, and interacting with local farmers. The program also engages the parents and broader community through a CSA program and blog (Rymanowicz et al., 2020).

Apprenticeships

Gilmore (2019) explains that apprenticeships are an important aspect of place-based learning and that they are common in the organic vegetable production sector. Apprenticeships can allow the apprentice access to individual training at a fraction of the cost of a traditional higher education, plus the possibility of a job at the end of the apprenticeship (Gilmore, 2019).

Fischer (2017) conducted a review of various agricultural apprenticeship programs, analyzing their goals and operations. Fischer's (2017) study found that agricultural apprenticeship hosts are typically motivated by a desire to educate about sustainable agriculture and train new farmers. Apprentices participate in a mix of hands-on learning, field workshops, and farm tours (defined as "taking place at farms other than the host farm at which the apprentice is learning" [Fischer, 2017, p. 59]). Curriculum generally includes lessons in environmental stewardship and business (including direct sales, marketing, business planning, and financial management).

Apprenticeships offer incomparable opportunities to impart skills and knowledge needed to build agricultural literacy and develop future farmers. However, if the apprenticeship program is not economically accessible to diverse populations, it may serve to undermine the social justice goals of the apprenticeship program and actually

perpetuate inequality in the food system (Fischer, 2017). Fischer's (2017) study found that while the majority of apprenticeship programs provided some sort of stipend or wage, over a third of the programs actually charged a fee for participation.

Agricultural centers

Agricultural centers bring together many of the other aspects presented above. They exist as working farms that host ongoing, daily programming, in addition to special events. They educate visitors of all ages and many also host apprentices.

Randall et al. (2017) examined the landscape of agricultural centers in the Northeast. The examination looked at Shelburne Farms in Shelburne, Vermont; Radix Ecological Sustainability Center in Albany, New York; Pineland Farm in New Gloucester, Maine; Bread and Butter Farm in Shelburne, Vermont; New Pond Farm in Redding, Connecticut; Morris Farm Trust in Wiscasset, Maine; Stone Barns Center in Tarrytown, New York; Ambler Farm in Wilton, Connecticut; Lakeside School at Black Kettle Farm in Essex, New York; and City Sprouts in Cambridge, Massachusetts (Randall et al., 2017).

Randall et al. (2017) identified common practices they viewed as particularly important. A sampling of relevant practices and examples are highlighted below in table 2.

Table 2: Common practices of farm-based education centers

Practice	Agricultural center highlighted	Example
Customizing curriculum to meet stakeholder needs	City Sprouts Morris Farm Stone Barns Center	Analyzes state educational standards when developing curriculum and integrates into programming (City Sprouts/Morris Farm); Works with stakeholders to develop bespoke lessons (Stone Barns Center/City Sprouts)
Designing membership opportunities	Shelburne Farms	Engages 3,700 members from 44 states in a "deeper level of connection" to the farm (Randall et al., 2017, p. 68)
Developing/selling branded products	Ambler Farm	Serves maple syrup from the farm in local schools, boosting the farm's familiarity among students

Practice	Agricultural center highlighted	Example
Hiring interns	Shelburne Farms	Partners with the University of Vermont to offer a program that gives college credit for internship
Hosting workshops and community partnerships	Bread and Butter Farms New Pond Farm	Opens its doors to the public for educational lectures and events (e.g., Weekly Burger Night with local musicians - Bread and Butter Farms/local biologist lessons - New Pond Farm)
Offering opportunities for student advancement	Ambler Farm	Hosts an apprenticeship program that enables students to steadily gain “on-farm” responsibilities each year
Promoting farm online and in the community	New Pond Farm	Relies on social media, calendars, and program brochures sent to membership base
Training educators via workshops, in-service training	City Sprouts Shelburne Farms Stone Barns Center	Offers support and opportunities for local teachers (all three organizations)

What impact can farm-based education have?

Across its many forms, farm-based education can provide an enriching experience for educators (typically farmers themselves), students, and the surrounding community.

Benefits for farmers

By bringing members of the public onto their farm, farmers and food producers can learn about “consumer values and concerns about modern food production” (Ferris et al., 2020, p. 1). As a result, they can work to correct misperceptions and/or evolve their own operations to address these concerns. Conversations at on-farm educational events may also nurture a stronger tie to the farmer’s community. Additionally, farm-based education can financially benefit farmers.

For example, Michigan's BOTF initiative yielded positive results for farmers and visitors. Post-event surveys found that public perceptions of on-farm practices improved and 20 percent of visitors reported that their dairy purchasing increased (Ferris et al., 2020). This echoes findings from the High Country Farm Tour in North Carolina as well. A post-event survey found that the majority of visitors felt more inclined to buy from farmers "who employ practices they support" (Johnson et al., 2016, p. 21). The majority of visitors also reported that they "definitely intend to return to one more farms/farmers markets they visited on the tour" (Johnson et al., 2016, p. 21).

Benefits for visitors

The literature documents an extensive list of ways visitors, or students, benefit from farm-based education. This method of learning has been linked to better health, social and mental outcomes, increased agricultural literacy, higher academic performance, stronger family and community bonds, and more pro-social and -environmental behaviors (Angstmann et al., 2019; Johnson et al., 2016; Mindel, 2014; Rymanowicz et al., 2020). It is also credited with helping build new skills in areas like critical thinking, systems thinking, and leadership (McKim et al., 2019; Mindel, 2014; Rymanowicz et al., 2020). It provides members of the community a chance to directly engage and build relationships with area farmers (Ferris et al., 2020) and reconnect with their local food system (Johnson et al., 2016).

Specific to land-based learning programs, participants "are more engaged; realize greater gains in leadership, collaboration, and problem-solving skills; and build more extensive environmental and sustainability awareness" (McKim et al., 2022, p. 8).

Farm- or garden-based education has been shown to yield several benefits among young children as well. It has been linked to higher vegetable consumption, stronger family connections, increased academic achievement, greater affinity for the environment, more time outdoors, and improved social skills, among other benefits (Crary et al., 2022; Mindel, 2014). It can also foster youth empowerment (McKim et al., 2022). One study among Finnish and Swedish students found that farm-based education facilitated better learning outcomes and a better learning experience (Smeds et al., 2015). As one student in the study commented, "[I]t is impossible not to learn" in an authentic setting, like one provided on the farm (Smeds et al., 2015, p. 396).

Benefits for community

The benefits of farm-based education can also be felt across a community. In addition to the benefits mentioned above—increased connection to the local food system (Johnson et al., 2016) and strengthened social bonds (Rymanowicz et al., 2020)—

research shows that farm-based education can drive interest in environmental sustainability (McKim et al., 2022) and land stewardship (Randall et al., 2017), and also boost economic vitality (Ferris et al., 2020).

Numerous studies show that increased agricultural literacy, a key outcome of farm-based education, benefits local farmers and the food system (Ferris et al., 2020; Johnson et al., 2016; Randall et al., 2017). The High Country Farm Tour in North Carolina provides one example of this. A post-event survey found that two out of five participants (43%) learned about new ways to get involved in their local food system and one-third (36%) sought to get more involved as a result of the tour (Johnson et al., 2016)

Learning and engagement that happens on a farm can increase social economic ties across a community too. For example, Farm Sprouts brought together young families through a CSA program (Crary et al., 2022). This supports farmers' bottom line and families' healthy mealtimes.

Measuring impact

There are myriad ways to measure the impact of farm-based education. The Barcelona Principles of Measurement—an approach used by organizations to measure and evaluate communications efforts—provides a useful way to categorize metrics referenced in the literature (*Barcelona Principles 3.0*, 2020).

The metrics categorized below in table 3 are not exhaustive, but illustrate many ways to define "success." With appropriate collection mechanisms in place, outputs and outcomes are more easily quantifiable. "Potential impact" metrics are more difficult to measure—especially by a single organization. However, they point to a higher level of transformational and systemic change.

Table 3: Success metrics of farm-based education centers

Outputs (assets produced or procured by organization)	**Outcomes** (response/reaction to those assets)	**Potential impact** (long-term, transformational shifts in participants, for organization and/or society more broadly)
• **Number of tours hosted** (Ferris et al.,	*Participation/Engagement* • **Number of visitors**	*Community-based* • **Preservation of**

Outputs (assets produced or procured by organization)	**Outcomes** (response/reaction to those assets)	**Potential impact** (long-term, transformational shifts in participants, for organization and/or society more broadly)
2020) • **Number of programs or courses/trainings offered** (Randall et al., 2017) • **Number of schools visited** (Randall et al., 2017) • **Number of scholarships awarded** (Randall et al., 2017) • **Number of communications and marketing assets published (flyers, brochures, newsletters, etc.)** (Randall et al., 2017)	(Ferris et al., 2020; Johnson et al., 2016) • **Number of members** (Randall et al., 2017) • **Number of participants (in programs, in CSA, etc.)** (Crary et al., 2022; Randall et al., 2017) • **Number of community partners** (Randall et al., 2017) *Environmental* • **Changes in soil health (McKim et al., 2022)** • **Amount of food harvested** (McKim et al., 2022)	**farmland** (Randall et al., 2017) • **Expansion of "food justice" and food security** (Randall et al., 2017) • **"Connect[ion] of communities back to their landscape"** (Randall et al., 2017) • **Replicability of food systems model in other regions** (Randall et al., 2017) • **Changes in community's environmental sustainability, economic viability and social equity** (McKim et al., 2019) *Participant-based* • **Awakening of curiosity in a child/child's "excitement to come back" to the farm** (Randall et al., 2017; Rymanowicz et al., 2020) • **Trainees' long-term engagement in food**

Outputs (assets produced or procured by organization)	**Outcomes** (response/reaction to those assets)	**Potential impact** (long-term, transformational shifts in participants, for organization and/or society more broadly)
		systems work (Gilmore, 2016) • **Changes in health and environmental awareness** (Johnson et al., 2016; Mindel, 2014) • **Changes in academic achievement** (Mindel, 2014; Smeds et al., 2015) • **Changes in public perceptions (trust, acceptance, "civic mindedness," etc.)** (Ferris et al., 2020 (Angstmann et al., 2019; Crary et al., 2022; Johnson et al., 2016) • **Changes in agricultural and/or scientific literacy** (Angstmann et al., 2019; Johnson et al., 2016; Smeds et al., 2015) • **Changes in sustainability (e.g., composting), purchasing or dietary behaviors (e.g., buying more local food)** (Crary et al.,

Outputs (assets produced or procured by organization)	**Outcomes** (response/reaction to those assets)	**Potential impact** (long-term, transformational shifts in participants, for organization and/or society more broadly)
		2022; Ferris et al., 2020; Johnson et al., 2016) • **Skills cultivated (leadership, systems thinking, mental and/or social skills)** (McKim et al., 2019; Mindel, 2014; Rymanowicz et al., 2020)

Different research methods are used to measure and evaluate farm-based education or similar efforts (agritourism, land- or place-based learning, etc.). The most commonly cited include interviews, focus groups, food log journals, tests, and surveys.

Interviews and focus groups have been used to engage both host farmers and participants in conversation about their experiences with farm-based education (Angstmann et al., 2019; Crary et al., 2022; Johnson et al., 2016; Randall et al., 2017; Rymanowicz et al., 2020; Smeds et al., 2015). Typically, they are used alongside surveys for a mixed-methods data collection approach.

Surveys are the most popular instrument for measuring the impact of farm-based education. Numerous studies describe how pre-event and/or post-event surveys are given following an on-farm experience (Angstmann et al., 2019; Crary et al., 2022; Ferris et al., 2020; Gilmore, 2016; Johnson et al., 2016; Rymanowicz et al., 2020). Surveys have been distributed both immediately following the experience (before the participant leaves the site) and several days or weeks post-event to gauge longer-term impacts.

There are also measurement techniques more commonly used in an academic or classroom setting. For example, students have been asked to log food recall journals to document vegetable preparation and consumption habits (Crary et al., 2022). They are

also asked to complete different kinds of evaluations, such as the civic-minded graduate scale and Test of Scientific Literacy Skills survey instrument (Angstmann et al., 2019). Students have also been subject to immediate and long-term tests to gauge memory/recall following their time on the farm (Crary et al., 2022; Smeds et al., 2015).

What are "best practices" in farm-based education, based on the current literature?

Farm-based education can be a transformative experience at both an individual and community level. While farm-based education can take many shapes, the literature reviewed reveals some common threads in "successful" embraces of this learning approach.

As noted at the start of this literature review, farm-based education should be experiential, interdisciplinary and transdisciplinary, problem-based, and systems-focused. In addition to these attributes, farm-based education should embrace the practices described below.

Reflect and benefit the local community

First and foremost, farm-based education should be strongly rooted in the community in which it is based. Steps should be taken to continually involve the local community and earn that community's support (McKim et al., 2019; Randall et al., 2017). This means that curriculum and programming are inspired by the land and "local concerns" and that local farmers, food producers, and other experts (i.e., "locally-produced knowledge") are engaged in the solutions (McKim et al., 2019). As an example of "civic agriculture" and place-based learning in action, farm-based education can help enhance "community identity" and "vitality," while also improving environmental sustainability (Johnson et al., 2016, pp. 6-7).

Similarly, farm-based education efforts should be imbued with a sense of place. The community emphasis described above is a key tenant of place-based learning. But, there may be an opportunity for farm-based education practitioners to embrace the burgeoning concept of land-based learning.

Rely on expert educators

Who is delivering farm-based lessons is incredibly important. The educator can vary from career farmers and food producers to traditional classroom teachers (though the learning will take place beyond classroom walls). While some studies note the importance of highly trained educators in facilitating place-based learning (Randall et al., 2017; McKim et al., 2019), the literature largely emphasizes how full-time farmers

and food producers are powerful advocates for farm-based education (Ferris et al., 2020; Johnson et al., 2016; Rymanowicz et al., 2020).

Use meaningful measurements

Farm-based educators should measure outputs, outcomes, and behavioral change in a long-term and holistic way (Ferris et al., 2020; Johnson et al., 2016; McKim et al., 2019; Rymanowicz et al., 2020). This facilitates a better understanding of impact across programs, participants, and the community. Using pre- and post-research methods is essential for measuring changes that can be attributed, in part, to lessons learned on the farm.

Ensure adequate funding

Integration of these practices assumes that funding is available to make the necessary investments in farm-based education. While not mentioned directly in all studies reviewed, it is essential that adequate budgets are in place. Studies that discussed funding mentioned it in the context of fundraising approaches and top spending categories.

In terms of fundraising, membership programs are popular among farm-based education centers (Randall et al., 2017). These facilitate a tiered approach to supporting the farm. Ticketed entry and program enrollment costs are also used by some programs, like the High Country Farm Tour (Johnson et al., 2016) and Farm Sprouts (Rymanowicz et al., 2020) respectively. Other programs, like Michigan's BOTF, rely on sponsors and local fundraising (Ferris et al., 2020) or grants (Randall et al., 2017).

Expenditures were less frequently discussed in the literature. But, studies that did reference it usually noted that educational programming and staff salaries are the highest expenses (Randall et al., 2017). A review of diverse farm-based education programs found that "a common thread seen throughout all of the farms, no matter the size of the budget, is that each farm spends approximately 40-50% of their annual budget on educational programming, including the salaries for their educators" (Randall et al., 2017, p. 55)

Conclusion

This literature review underscores the valuable role farm-based education can play in connecting the public to their local farmers and food system. Though they can take many shapes, farm-based education efforts are united by their commitment to reinvigorating a sense of curiosity and care for the land.

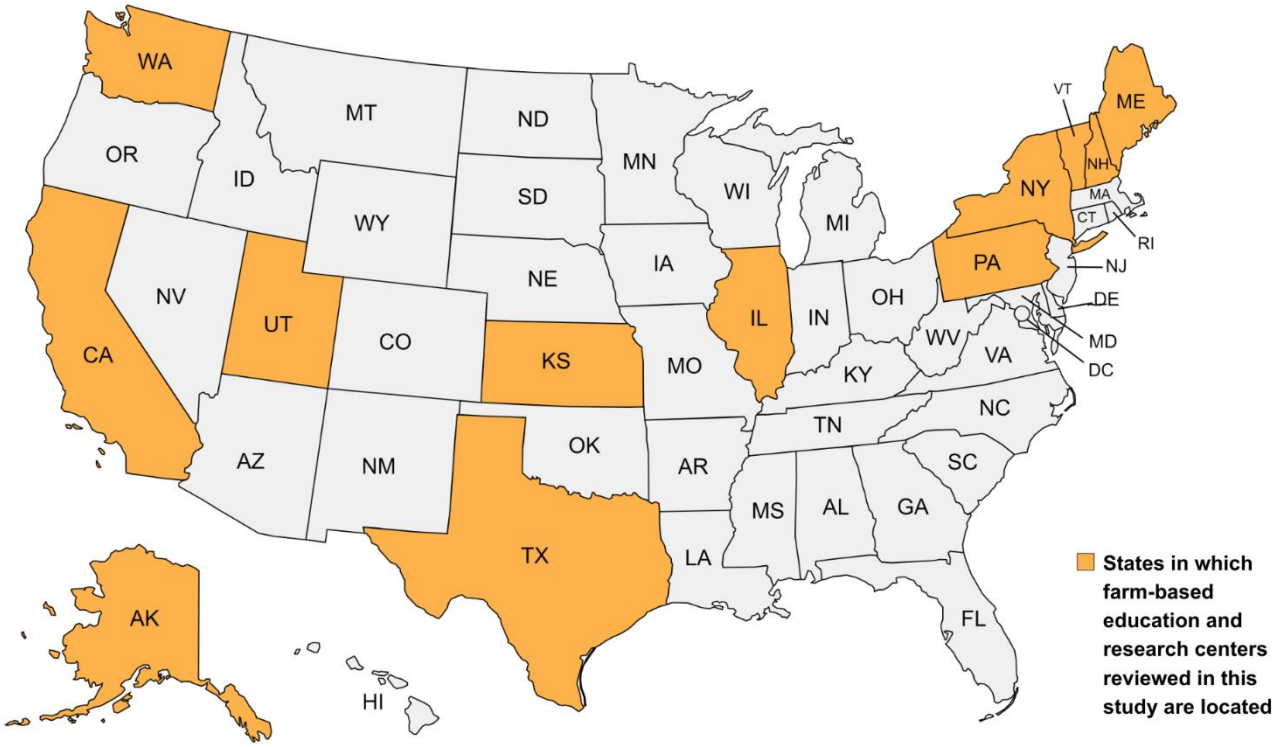
This literature review also indicated that there are opportunities for improvement and knowledge gaps to fill. For example, more research is needed on core concepts like land-based learning (McKim et al., 2019) and agritourism (Johnson et al., 2016). More data is also needed to illustrate farm-based education's impact on behavior, like consumption of healthy foods (Crary et al., 2022). No studies reviewed documented how the COVID-19 pandemic shifted operations of farm-based educational programming. Few went into detail on operational best practices at a national level to better ensure the impact and longevity of farm-based education and research centers. This paper seeks to help fill this gap.

Analysis

As noted, the research team conducted an in-depth analysis of 16 farm-based education and research centers across the United States. Organizations were selected to provide a diverse sample of location, size (acreage), and budget (as measured by total revenue), as demonstrated in table 1 and figure 1. The organizations also had diverse program offerings, with programming being a mix of either farmer-, educator-, community-, or research-focused, but many offer programming in two or more of these areas.

Generally speaking, farmer-focused programming consists of training or resources for farmers to teach them skills or help enhance their operations. Educator-focused programs involve training educators and equipping them with resources on farm-based learning. Community-focused programs bring the center's agricultural approach to the community through public access, workshops, events, training, and other means. Research-focused programs specialize in testing different approaches to improve agricultural innovation and sustainability.

Figure 1: Locations of farm-based education and research centers reviewed



Framework for farm-based education and research centers

The research team's literature review, primary (interviews) research, and secondary (organizational tracker) research led to the creation of a "Framework for farm-based education and research centers" (Framework). The Framework is designed to inform and inspire farm-based education and research centers with actionable guidance. It also fills a gap identified during the review of the literature. While some papers provided recommendations for farm-based education centers, they did so from a regional perspective[3] or related to a specific aspect of farm-based education and research,[4] as opposed to the more comprehensive approach this review took.

This Framework is comprised of 10 Components, each of which is organized into one of five domains and includes illustrative examples, or Components in Practice (CiPs). The Framework is structured in three levels: 1) Domain, 2) Components, and 3) CiPs.

The first level is the domain. The domains are a modified version of the four domains of sustainable food systems science, which are environment, health, economics, and society (Drewnowski et al., 2018). These domains were modified for the purpose of this Framework to be environmental, nourishment, economic, and social. A fifth domain was added to provide insights on governance and operations. Health was expanded to be "nourishment" to more broadly capture the ways farm-based education and research centers can provide programming and resources on local, sustainable, and healthy eating, in addition to culinary offerings (be it dining, groceries, workshops, and more).

This adapted framing helps better capture the breadth of farm-based education and research center's programmatic areas and planning needs. It was also used to demonstrate that farm-based education and research centers should strive to holistically encompass the environmental, nourishment, economic, and social aspects of sustainable food systems. This reinforces that farm-based education and research centers' food systems work must be inherently and intentionally intersectional.

Next, within each domain are the Components, which are the key pieces of the Framework. These Components represent 10 considerations for farm-based education and research centers to weigh in their strategic planning and programming. This Framework recognizes that organizations may wish to dedicate resources in a more targeted manner, and they should strive to follow the ones that most align with their goals.

[3] For example, Randall et al., 2017.
[4] For example, Fischer, 2017.

Additionally, it is important to note that equity is not listed as its own Component, but rather it permeates all of the Components. Adherence to these considerations is intended to drive more equitable outcomes in the farm-based education and research space.

Finally, the third level is the CiPs. CiPs illustrate noteworthy ways each Component is being actualized on the ground. The CiPs are “pick-and-choose.” One organization does not have to do all these things. The CiPs may not always be fully exhaustive of all the ways the organizations reviewed deliver on these Components, but they do provide a representative sampling of diverse approaches to deliver on the same premise. For more details on how any of the organizations reviewed may be addressing a CiP, please see the Organizational Tracker. At the conclusion of each CiP, the appropriate row(s) to reference within the Tracker are listed like this: *See row XX*.

Framework for farm-based education and research centers

Considerations to inform and inspire farm-based education and research centers

Environmental domain

1. Recognize the importance of holistic land management and diverse farming practices to promote soil health and protect biodiversity.

2. Design research, training, and resources so that they promote actionable and replicable practices intended to regenerate or sustain natural environments.

Nourishment domain

3. Make the farm-to-food connection.

Economic domain

4. Support market development and farmer empowerment to allow farmers practicing holistic land management to realize a return on investment.

Social domain

5. Deliver experiential, hands-on learning opportunities.

6. Ensure farm operations reflect, engage, and benefit the surrounding community.

Governance/operational domain

7. Articulate and work against a clear strategic plan.

8. Set and report on transformation-oriented metrics.

9. Diversify funding and revenue for organizational resiliency.

10. Report financials transparently to build trust.

Environmental domain

Component 1: Recognize the importance of holistic land management and diverse farming practices to promote soil health and protect biodiversity.

Farm-based education and research centers play a critical role in promoting and educating the public, farmers, and future generations on sustainable and responsible agricultural practices. This can be achieved, in part, by recognizing the significance of holistic land management and diverse farming techniques to enhance soil health and preserve biodiversity. By integrating diverse farming practices and emphasizing holistic land management principles, these centers contribute significantly to establishing resilient, regenerative farming systems that support both soil health and biodiversity.

An in-depth analysis of farm-based education and research centers revealed their implementation of diverse farming practices and holistic land management. These practices align closely with the principles of regenerative agriculture, a term that lacks a uniform definition in policy or regulation. Regenerative agriculture is “an alternative means of producing food that … may have lower—or even net positive—environmental and/or social impacts” (Newton et al., 2020, p. 1). This analysis identifies key aspects of a regenerative agriculture system, including integrating livestock, reducing or eliminating tillage, improving soil health, and increasing biodiversity, all practices well-documented in various studies.

Due to the lack of a consistent definition for regenerative agriculture, the term “holistic land management” may be more appropriate to describe the role of certain, though not all, regenerative agriculture practices. Holistic land management also offers a comprehensive way to describe the intersections between the principles of regenerative agriculture and the steps proposed for successful implementation of place-based learning. This broader and more inclusive approach accommodates farm-based education and research centers that may not precisely meet a technical definition of regenerative agriculture.

By integrating both regenerative agriculture practices and the four steps for successful land-based learning (box 1), farm-based education and research centers can gain a more complete understanding of their educational program’s physical setting and establish a deeper relationship with their land and community. The following CiPs provide practical examples of holistic land management, demonstrating how it leverages the intersections between regenerative agriculture and place-based learning. This

integrated approach enhances the educational impact of these centers while advancing environmental sustainability and community engagement.

Four steps for land-based learning
Per McKim et al. (2019, p. 176):
1. Identify “local phenomenon and partners”
2. Demonstrate “understanding [of] place and interconnected systems”
3. Implement “place-based intervention to enhance sustainability”
4. Evaluate “changes in place, systems and community”

(Box 1)

- **CiP** - **Develop community partnerships for monitoring soil health.** Soil health is a key factor in holistic land management. Not only is managing soil health a key consideration in implementing regenerative agriculture practices, but it’s also a powerful tool for measuring the impacts of such practices. Newton et al. (2020) found that measuring improvements in soil health was listed as a key outcome of regenerative agriculture practices in half (49%) of academic journal articles and the majority (86%) of practitioner websites reviewed for the study. Monitoring soil health creates an excellent opportunity for organizations to practice the four essential steps for successfully implementing land-based learning proposed by McKim et al. (2019) and expand their impact as a farm-based education and research center. This is particularly true when these centers invest in developing community partnerships for monitoring soil health. Bill White Farms is an excellent example of community partnerships in action to monitor soil health and educate on sustainable farming and ranching (*Bill White Farms*, n.d.). Bill White Farms and the Summit Land Conservancy, both in Park City, UT, partnered to measure soil health and monitor the impacts of regenerative grazing on a land conservancy in Park City. While Summit Land Conservancy holds ownership of the land, its partnership allows Bill White Farms to expand its regenerative practices, environmental impact, and education opportunities for farm guests. *See row 14.*[5]

- **CiP - Utilize multiple livestock species and/or managed grazing patterns.** Utilizing livestock in land management practices can contribute to sustainability goals, offer expanded educational experiences for guests, and provide an

[5] At the conclusion of each CiP, row(s) are listed for where readers can find more information in the Organizational Tracker. Please see page 5 to see how to access the Organizational Tracker.

additional stream of income. This, in turn, can help protect the physical space the organization operates on, as well as insulate a farm from shocks or changes in their respective markets. Some farm-based education and research centers use livestock to complement existing regenerative practices. Some utilize livestock in multiple aspects of their operation. Others rely on livestock as the primary means through which they offer their programming. Soul Fire Farm, for example, practices silvopasture, "the integration of trees and pasture for livestock," as a way to combine regenerative crop and livestock management practices (*Soul Fire Farm Farming Practices*, 2012, para. 8). The livestock, specifically sheep and goats, are used in Soul Fire Farm's programs, such as farm tours and community farm days. Hidden Villa utilizes livestock to enhance every aspect of its operation and education programming. On Hidden Villa's farm, "a single pig can turn soil in the fields, be an educational resource for program participants and visitors, and deliver the highest quality meat to the farmer's market" (*Hidden Villa Fact Sheet*, 2018, p. 5). TomKat Ranch uses "livestock grazing to grow healthy soil, support diverse and vibrant rangelands, and produce nutritious food for our community" by "carefully managing the location, timing, duration, and density" (*Regenerative Ranching*, n.d., para. 4). TomKat Ranch invites guests to learn about managed grazing and regenerative livestock production through its "Day at The Ranch" program. Guests can also participate in educational and leadership development through TomKat Ranch's equine program, "Gallop Adventure" (*Gathering for Action*, n.d.). *See rows 13 and 21.*

- **CiP - Prioritize perennial soil cover through land management practices.** Perennial soil cover assumes significant importance in the realm of holistic land management, providing a multitude of benefits through a variety of applications. These benefits include reducing erosion, weed pressure, and costs while improving biodiversity, soil health, and organic matter (*Organic No-Till*, n.d.). Perennial soil cover offers many opportunities to provide education while contributing to a holistic land management approach. Rodale Institute conducts extensive research on the costs and benefits associated with maintaining perennial soil cover on farms and integrates its findings into farmer training and educational materials. Another method to achieve perennial soil cover is agroforestry. The director of farm stewardship at Glynwood Center defines agroforestry as "the cultivation or conservation of trees in an agricultural system," with the goal to "improve drainage and water infiltration, soil health, habitat, while minimizing erosion, adding windbreaks, and sequestering carbon" (Llewellyn, 2018, para. 2). Glynwood Center's agroforestry practices are only a part of its holistic land management approach, which it uses as a "demonstration and

training destination" for farmer education and regional food programs (*Regenerative Farming at Glynwood*, n.d., para. 5). *See row 14.*

Measuring and studying holistic land management's impact on farm ecology
Measuring the impact of holistic management on the ecological health of a farm-based education and research center's land can be challenging due to the absence of comprehensive definitions, regulations, or guidelines for regenerative agriculture practices. During the research process, various environmental indicators and ecological studies were identified as relevant for measuring and monitoring ecological impacts.

Sampling of environmental indicators organizations are measuring:

- Percent of organic soil matter
- Percent of land area with perennial cover
- Amount of food harvested
- Tons of CO_2 sequestered through on-farm agricultural practices
- Rate of landfill conversion
- Supplemental livestock feed purchased
- Number of wildlife and wildlife species

Care should be taken to utilize indicators that align best with the practices adopted by the farm, the needs of their community, and the ability to leverage local partnerships to pursue thorough measurement and analysis.

(Box 2)

- **CiP - Conduct ecological monitoring to assess impact of land management practices.** Having a method or plan to measure the ecological impacts of land management is a critical aspect for some farm-based education and research centers. By analyzing outcomes, valuable insights can be gained to support the integration of holistic land management practices and principles of farm-based learning. Ultimately, this process can foster further sustainability measures and offer opportunities for community engagement. Some organizations reviewed and applied extensive ecological planning and measuring and executed detailed research studies. These include Stone Barns Center's "Conservation Action Plan" and TomKat Ranch's "Ranch Data Project." Not every farm-based education and research center can invest in such extensive monitoring or studying. Stone Barns Center's Conservation Action Plan is notable for its use of extensive planning, data collection, and mapping in partnership with the

Rockefeller State Park Reserve. The data is recorded and organized online where it is utilized for a long-term analysis of their land management practices.

Using a monitoring tool developed by a regional partner Point Blue Conservation Science (PBCS), TomKat Ranch's "Ranch Data Project" is able to widen the scope of its ecological monitoring. In addition to capturing data directly related to its management practices, the PBCS Rangeland Monitoring Network "carefully tracks ecological function at numerous sites across the ranch through regular measurements of soil health, streamflow, local weather, and the abundance and diversity of birds and plants" (*Regenerative Ranching*, n.d., para. 9). This expanded data collection offers TomKat Ranch a full assessment of the impact of its land management practices to better understand how its organization impacts the physical place. *See row 14.*

Component 2: Design research, training, and resources so that they promote actionable and replicable practices intended to regenerate or sustain natural environments.

Farm-based education and research centers working towards transforming the food system need to make sure the practices they are promoting are actionable and replicable for farmers. In order for the practices to be widely adopted, farmers must be able to visualize the success of those practices for their bottom lines and productivity. Environmental outcomes should be clearly defined and measurable.

According to Piñeiro et al. (2020), farmers have to weigh a large list of factors—ranging from personal beliefs to what their land can support to the amount of risk their operation can handle—when choosing to adopt sustainable agricultural practices. As a result, "sustainable policies should seek to adopt an integrated approach that addresses both short-term priorities such as profitability, while simultaneously working towards long-term environmental outcome" (Piñeiro et al., 2020, p. 816). Piñeiro et al. (2020) go on to explain that there needs to be a balance when presenting farmers with a sustainability program, one that addresses their short-term concerns, like profitability, while also working towards longer-term sustainability goals. The following CiPs can help pave the way towards actionable and replicable farmer resources.

- **CiP - Demonstrate that regenerative agricultural practices researched and promoted by the center are realistic and accessible to a diverse range of farmers.** Farm-based education and research centers should ensure that the sustainability practices they advocate for are realistic for a broad range of farmers and locations. Centers should also avoid an "all or nothing" approach to conservation practices, wherein they look past the value of implementing specific

conservation practices if the farmer does not adopt all of the practices the center is advocating for. Centers should recognize that varied climates, geographies, soil types, pest pressures, and other factors contribute to certain conservation approaches or practice changes being less effective or productive, with respect to the ability of farmers to determine what works best for their operation. Rodale Institute conducts farm trials on organic versus conventional cropping systems, seeking to demonstrate the economic viability and productivity of organic systems (*Science*, n.d.). It also operates a network of regional resource centers to target its research to diverse areas of the country (*Regional Resource Centers*, n.d.). Despite Rodale Institute's commitment to regenerative organic agriculture, an interviewed staff member explained their desire to see a commitment to decreased use of synthetic pesticides in the termination of cover crops, but they do not begrudge farmers who just plant cover crops and terminate using a herbicide. *See row 14.*

- **CiP - Ensure practice changes have a measurable environmental benefit and are weighed against costs of adoption and any adverse effects to productivity for farmers.** The conservation practices farm-based education and research centers advocate for should not lead to an overall decrease in productivity and economic viability for farmers, and their environmental benefits should be clearly defined. Component 4 focuses on the proactive steps centers can take to improve economic conditions for farmers, whereas this CiP is focused on ensuring that practice changes do not negatively impact a farmer's bottom line. One example of an organization actively working to do this is The Land Institute, which is working to promote perennial crops like Kernza (*Kernza® Grain & Perennial Agriculture*, n.d.). The Land Institute approaches this from both an environmental and economic perspective for the farmer, demonstrating how a farmer can maintain their profitability because they can cut back on inputs with a perennial crop (*Why Perennial Grains?*, n.d.). It also conducts scientific research on the effects of perennial crops, such as a study on the effects of Kernza on nitrate leaching losses (Huddell et al., 2023). *See rows 13-19, 21-22.*

Kernza

Kernza, the grain harvested from intermediate wheatgrass, is a crop The Land Institute has been breeding and conducting research trials on since 2003 (*What Is Kernza®?*, n.d.). It is currently working to scale up the crop's production and build markets for it. Currently, there are 3,951 acres of Kernza grown nationwide (*The State of Kernza®*, n.d.). Intermediate wheatgrass is a perennial grain crop, meaning it will provide year-round ground cover. According to The Land Institute, it requires less

inputs, causes less soil disturbance, results in less soil carbon loss, and sequesters atmospheric carbon deeper in the soil (*Perennial Grain Crop Development*, n.d.)

(Box 3)

Nourishment domain

Component 3: Make the farm-to-food connection.

Wendell Berry (1990) wrote, “Eating is an agricultural act” (para. 1). Farm-based education and research centers are well-positioned to embody this mantra. They provide an unparalleled opportunity to educate and engage around both agricultural practices, healthy and sustainable diets, and culinary traditions. They can directly connect work that’s done on the farm to food that’s served on the farm or in the community. This Component is important for several reasons, as it can:

- Foster an appreciation for the local food landscape. Visitors can see first-hand the labor, the conditions, and the many decisions that go into farming and food production. Witnessing a farm at work can expand visitors’ understanding and enjoyment of seasonal eating and locally-available foods, as well as their appreciation for the people who make that possible.
- Educate around and inspire ways of healthy and sustainable eating, as food harvested on the farms tends to be nutrient-dense fruits, vegetables, and animal-source foods. This can be accomplished through cooking workshops, educational materials that accompany CSA boxes, and on-site dining and groceries.
- Tap into the transformative power of taste, as the farm sets the scene for a more meaningful and memorable dining atmosphere. For example, sipping a warm cup of mulled apple cider while walking through the apple orchard it came from makes for a delightful and fully sensory experience.
- Build pride in and celebrate the “sense of place” where the food is grown, harvested, and served. Serving regionally-inspired meals is particularly important for place-based establishments, which should reflect the place they operate.
- Enable farms to directly serve their community and help advance the goal of food sovereignty. This is largely accomplished through the provision of CSA programs.
- Open new market opportunities for farmers, as guests may feel more affinity for purchasing farm fresh products during their visit and in the future. This may also shift long-term purchasing to more sustainably and/or locally-produced foods.
- Inspire visitors to “play an active and responsible part in the economy of food” (Berry, 1990, para. 6). In Berry’s view, engaging more fully in the local food

system is the surest way to heighten the connection to and enjoyment of food (1990).

The farm-based education and research centers reviewed make the "farm-to-food connection" in diverse ways, but vary in the extent to which they integrate agricultural, nutritional, and culinary efforts. Stone Barns Center is the most hybridized, as it sits at the intersection of agriculture and culinary programming. In an interview, staff shared that they work hard to intentionally integrate work between farmers and cooks. Other centers have limited or no culinary offerings. The CiPs below illustrate the many ways in which farm-based education and research centers could make the connection to eaters.

- **CiP - Make CSA shares available and accessible.** Inviting community members to participate in a CSA is one way organizations earn money, advance food sovereignty, educate on healthy eating (via provision of nutrient-rich foods and recipes), and deepen connections to their farm. Some, like Glynwood Center and Stone Barns Center invite Supplemental Nutrition Assistance Program (SNAP) beneficiaries to participate (*CSA & Farm Store*, n.d.; *Support a Healthy Farm Ecosystem*, 2022). Soul Fire Farm offers sliding scale CSA shares. It accepts SNAP and Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) Farmers Market Coupons and distributes "Solidarity Shares" (Lennon, 2018). Solidarity Shares are "no cost doorstep delivery of vegetables, fruits, medicine, eggs, and value-add[ed] products to people living under food apartheid in the Albany-Troy area" (Lennon, 2018; *Solidarity Shares*, 2011, para. 1). *See row 18.*

- **CiP - Sell farm fresh goods.** Making goods available for purchase enables guests to take a taste of the farm home with them or enjoy their snack on-the-spot. It also provides a revenue stream for farms and allows them to build awareness and affinity via branded products. These goods are generally sold at on-site farm stores or farm stands, though some centers also have restaurants. Shelburne Farms, Stonewall Farm, Rodale Institute, Stone Barns Center and Wolfe's Neck Center are among the organizations reviewed that sell groceries. Goods sold include produce, herbs, dairy, meats, eggs, and pantry and picnic items. Though the majority sell groceries on-site, some organizations have e-commerce platforms as well. Some organizations also form partnerships to create value-added goods. TomKat Ranch, for example, worked with other local ranchers to open a cooperative-run, grass-fed multi-species mobile processing facility. This provides a direct-to-consumer option for farms to sell their products (*BAR-C*, 2020). *See row 17.*

- **CiP - Offer dining experiences on-site.** On-site dining makes farm-based education and research centers even more of a destination. It is perhaps the most involved—yet impactful—way for centers to truly tell a story with the food that is grown and served on-site. This can be executed in not only what is on the menu, but the way those items are named, plated, and presented by staff. Stone Barns Center is home to the renowned Michelin Star restaurant Blue Hill at Stone Barns. Other dining options on-site include a café, small plate lunches ("Lunch Tray"), and family-style dinners ("Community Table"). These highlight "ongoing work with whole grains (freshly milled whole-grain breads), preservation (fermented and pickled vegetables) and butchery (pork and beef charcuterie)" (*Lunch Tray*, n.d., para. 1). Shelburne Farms serves breakfast and dinner at its on-site Inn. Wolfe's Neck Center's Maggie Mae Outpost functions as a cafe and grab-and-go meal location. *See row 17.*

- **CiP - Host events that feature farm-to-table fare.** Inviting donors to enjoy a night out on the farm is a popular fundraising tactic. These special occasion dinners feature menus inspired by and sourced from the farm, and facilitate conversation between farmers, chefs, and guests. Some are seasonal celebrations, like Stone Barns Center and Blue Hill's "Feasts" or GRuB's "Harvest Soiree Dinner." Others are ongoing events, like Glynwood Center's "Farm Dinner Series," which invites guests to hear from thought leaders in the food and agricultural world as they enjoy the "beautiful bounty of [Glynwood's] farm and the Hudson Valley" (*Farm Dinners*, 2023, para. 1). While these special events may be limited to just one evening, the sensory experience of dining on-site may inspire guests to seek out more local food and continue their support of the host organization. *See rows 17 and 19.*

- **CiP - Provide culinary and/or nutritional programming to inspire and impart new skills.** Farms can be an ideal and idyllic classroom for learning new food preparation techniques. Many of the organizations reviewed, such as Stone Barns Center and Shelburne Farms, host fee-based food and/or beverage-focused workshops. These classes elevate seasonal goods grown on the farm. For example, Wolfe's Neck Center has hosted workshops on making elderberry syrup, herb-infused oils, and kombucha (*Workshops*, n.d.). Angelic Organics Learning Center created a video series intended to "increase knowledge, access, and consumption of specialty crops in northern Illinois, and to expand the availability of fresh, locally-grown produce and strengthen the state of Illinois' specialty crop industry" (*Seasonal Eating Video Series*, n.d., para. 1). Stone Barns Center has the most extensive culinary-focused programming. In addition to cooking and botanical workshops, it has hosted "Chefs in Residence" and a

public discussion series with chefs. These included “At the Pass” and “Cooks & Farmers Conversations,” both of which explored the intersection of “culinary and agricultural influences” (*Stone Barns Center 2021 Annual Report*, n.d., para. 3). *See rows 13 and 17.*

Economic domain

Component 4: Support market development and farmer empowerment to allow farmers practicing holistic land management to realize a return on investment.

According to Carlisle et al. (2019), some of the greatest challenges facing the entry of new farmers include access to land, markets, training, and/or technical assistance. Farm-based education and research centers striving to spark change in the food system are well-positioned to be a valuable resource to new and existing farmers interested in sustainability. Farming requires immense amounts of capital to begin and sustain an operation. Therefore, farmers need to be able to realize a return on their investment in order to succeed. Farm-based education and research centers can be a support system for farmers, working to ensure that they have a path to success.

- **CiP - Create a community of farmers to allow for knowledge sharing and growth.** Farm-based education and research centers can facilitate the spread of knowledge about sustainable farming practices amongst farmers, increasing the chance of their adoption and allowing farmers to support each other. Carlisle et al. (2019) explains how sustainable farming requires large amounts of knowledge, but there is a lack of information flowing from traditional sources such as the government and land-grant universities. Furthermore, farmers looking to adopt sustainable practices face challenges of navigating markets, financial systems, and other aspects of the agricultural economy that have largely been set up for traditional agriculture (Carlisle et al., 2019). These challenges make knowledge sharing amongst sustainable farmers extremely important, and farm-based education and research centers can facilitate this. For example, Glynwood Center supports the Mid-Hudson Collaborative Regional Alliance for Farmer Training (C.R.A.F.T.), which allows farmers to join together to host trainings for the other farmers on their farm (*Mid-Hudson CRAFT*, n.d.). Angelic Organic Learning Center participates in the Upper Midwest CRAFT (*Upper Midwest CRAFT*, n.d.). Calypso Farm & Ecology Center hosts free farmer training events in rural Alaska for indigenous farmers (*Indigenous Agriculture*, 2022). *See row 15.*

- **CiP - Support and facilitate market development for farmers practicing regenerative agriculture to connect them with customers and revenue streams that allows their operations to be successful.** Supporting market development for the products grown by farmers in the area is important to ensure the farmers have a place to sell their goods and earn a profit. Carlisle et al. (2019) explain that because of consolidation in the agriculture industry, scale is required to compete in traditional wholesale marketplaces, leaving smaller retail markets as the primary means of sale for beginning farmers. In addition to physically selling the farmers' produce at the center (as discussed in Component 3), farm-based education and research centers can focus on broader market development for specialty crops and value-added products. Glynwood Center runs two market development programs. The first, "Grains and Staples," promotes the cultivation of grain and staple crops as part of a robust regional food system. It also facilitates market development for these locally-grown crops by assembling a network of prospective and current buyers, including bakers, distillers, producers, and others in the industry. In addition, it hosts field days and home baker meetups featuring the farmers in the area growing the grain and staple crops (*Grains & Staples*, n.d.). The second is a market development program for cider in the state of New York, with Glynwood Center even going as far as co-founding the New York Cider Association as a promotional organization for the New York cider industry (*Cider Project*, n.d.). *See row 22.*

- **CiP - Provide support to beginning and socially disadvantaged farmers to facilitate access to land.** Working to promote land access for beginning and socially disadvantaged farmers will be important to continue the growth of local and regional agriculture. Farmers are getting older, with the average age of farmers increasing 56.3 to 57.5 between 2012 and 2017 (Halvorson, 2023). Farmland prices have risen too. According to the USDA, the average farm real estate value has risen from $2,520 per acre in 2012 to $3,800 per acre in 2022 (USDA National Agricultural Statistics Service, 2022). Carlisle et al. (2019) lay out the challenges new farmers face in acquiring access to land, including "disappearing farmland, increasing farmland value, and depreciating new entrant purchasing power" as well as "landlord discretion, tenants' rights, and the history of land control and dispossession" (p. 5). Farm-based education and research centers can provide resources to beginning and socially disadvantaged farmers to help them overcome these challenges. For example, Liberty Prairie Foundation prioritizes land access as a key program, hosting a website that connects farmers and landowners and making its staff available as a resource to farmers looking to find land (Liberty Prairie Foundation, n.d.). *See row 22.*

Social domain

Component 5: Deliver experiential, hands-on learning opportunities.

The literature reviewed makes clear that place-based learning can benefit students, educators, and the broader community. It can yield better outcomes across health, social, and mental indicators, boost academic achievement and agricultural literacy, bolster local food systems, and impart valuable and fulfilling lifelong skills (Angstmann et al., 2019; Ferris et al., 2020; Johnson et al., 2016; McKim et al., 2019, 2022; Mindel, 2014; Rymanowicz et al., 2020). As venues of place-based learning, farm-based research and education centers are well-suited to deliver experiential agriculture education. Central to the success of farm-based education, however, is the degree to which it can offer a hands-on and sensory experience. These conditions can set the stage for transformational learning.

This particular Component is broad in that it spans the many ways in which organizations run educational programming. Most organizations reviewed cater programming to several different segments of the general public (students and/or adult learners), in addition to more targeted, professional audiences, like beginning or established farmers, researchers, or educators. Tactics range from one-day workshops to week-long camps to months- or years-long apprenticeships. The CiPs below are intended to be broad enough to be applied to any organization, regardless of their niche focus area(s).

- **CiP - Emphasize the experiential nature of farm-based learning.** Farm-based education and research centers can strive to create fully sensory experiences for their visitors. This means designing programs that engage all the senses, inviting guests to work with their hands, taste ingredients sourced from the farm, walk through the fields, and feel the breeze or sun on their face. Farm-inspired workshops are a popular way to provide a more immersive and sensory experience for visitors. They also enable organizations to showcase how ingredients sourced from the farm can be put to use—whether in culinary or medicinal applications or crafts. For example, Maine-based Wolfe's Neck Center hosts workshops inspired by the state's edible seaweeds (*Workshops*, n.d.). Stone Barns Center pairs on-site culinary and beverage classes with walking tours (*Programs*, n.d.). In an interview, Stone Barns Center shared that it also invites the public to attend open houses, where it showcases current on-site agricultural experiments and makes meals and groceries available for purchase. Taken together, sensory and land-inspired programming can help deliver on the potential of place-based learning. *See rows 13 and 17.*

- **CiP - Know the target audience and focus offerings accordingly.** Some organizations center programming on a specific audience segment. For example, Soul Fire Farm offers a suite of trainings intended for Black, Indigenous, and/or People of Color (BIPOC) community members (*BIPOC Trainings*, 2023). Shelburne Farms specializes in trainings for educators (*Professional Learning*, 2023). Organizations like GRuB and Rodale Institute host programs specific to veterans (*Veteran Farmer Training*, n.d.; *Victory Farm*, n.d.). Others, like Cibolo Center, cast a wider net and offer programs catered to students, members of the general public, educators, community decision makers, and others. Organizations do not have to be everything to everybody, but it is worth evaluating how an organization can best serve its mission and target audience(s) to ensure resources are not being spread too thin. This can be informed by a strategic planning process (see Component 7). *See rows 10 and 15.*

Farm-based learning at any age

While not all organizations reviewed have youth-centric programming, many offer multiple ways to educate and engage students of all ages. Farm camps and field trips are among the most popular offerings for the youngest learners. Angelic Organics Learning Center, Calypso Farm, Cibolo Center, Hidden Villa, Stonewall Farm and Wolfe's Neck Center invite students to fully immerse themselves in farm life—whether for a day or a week of summer camp. Here, the farm provides the ultimate classroom for hands-on learning, as children can plant, harvest and cook, care for animals, explore nature, and get their hands dirty.

Some organizations also offer youth training programs. These impart sustainable agriculture skills, leadership development, and door-opening opportunities through hands-on learning. For example, GruB's GroundED program seeks to re-engage students to graduate high school or secure their GED.

Many of the organizations reviewed also offer programming to community members who want to learn new skills or dig deeper into a passion area. This programming most often takes the form of one-day or more intensive workshops. Calypso Farm, for example, hosts workshops on topics as diverse as blacksmithing, woodworking, fiber arts, spinning, bouquet making, and gardening. Soul Fire Farm's suite of BIPOC trainings focus on carpentry, culinary, and gardening skills; trainings are open to aspiring, beginning, and intermediate growers, cooks, food justice workers, and other community members of BIPOC heritage (*BIPOC Trainings*, 2023). Other workshop topics across the centers reviewed include land management, wildlife, watercoloring, cooking, beverage making, medicinals, herbal skincare, and more.

(Box 4)

- **CiP - Connect to the community through gardens—whether in the schools, in backyards, or in public spaces.** Gardens provide a tremendous setting for farm-based education and research centers to provide hands-on, place-based learning, even if away from the farm itself. Many organizations also use gardening programs as a way to build food sovereignty in their community. Wolfe's Neck Center hosts a community garden, open to people who lack space for their own garden. Soul Fire Farm equips community members with raised beds, materials, and training as part of its "Soul Fire in the City" effort (*Soul Fire in the City*, 2018). Calypso Farm's **"**School Garden Initiative" encompasses many programs that engage local elementary school teachers and students year-round in hands-on learning (*School Gardens*, 2018). GRuB and Calypso Farm also offer support and training for home gardeners (*Beginning Organic Gardening Series*, n.d.; *GRuB Garden Project*, n.d.). *See rows 13 and 22.*

- **CiP - Consider opportunities to train classroom educators in farm-based learning.** Specialized programming for educators can have a ripple effect throughout the food system and across generations. Shelburne Farms showcases how this can be done. Each year, it engages over one thousand educators, grades pre-K through 12, on the art of farm-based learning (*Professional Learning*, 2023). Through its Institute for Sustainable Schools, Shelburne Farms offers extensive training and resources for educators. Cibolo Center offers training on outdoor education for educators (*Educator Professional Development*, n.d.). *See rows 13 and 15.*

Sampling of Shelburne Farms' Institute for Sustainable Schools programming

The programs below illustrate some of the many ways Shelburne Farms trains classroom teachers in farm-based education. In most cases, Shelburne Farms brings educators to the farm so they can experience outdoor learning themselves. But, for other programs, it brings the farm and its pedagogical philosophy to teachers in other classroom settings.

- **Education for Sustainability graduate certificate programs** - Shelburne Farms and University of Vermont partnered to design and offer two graduate certificates in Education for Sustainability.
- **Farm to School Adaptation Program** - Shelburne Farms and the Northeast Farm to School Institute partnered to develop this professional learning program. It engages educators in developing "robust, sustainable farm-to-school programs that become embedded in the school's culture" (*Farm to School Institute Adaptation Program*, n.d., para. 1)
- **A Forest / A Watershed / A Park for Every Classroom** - These three programs teach teachers how to use the outdoors (forests, watersheds, and parks, respectively) as their classroom. They provide instruction on equity-centered education and curriculum development, and enable teachers to learn from others in their cohort.
- **Field trips and school visits -** Shelburne Farms hosts teachers and their students for on-farm tours and activities and also goes into classrooms to provide agricultural education (e.g., Dairy in the Classroom).

(Box 5)

- **CiP - Host interns and/or apprentices for more intensive educational experiences.** Most organizations reviewed regularly host on-farm interns and/or apprentices. Calypso Farm, Cibolo Center, Glynwood Center, Hidden Villa, Rodale Institute, Stone Barns Center, The Land Institute, TomKat Ranch, and Wolfe's Neck Center are among the organizations that do so. Some organizations offer specialized training opportunities, like TomKat's "Women in Ranching" program and Wolfe's Neck Center's "Dairy Grazing Apprenticeship," but most are more general for aspiring farmers. Farm-based internships and apprentices provide long-term (from one month up to two years), experiential training, mentorship, and networking opportunities. At the same time, they enable organizations to train and learn from the next generation of sustainable food systems leaders. Topics covered by these programs typically include small-scale, diversified, and/or regenerative agriculture practices, as well as business management. *See row 15.*

Immersive professional development opportunities

Although the majority of internships and apprenticeships are targeted to aspiring farmers or food producers, several of the organizations reviewed host on-site, immersive experiences for other professionals, such as:

- **Artists** - Glynwood Center hosts artists on-site, offering them a restorative and inspiring landscape for their creative work (*Regenerative Residency*, 2023). Artists' multi-week stay on the farm concludes with a dinner that serves as both a fundraiser and reflection on the art created.
- **Educators** - Shelburne Farms' Institute for Sustainable Schools Programming provides an extensive array of educator-focused training. Most are hybrids of on-site and virtual learning. These range from just a few days (e.g., Immersion in Sustainability) to multiple years (e.g., graduate certificates).
- **Chefs** - Stone Barns Center's "Chefs in Residence" program and Soul Fire Farm's "Farm to Table Immersion" connect on-farm agricultural practices with culinary techniques. While Stone Barns Center's residency program hosted accomplished chefs, Soul Fire Farm's immersion is open to a cohort of cooks of all levels.
- **Researchers/Scientists** - The Land Institute hosts emerging researchers to further their studies and expertise in perennial grains. Each year, it welcomes a cohort of general and/or program-specific interns (*Training & Education*, n.d.).

(Box 6)

Component 6: Ensure farm operations reflect, engage, and benefit the surrounding community.

One of the key attributes of farm-based education is its emphasis on being civic-minded and community-oriented. Farm-based education and research centers are encouraged to prioritize serving their surrounding communities, as demonstrated in the literature. These centers, as practitioners of land-based learning, have the opportunity to identify locally-felt issues, establish local partnerships, showcase an understanding of their physical environment's interconnectedness, implement programs to improve the well-being of community members, and evaluate the outcomes of their initiatives.

By leveraging their understanding of local problems through partnerships, farm-based education and research centers can effectively engage with their community through programming, thus contributing to solutions for these issues. It is essential for these solutions to be reflective of the community to which the farm-based education and research centers belong. Achieving this requires active engagement and collaboration

with local institutions and leaders to ensure net benefits for the community. The CiPs below can help organizations expand their community impact.

- **CiP** - **Reflect the community to which an organization belongs.** Being an effective farm-based education and research center requires recognizing and understanding the community to which it belongs, encompassing geographical, social, and/or economic aspects. The organizations reviewed each engage in community-based food system activities that not only cater to consumer demands for farm products, but also foster local economic growth and strengthen the community's identity. Calypso Farm, in an effort to acknowledge and support its local indigenous community in present-day Alaska, offers specialized training led by indigenous farmers in partnership with the farm's own farmers. This training equips participants with knowledge transferable to village communities, specifically focusing on vegetable cultivation (*Indigenous Agriculture*, 2022, para. 1). The program is provided at no cost to indigenous participants and includes financial support for transportation, recognizing the farm's presence on historically indigenous land. Similarly, Angelic Organics Learning Center runs "Roots & Wings," which offers a CSA for urban community members in Rockford, IL. The program's "purpose is to foster authentic relationships and motivate, educate, and inspire residents to grow, obtain, and consume nutritious food" (*Roots & Wings CSA*, n.d., para. 2). By providing access to fresh and healthy food, as well as generating farm employment opportunities, the program is able to directly meet the needs of its community. *See rows 15 and 40.*

- **CiP - Provide low or no-cost opportunities for community members to interface with an organization's physical place.** It is incumbent on farm-based education and research centers to offer as diverse as possible ways for their community to engage with the physical space of the center. It is especially important for these centers to offer free opportunities when possible to engage portions of the community that may not be financially able to participate in programs at the farm. Both Shelburne Farms and Cibolo Center are among the many organizations reviewed that offer free walking trails on their properties. These trails give visitors the opportunity to interface with the centers in a way that exposes them to their land management and environmental stewardship practices and provides the experience and benefit for the community to enjoy natural spaces without needing to participate in their programming. An additional example can be found in Cibolo Center's "Community Science" program. Through this program, community members are welcomed to the center as volunteers and are not required to pay a fee to access the land. Volunteers are then trained and instructed on various wildlife field research projects and

practices to help contribute to Cibolo Center's wildlife monitoring programs. Cibolo Center then uses "observations made by community scientists to monitor the wildlife of the park and inform land management," and help work towards achieving its overall mission (*Community Science*, n.d., para. 3). *See rows 14 and 22.*

- **CiP - Partner with community organizations to enhance the reach of farm-based education.** Partnerships with community, or peer, organizations give farm-based education and research centers the opportunity to expand the impact of their programming beyond their physical space. The materials or opportunities provided by these partnerships are often rooted in the values and curriculum executed through programming at the center. Rodale Institute, in partnership with a regional philanthropic foundation, provides community members with a free educational "Grow Your Own" kit with informational resources on the connection between farming practices and water quality. Providing these free resources to community members through a local partnership expands Rodale Institute's engagement with its community while also helping to achieve the organization's mission. Additionally, Stone Barns Center partners with their local libraries to offer day passes to the center to expand free day access to library card holders. This opportunity gives library card holders free parking and day access to the Stone Barn's campus as well as ten percent off retail purchases. Organizations like the Farm-Based Education Network (FBEN) are also important outlets for education centers to learn from one another, and strengthen practices and reach. See Appendix E for a listing of FBEN and other organizations that support peer-to-peer learning. *See row 13.*

- **CiP - Invest in community food sovereignty.** Contribution to food sovereignty stands out as one of the most crucial benefits a farm-based organization can offer its community. Farm-based education and research centers possess specific capabilities to enhance community food sovereignty by not only providing education on the subject, but by also committing resources to food sovereignty projects. Engaging in such projects not only directly benefits the community, but also enhances the community's capacity to identify and address disruptions and insecurities within the food system, as highlighted in the literature review. Soul Fire Farm is an example of an organization that conducts educational programming for and invests in its community to expand food sovereignty. Through partnerships with food sovereignty leaders, Soul Fire Farm developed a resource titled "Food Sovereignty Action Steps," offering a planning tool to create a more just food system (*Food Sovereignty Action Steps*, 2020). Glynwood Center runs a Food Sovereignty Fund, which pays farmers in advance for

consumer products and partners them with appropriate community-based hunger relief programs to enhance and protect local food sovereignty. *See row 40.*

Spotlighting Glynwood Center's Food Sovereignty Fund

Through directly providing capital to farmers and leveraging community partnerships, Glynwood Center directly embodies the foundational aspects of a successful farm-based education and research center working to ensure food sovereignty.

> The Food Sovereignty Fund exists to empower farmers to partner with hunger relief projects in order to make delicious, nutritious and culturally appropriate food grown by regional farmers available to people who otherwise may not have access. (*Food Sovereignty Fund*, n.d., para. 7)

- **How It Works -** Farmers are paid for food intended for the program in advance. Glynwood Center then matches these farms with community-based hunger relief projects so they receive access to the types of food needed most by the community served by the matched project.
- **History -** The fund began in the Spring of 2020 amidst the fallout of the COVID-19 pandemic to increase community access to healthy and nutritious regionally produced food. Additionally, the fund began with the intention of financially supporting small, regenerative farms managed by historically marginalized groups.
- **Accountability Council -** A diverse six member group of experts representing the intersection of regional farming and food access help manage the Food Sovereignty Fund.
- **Participation -** A list of 2023 participants shows that 21 farms and 18 food access partners within Glynwood Center's region engage in the Food Sovereignty Fund (*Food Sovereignty Fund*, n.d., para. 7).

(Box 7)

Governance/operational domain

Component 7: Articulate and work against a clear strategic plan.

In order to achieve a farm-based education and research center's overall mission, the center must have a clear strategic plan to provide a pathway and guide for its leadership and staff to follow to achieve success. Throughout the interviews conducted, it was

clear that many organizations have strategic planning top-of-mind and that staff at all levels are involved in the process. Multiple organizations at the time of this research stated that they were in fact reviewing their current strategic plans, reevaluating their mission statements, and going through a planning process to realign their work. With the ongoing shift in agriculture to understand the interconnected nature of a sustainable food system and its impacts on the environment, health, and farm economics, organizations are working to ensure that their expertise is articulated and aligned with where they can have the most impact.

Although not all organizations publish a strategic plan, it should be evident in their public-facing messaging and mission statements that their efforts are working to achieve a common goal. The CiPs below can help advance the strategic planning process.

- **CiP** - **Develop a distinct, identifiable, and aspirational mission statement.** A mission statement should succinctly articulate how an organization defines success and achieves impact. These statements provide farm-based education and research centers with an opportunity to distinguish themselves and their role in their local food system. Most mission statements reviewed were typically a one sentence explanation that captures the heart of an organization and serves as a guidepost for the work being done. All work being done should be evaluated against its ability to advance its mission statement. An example of a distinct and identifiable mission statement is from Calypso Farm; it states that “our mission is to encourage local food production and environmental awareness through hands-on education in natural and farming ecosystems” (*About Calypso*, 2018, para. 2). Calypso Farm’s location in Fairbanks, AK, provides a novel landscape to engage its community through hands-on programming to educate on local and traditional knowledge of growing fresh produce (seasonally and year-round), to promote food sovereignty, and to combat the many challenges of accessing food in rural Alaska brings (transportation, high cost, evolving ecosystem, etc.).

  If a mission statement is an organization’s guide, then its “north star” serves as its navigational beacon. The Robin Report described an organization’s north star by stating:

  > North Star is what inspires and influences us. It’s not goals. It’s not a mission statement. It’s the fundamental ethos that your organization operates on. To be more precise, it is the reason you are in business. It is your shared purpose reflected and embraced by everyone in your organization. And your true sense of direction. (Patton, 2022, para. 2)

In each interview conducted, the research team asked the interviewee to describe their organization's "north star" in their own words. Their response was often an extension of the organization's written mission statement. It also elicited a response from the interviewees that allowed them to bring the mission down to a personal level and reflect on how their work in their department drives the overall mission. In the case of Rodale Institute, the response provided a simple, basic equation of "Healthy Soils = Healthy Food = Healthy People." This succinctly and memorably captures the organization's official mission statement:

> Rodale Institute confronts one of the world's greatest challenges: creating a resilient global food system that improves human health and the environment. Our mission is to advance groundbreaking research and best-in-class education that enables farms and farmers to transition to regenerative organic agricultural practices, thereby improving the health of the world's soil and securing the global food supply. (*About*, n.d., para. 2)

Soul Fire Farm is among the few organizations that shared a north star in publicly available materials. It is noteworthy in that its north star is both quantifiable and time-bound:

> By 2050 U.S. Black farmers will regeneratively steward 100,000 farms on 10 million acres of rural and urban land (400,000 BIPOC farmers on 200 million acres) providing food, habitat, medicine, ecosystem services, and healing to our communities and experiencing agency and societal support for our honorable work. (*Soul Fire Farm Community FAQ*, n.d., p. 11)

See rows 7 and 8.

- **CiP** - **Develop a strategic plan**. To fully realize an organization's mission statement, it should have a strategic plan that provides a roadmap to execute against. A strategy can be defined as "a pattern of purposes, policies, programs, actions, decisions, or resource allocations that define what an organization is, what it does, and why it does it" (Bryson, 2018, p. 74). In his book *Strategic Planning for Public and Nonprofit Organizations: A Guide to Strengthening and Sustaining Organizational Achievement*, Bryson describes how strategic planning can benefit an organization. Benefits include 1) promotion of strategic thinking, acting and learning; 2) improved decision making; 3) enhanced organizational effectiveness; 4) enhanced organizational legitimacy; 5) enhanced effectiveness of broader societal systems; 6) directly benefit the people involved (Bryson,

2018, pp. 39–40).

While most farm-based education and research centers had a public facing mission statement, only a few publicly posted a strategic plan. This is an added element of transparency that can increase an organization's legitimacy, in addition to financial transparency considerations discussed in Component 10. Angelic Organics Learning Center is a noteworthy example of this. Its strategic plan—developed in 2021 with support of all its staff and board members—lays out its vision, mission, guiding principles, and strategic goals (*Mission*, n.d.). *See row 37.*

- **CiP** - **Leverage the strategic plan for decision making**. As Bryson (2018) mentions, a benefit of strategic planning includes improved decision making. All decisions that impact the overall organization should be examined through the lens of the strategic plan. This can ensure that the day-to-day activities—or in the case of farm-based education and research centers, the programming and research conducted—is aligned with and increases impact. A few of the organizations researched provided a window into their decision making tools. The Land Institute points to its values as to the tool "through which all our day-to-day and larger decisions are made" (*Purpose & Values*, n.d., para. 6). These values include taking a long view, considering both the past and the future, understanding limits by having an "unwavering respect for ecological limits," relying on whole science that "embraces holistic and reductionist approaches," acting with courage, understanding, and not being imitated by what it takes to create transformational change (*Purpose & Values*, n.d., paras. 7–10). Soul Fire Farm provides a "decision-making chart" that outlines how all decisions are made within its organization and held accountable to the organization's vision, mission, and values (*Soul Fire Farm Institute Decision-Making Flow Chart*, n.d.). *See row 37.*

A closer look at Hidden Villa's strategic plan

Hidden Villa's Strategic Plan stands out in the area of farm-based education and research centers due to the clear and concise nature of how its plan is outlined, the elements it includes, as well its Theory of Change to guide decision making (*Hidden Villa Strategic Plan 2021-2024*, n.d.).

- **Vision - "**A sustainable, healthy, and just future for all" (p. 3).
- **Mission - "**To foster educational experiences that build connections and inspire a deeper appreciation and respect for nature, food, and one another" (p. 3)
- **Values -** Access; Community; Exploration; Stewardship
- **Four Strategic Areas of Focus**
    1. **Foundation - "**Diverse perspectives positively impact problem-solving and decision-making" (p. 6).
    2. **Programs - "**We equip participants with the skills and experiences needed to find solutions to society's biggest challenges" (p. 7).
    3. **Living Laboratory - "**Hidden Villa provides place-based education that offers context for understanding complex systems in the world" (p. 8)
    4. **Organizational Support - "**This exciting vision for our world and direction for Hidden Villa will require collaboration with organizations, a phased approach for change, technology infrastructure, and increased financial resources" (p. 9).

- **Decision making tool**

> "Our Theory of Change outlines how providing access to nature, and scaffolded learning experiences in an inclusive environment equips a community with the skills needed to drive change towards social, food, and environmental justice. We use our Theory of Change model as our north star in decision-making throughout the organization" (*Hidden Villa Strategic Plan 2021-2024*, n.d., p. 10).

(Box 8)

Component 8: Set and report on transformation-oriented metrics.

Setting goals and measuring progress against them is essential to the management of any organization. In the non-profit sector, there is an expectation that organizations transparently and regularly communicate their strategic objectives, programming priorities, and financial status, with particular emphasis on where funding came from and how it was used (Ortega-Rodríguez et al., 2020). This information is typically synthesized into an annual report. Annual reports are used to communicate with the

public, especially donors. But, they also provide an ongoing opportunity for non-profit staff to take stock of progress and evaluate what is working well (or not) in support of the organization's long-term mission.

The farm-based education and research centers reviewed measure and report their impact to varying degrees. There tends to be consistency in both what is measured, as well as in gaps in organizations' measurement approach. In general, organizations' metrics focus heavily on quantifying outputs and outcomes (e.g., reporting a tally of programs offered or people reached). Impact measures and language become more generalized when talking about how these outputs and outcomes affect broader, transformational change.

While the organizations reviewed emphasize their commitment to driving systemic change (e.g., driving towards a more sustainable, resilient and/or equitable food system), few quantitatively and consistently measure how their organization's efforts contribute towards this longer-term shift. For example, of the guests who visited over the last five years, how many have shifted their buying behaviors as a result of their visit? How many of the farmers trained are still using regenerative farming practices (and earning a living doing so)? In essence, the number of visitors is important to know, but organizations should strive to understand how their programming actually impacted those visitors.

Soul Fire Farm is notable for its measurement work. It has a quantifiable and time-bound north star,[6] annually tracks indicators across the farm and community ecosystem, and measures how its programming accomplishes the following:

- **Makes people feel** by asking about feelings of joy and success among visitors post-programming
- **Benefits people** by tracking the percentage of "Solidarity Shares" members who "report positive impacts on their health and household economies" (Soul Fire Farm, 2022, p. 38)
- **Inspires people** by assessing the percentage of visitors who "take subsequent action to heal the food system" (*Soul Fire Farm Community FAQ*, n.d., p. 5), percentage of audience members who "report concrete actions toward food justice and land sovereignty as a result of what they learned" (*Soul Fire Farm Community FAQ*, n.d., p. 6), and the percentage of trainees who "go on to work as growers, rural land stewards, and/or food system changemakers," etc. (*Soul Fire Farm Community FAQ*, n.d., p. 5)

[6] By 2050 U.S. Black farmers will regeneratively steward 100,000 farms on 10 million acres of rural and urban land (400,000 BIPOC farmers on 200 million acres) providing food, habitat, medicine, ecosystem services, and healing to our communities and experiencing agency and societal support for our honorable work. (*Soul Fire Farm Community FAQ*, n.d., p. 11)

These are examples of the many meaningful metrics Soul Fire Farms tracks through a variety of research tools. Its measurement protocol includes an annual biodiversity inventory and alumni survey. It tracks long-term impacts by sending follow-up surveys to participants and monitors news and social media for conversations about the farm. Soul Fire Farm also gauges system-wide change through policy change that it helped advocate for (*Soul Fire Farm Community FAQ*, n.d.). Progress is reported on through an annual report and Community FAQ.

Research-focused centers also tend to make a stronger case for linking their efforts (e.g., research studies) to longer-term, system-wide changes. For example, The Land Institute's 2022 impact report starts with a bulleted list of "key milestones to perennial grain success" (*Perennial Impact 2022 Report*, n.d., p. 3). This serves to illustrate, and in some instances quantify, what needs to happen to achieve The Land Institute's mission and justify the programming being implemented. The Land Institute's impact report also includes more in-depth explanations of how its research studies can yield benefits in the environment and across the food system both in the immediate and distant future.

Using the same approach as the literature review's "Measuring Impacts" section, a review was done to categorize the impact metrics cited in organizations' most recent, publicly-available annual reports[7] or in other communications assets (e.g., websites). These are metrics that are quantified within the reporting, rather than outcomes or impacts that were alluded to more generally. In addition, these metrics are not inclusive of all data collected via ecological indicators, as discussed in Component 1.

This table (table 4) can be thought of like a funnel. Outputs quantify what an organization puts out into the world. Outcomes gauge the response to those outputs. Potential impact measures how things change as a result of that response. Organizations can draw inspiration from this table, as well as the CiPs within this section, to consider how they may integrate more transformation-oriented metrics into their reporting moving forward.

[7] Table 4 is populated with publicly available metrics. It does not include any metrics that an organization may be tracking internally.

Table 4: Metrics cited in organizations' public-facing materials

Outputs (assets produced or procured by organization)	**Outcomes** (response/reaction to those assets)	**Potential impact** (long-term, transformational shifts for organization and society more broadly)

• Number or hours of programs, courses, or trainings offered
• Amount of aid given (via scholarships, financial aid, food donations, etc.)
• Number of crop varieties harvested
• Number of trees planted
• Number of new tools or resources (databases, books/guides, etc.) created
• Number of research studies undertaken
• Number of studies published
• Number of presentations given
• Number of staff
• Number of years in operation
	Participation/Engagement
	• Number of visitors
	• Number of audience members reached (farmers, educators, students, etc.)
	• Number of participants enrolled (in programs, in CSAs, etc.)
	• Number of volunteers
	• Number of vendors at farmer's markets
	• Number of value-added foods sold
	• Number of partners collaborated with
	• Number of news articles secured
	• Number of readers of tools or resources created
	
	Economic
	• Number of donations received
	• Breakdown of donor demographics
	• Number of members (i.e., contributing donors)
	• Amount earned for regional farmers via
		Community-based
		• Acres of land (farmland, woodland, etc.) restored, conserved, or transitioned to organic
		• Potential for new crops developed to benefit wildlife and soil health
		• Frequency of input on policy matters (e.g., testimony or expert consult given) and outcomes of that input
		
		Participant-based[8]
		• Percent of participants who "report [taking] concrete actions toward food justice and land sovereignty as a result of what they learned" (*Soul Fire Farm Community FAQ*, n.d., p. 6)
		• Percent of urban gardeners who report:
		  • Experiencing joy and satisfaction from their garden
		  • Wanting to deepen their connection to the land
		  • Committing to doing

[8] With the exception of the last bullet point (which is a Land Institute metric), all participant-based examples come from Soul Fire Farm.

Outputs (assets produced or procured by organization)	**Outcomes** (response/reaction to those assets)	**Potential impact** (long-term, transformational shifts for organization and society more broadly)
	contracts ● Amount of grant funding secured ● Amount and percentage change of private investment secured *Land/agricultural goods* ● Percent of organic soil matter ● Percent of land area with perennial cover ● Amount of food harvested ● Tons of CO_2 sequestered through on-farm agricultural practices ● Rate of landfill conversion ● Number of seed varieties saved ● Number of new crops developed or released (e.g., perennial grain food crops) ● Number of seeds and co-products listed as "Generally Regarded As Safe"	more farming or gardening ● Percent of trainees and alumni who are: ● Growing food or medicine at scale ● Teaching others about food sovereignty ● Stewarding urban land ● Percent of CSA members who do the following as a result of participating: ● Eat more vegetables ● Cook more often ● Report better health ● Eat wider variety of cultural foods ● Save money on foods ● Percent of alumni who earn degree or GED *Innovation* ● Acceleration of innovation/scientific discovery (e.g., discovery now takes X number of weeks vs. X years)

The CiPs below include ways that organizations can consider enhancing their approach to measurement.

- **CiP - Publish an annual and publicly accessible impact report.** Doing so is an essential factor in transparently reporting impact and financial health. The annual report should be used to articulate an organization's mission, illustrate how programming helps achieve that mission, communicate with donors (both current and prospective), and inform strategic planning. It should also be easy to find on the organization's website. The majority of organizations reviewed publish an annual report, but Rodale Institute is a stand-out example, in that it has published an annual report, financial audit, and Form 990 since 2013. All documents are easily viewable on Rodale's "Financials" webpage (Rodale Institute, n.d.). *See row 37.*

- **CiP - Set and measure Specific, Measurable, Achievable, Relevant, and Time-Bound (SMART) goals that clearly tie back to the organization's mission.** All metrics collected by an organization should: 1) clearly ladder back to the mission, 2) be measured regularly, quantifiably, and consistently to help illustrate trends, and 3) shed light on what is working well and where there is room to improve. Not everything has to be measured. But, what is measured must matter to the organization and help it march incrementally towards its broader goal. To help focus this, consider taking inspiration from Soul Fire Farm and set a SMART "north star" goal and strategic goals (Soul Fire Farm, 2022; *Soul Fire Farm Community FAQ*, n.d.), as noted in Component 7. *See rows 8 and 37.*

- **CiP - Put metrics in context.** Metrics cited by the organizations reviewed typically show how an organization performed "that year." Few provide historical or future-looking context. For example, a "by the numbers" snapshot is commonly found on websites and/or in annual reports. While this illustrates the number of farmers trained, studies published, meals served, etc., it does not communicate the context. How do those numbers compare to previous years? Is that the rate of change an organization hopes to see? Putting numbers in context helps tell a more compelling and complete story. The Land Institute's Perennial Impact Report, most recently in its 2022 edition, is a strong example of how this can be accomplished. *Not captured in Organizational Tracker, but scan annual reports (shown in row 37) for more background on the metrics organizations are tracking.*

- **CiP - Go beyond measuring outputs and outcomes[9] to account for how**

[9] See tables 3 and 4.

programming is driving transformational change. Soul Fire Farm provides inspiration for how this can be done, as demonstrated across its annual report and Community FAQ (Soul Fire Farm, 2022; *Soul Fire Farm Community FAQ*, n.d.). Tactically, this could be achieved through the CiPs described above in addition to practices employed by Soul Fire Farm:

- Employing a multi-pronged research approach that relies on surveys, interviews, news monitoring, and/or ecological inventories
- Consulting with a measurement expert to help develop a robust research approach, as Soul Fire Farm did in its work with Dr. Kristin Reynolds
- Using pre- and post-visit surveys to compare perception and behavior changes,
- Conducting annual outreach to guests/trainees to measure the long-term effects of programming, and/or
- Ensuring all questions asked in surveys and interviews can reveal actionable insight on how to better achieve organizational goals.

Not captured in Organizational Tracker, but scan annual reports (shown in row 37) for more background on the metrics organizations are tracking.

High-level analysis of organizations' annual reports

Non-profit organizations typically use annual reports to showcase their mission and progress in achieving it, as well as report on their financial status. Most organizations reviewed publish an annual report, though this is not universal. The annual reports that were available for review vary widely in length and format. Some are one-page hand-outs, others are detailed reports, while others are interactive websites. Some organizations post only the most recent annual report, while others, like Rodale Institute, link to a decade's worth of annual reports, 990 Forms and audits. Despite this variation, organizations' annual reports generally include the following:

- Letter from organization's and/or board leader
- Overview of strategic goals, vision, and/or mission statements
- Overview of programs, with illustrative stories, photos, and quotes
- Highlights over the past year
- Acknowledgement and/or listing of funders
- Financial information

(Box 9)

Component 9: Diversify funding and revenue for organizational resiliency.

Adequate funding is essential to the success and longevity of farm-based education and research centers. The research team's organizational review and interviews demonstrated that organizations rely on multiple funding streams. At a high-level, these include the following, but box 10 provides a more extensive list:

- Donations from individuals (both via one-off donations and membership programs)
- Earned income from goods and services
- Endowments
- Grants from government, philanthropic organizations, and corporate and/or family foundations

These funding streams allow farm-based education and research centers to execute against their mission by providing educational programming, performing research, and increasing reach within the community.

Exploring diverse revenue streams of farm-based education and research centers

The below are more detailed examples of how organizations earn revenue, though this is not exhaustive of the myriad ways they do so:

- Campground rentals
- Camps for kids
- CSA programs
- Consulting fees
- Educational workshops
- Farmers markets and farm stores/stands
- Field trips and retreats
- Grants
- Membership programs
- Personal and corporate donations
- Private events and facility rentals
- Public programming and events
- Restaurants
- Tours
- Training programs (farmer and professionals)

(Box 10)

- **CiP - Build buy-in among supporters via tiered membership programs.** Loyal supporters are a critical revenue source for farm-based education and research centers. Many centers rely on tiered membership programs to support their operating and overhead costs. These membership programs vary in their frequency of donation from monthly to yearly. Of the 16 organizations reviewed, over half offer a tiered membership program. These included Cibolo Center, Hidden Villa, Liberty Prairie Foundation, Rodale Institute, Shelburne Farms, Stone Barns Center, Stonewall Farm, The Land Institute, and Wolfe's Neck Center.

  Membership programs can also offer exclusive benefits to those who participate. For example, Stone Barns Center's membership program offers benefits based on the level of donation. All ranges of membership have access to the following benefits: complimentary parking, 10% discount on cafeteria and public programs, early access to event tickets, member Thursday's (a "monthly program offering a behind-the-scenes look into the collaborative work between Stone Barns Center and Blue Hill"), and Botanical Beverages (early access to farm-based cocktail classes with the Blue Hill at Stone Barns beverage team) (*Stone Barns Center Membership*, n.d., para. 9). As members increase their donation, they enjoy access to additional benefits including cooking classes, guest parking passes, professional photography shoots, private farm tours, and special access to reservations to Blue Hill at Stone Barns (*Stone Barns Center Membership*, n.d.).

  Ongoing support through membership programs can also benefit the communities in which an organization operates. Stonewall Farm mentions that its membership program helps provide free 365 days-a-year access to its public spaces, hiking trails, and animals by maintaining the grounds and structures on its campus (*Stonewall Farm Quarterly*, 2023). Organizations also get creative with membership options like Cibolo Center's Junior Trailblazers membership for kids (*Become a Member*, n.d.) or Wolfe's Neck Center Farm Dog membership for a $25 that allows a member's dog to also become a member (*Wolfe's Neck Center Membership*, n.d.). *See rows 27 and 31.*

- **CiP - Generate revenue through providing goods and services.** To increase revenue, farm-based education and research centers typically offer programs and services for a fee, sell products produced on-farm (CSA shares, groceries or value-added products), offer consulting services, and/or rent out their facilities. For example, of the 16 organizations reviewed, the majority had CSA programs and/or host events or programs for a fee. The benefits are twofold. Farm-based education and research centers increase their revenue, which allows them to

stay in operation and expand their offerings, while participants/attendees benefit from locally-sourced goods and/or new skills or knowledge.

Some of these options are discussed in detail in other sections. For example, Component 3 explores opportunities for centers to sell CSA shares, groceries, and/or value-added goods. Component 5 discusses fee-based programs, such as summer camps, field trips, or workshops, which are another revenue-generating opportunity.

Organizations like Rodale Institute and Calypso Farm offer consulting services for a fee. Calypso Farm focuses on providing knowledge on soil sample analysis, home gardening, farming and community agriculture projects (*Calypso Farm Consulting*, 2018). Rodale Institute's consulting services are offered nationwide and focus on organic farming by providing organic transition services, farm planning, certification assistance, among many other topics (*Organic Consulting*, n.d.)

Additional revenue sources include facility rentals for private events, recreation activities, or lodging. These additional revenue sources can provide a stream of unrestricted funding for farm-based education and research centers to use and direct to programming without donor or grant limitations. For example, Wolfe's Neck Center operates a 150-campsite campground, which provides one of its largest sources of revenue. Visitors benefit from staying in a beautiful setting and having the option to partake in Wolfe's Neck Center's varied programming options, while being in the middle of an operating farm. Shelburne Farms hosts visitors at the "Shelburne Farms Inn" which states that "the proceeds from your stay support our mission" (Stay at Shelburne Farms, n.d., para. 2). *See rows 18, 19, 22, 27, and 28.*

- **CiP - Apply for grants to expand programming and match fundraising efforts.** Grants provide an important revenue stream for many farm-based education and research centers. These grants allow organizations to increase their range of program offerings, expand research, and grow impact. Grants often vary in size of funding and scope. Often smaller in funding amounts, local government grants provide an important source of money that often allow farm-based education and research centers to offer free educational programming to school-aged children and increase the number of children who visit their farm.

  Federal funding can also be a valuable funding source. For example, in 2019, Glynwood Center and the Hudson Valley CSA Coalition were the recipients of a

USDA National Institute of Food and Agriculture (NIFA) Gus Schumacher Nutrition Incentive Program (GusNIP) pilot project grant. This grant led to the creation of the "CSA is a SNAP'" program, which seeks to increase participation in Hudson Valley CSA among SNAP customers.

> This innovative program utilizes GusNIP funds to capitalize a revolving incentive fund, paying farmers upfront for the full value of their share while giving SNAP customers the flexibility to pay week-to-week and at a 50% discount. At the end of the season, SNAP customers will have repaid the farms for 50% of the value of their shares; farms will then repay those funds back into the revolving fund to be used for the upcoming season's "CSA is a SNAP" project." (*CSA Is a SNAP*, n.d., para. 1)

Additionally, the United States government recently increased funding for climate friendly research and programming. One example is the USDA's Partnerships for Climate-Smart Commodities program. This grant program is set to provide more than $3.1 billion for 141 projects (*Partnerships for Climate-Smart Commodities*, n.d., para. 2). The goal is to expand markets for "America's climate-smart commodities, leveraging the greenhouse gas benefits of climate-smart commodity production, and providing direct, meaningful benefits to production agriculture, including for small and underserved producers" (*Partnerships for Climate-Smart Commodities*, n.d., para. 1). Wolfe's Neck Center was the recipient of up to a $35 million grant through this program. Through this grant, Wolfe's Neck Center and its alliance of over 60 partner organizations across the country will be able to continue and expand its Open Technology Ecosystem for Agricultural Management (OpenTEAM) network.

> This project will develop the systemic tools and approaches necessary to catalyze change by operating in three areas simultaneously: equipping and training Technical Service Providers for CSA implementation, creating transition finance incentives for producers, and developing a robust self-sustaining marketplace for climate-smart commodities. (*Workbook: Partnerships For Climate-Smart Commodities*, n.d., para. 4)

Without the critical revenue that grants provide, the efforts of farm-based education and research centers would be limited. *See rows 20, 22, 27, 28, 29, 40, and 43.*

"Unlimited funds" interview analysis

During interviews with participating organizations, interviewees were asked, “If funds were unlimited, what is the first thing you would invest in to strengthen the impact of your organization?” The responses varied, but common themes were clear. These underscored core needs of farm-based education and research centers.

The most common response was around staff salary. This is a challenge and opportunity in the non-profit sector. Higher employee salaries could create higher retention rates and give organizations the ability to hire additional skilled talent. Additionally, higher salary could incentivize potential staff to move to the more rural areas where these organizations are typically based.

Responses also focused on specific investment areas to strengthen operational impact. Areas include investments in staff, infrastructure and resources, community engagement infrastructure (physical and social), technology for sustainability and growth, and funding for collaboration with peer organizations and participants.

(Box 12)

Component 10: Report financials transparently to build trust.

Transparent financial reporting holds a pivotal role within the domain of farm-based education. It establishes credibility and showcases responsible management practices, ultimately bolstering the center’s reputation as a reliable institution. This transparency is paramount for farm-based education and research centers, as it fosters trust and accountability among their stakeholders, including donors, community members, and farmers. Throughout the research process, all organizations were reviewed for their financial practices and reporting. A majority of those reviewed were exempt from income tax and, as a result, were required to make their Internal Revenue Service (IRS) Form 990 publicly available. To conduct this research, online databases from Guidestar, ProPublica, and the IRS were utilized to locate and review the organizations’ financials.

To strive for the highest level of trust among their community and stakeholders, farm-based education and research centers could engage third-party reporting measures to ensure an objective analysis of financial transparency. Additionally, these centers could make their financial information, including IRS forms, top corporate and foundation donors, funding sources, and more, publicly available in a central location on their website for easy and free access. By providing this information alongside their education and programmatic details in the same online location, potential visitors, partners, donors, and participants can review the information when deciding whether or not to engage the organization.

- **CiP - Strive for four star rating for maximum transparency.** This project's research utilized Charity Navigator as an objective third-party source for rating the reviewed organizations' financial transparency. Charity Navigator is a 501(c)(3) organization whose "comprehensive ratings shine a light on the cost-effectiveness and overall health of a charity's programs, including measures of stability, efficiency, and sustainability" to help "inform donors of not just where their dollars are going but what their dollars are doing (*About Us*, n.d., para. 3).

  To determine an accountability and transparency score for organizations within its database, Charity Navigator reviews organizational governance, management policies, financial transparency, and financial metrics. Metrics within each of these areas is given a designation for full credit, partial credit, no credit, or not applicable. This analysis is inclusive of internal practices and standards which seek to report on and provide transparency regarding all decisions relative to an organization's financials, beyond what is available on the respective IRS form. A breakdown of these measurement areas and metrics can be found in table 5. Organizations that receive a four star rating on Charity Navigator typically receive full or partial credit on all metrics. These publicly available ratings can also provide strategic insight for planning and operational decisions. They increase accountability and transparency and serve to communicate fiscal and governance responsibility to stakeholders and participants. *See row 26.*

Table 5: Navigator review areas and metrics

Governance	Policies	Transparency	Financial Metrics
• Independent voting board members • No material diversion of assets • Audited financials prepared by independent accountant • Does not provide loan(s) to or receive loan(s) from related parties	• Conflict of interest • Whistleblower • Records retention and destruction • CEO compensation process • Donor privacy	• CEO salary listed on 990 • Board of directors listed on website • Key staff listed on website • Audited financial statements listed on website • Form 990 available on website	• Liabilities to assets ratio • Working capital ratio • Fundraising efficiency • Administrative expense ratio • Fundraising expense ratio • Program expense ratio • Program expense growth

Governance	Policies	Transparency	Financial Metrics
• Documents board meeting minutes • Distributes 990 to board before filing • Does not compensate board members			
(*Charity Navigator Ratings*, n.d.)			

- **CiP - Provide a publicly accessible list of top corporate and foundation donors.** Listing top corporate and foundation donors publicly can help enhance transparency and accountability. Many of the organizations reviewed do this within their annual report. By sharing a list of major corporate and/or foundation contributors, centers can further commit to honest and open financial practices. This transparency builds trust and fosters a sense of confidence in the organization's financial management. It also helps to avoid any notions of undue influence or conflicts of interest. Publicly disclosing top corporate and foundation donors demonstrates a willingness to be forthcoming regarding the sources of private funding, which can communicate, or eliminate speculation of, financial conflicts of interest. Furthermore, this practice serves as a method to strengthen the centers' relationships with their funders as a form of acknowledgement to encourage sustained support. By providing a clear and accessible list of top corporate and foundation donors, farm-based education and research centers can establish themselves as accountable, reliable institutions that prioritize ethical financial practices and maintain strong connections with their community and supporters. *See row 28.*

Additional findings

Thought leadership

The review of the organizations revealed examples of farm-based education and research centers going beyond their own programing and developing resources for the benefit of the entire field. For example, Shelburne Farms is the driving force behind the FBEN, a "free member network created to strengthen and support the work of farmers, educators, and community leaders who provide access and experiences of all kinds on working farms" (Farm-Based Education Network, 2023, para. 1). Shelburne Farms also

launched an Education for Sustainability graduate certificate, in partnership with the University of Vermont (Gilman, 2022). The Cibolo Center created a menu of “Resilience Solutions” “that can be activated to support communities, organizations and advocates, seeking a resilient future” (*Resilience Solutions for the Texas Hill Country*, n.d., para. 2). TomKat Ranch works as a thought leader in regenerative ranching, conducting extensive research and testing and making that data available to drive further development in the space through the “Ranch Data Project” (*Regenerative Ranching*, n.d.). *See rows 13-22 and 44-45.*

Coalition building

Many farm-based education and research centers seek to increase their capacity to work collaboratively by building coalitions with other organizations. For example, Glynwood Center is an active member of the Hudson Valley CSA Coalition, and it uses the Accountability Council of its Food Sovereignty Fund to bring in voices from diverse organizations and backgrounds (*Annual Report*, 2021). Soul Fire Farm lists a range of regional and national coalitions it partners within its annual report (Soul Fire Farm, 2022). *See row 40.*

Political advocacy

501(c)(3) tax-exempt organizations are prohibited from a range of political activities, but several of the organizations reviewed provide educational resources and background to promote policy outcomes that align with their missions. For example, Rodale Institute expressed during its interview the importance of working collaboratively with coalitions to secure changes in the Farm Bill that are beneficial to regenerative organic agriculture. Soul Fire Farm (2022) provides examples in its annual report of times its staff was asked to provide input on legislation being considered by the New York State Legislature. *See row 20.*

Board management

The organizations reviewed had a range of board sizes, from six to 17 people. During interviews, the organizations largely acknowledged that their boards were predominantly made up of wealthier individuals, but many spoke to goals they had for increasing diversity on their boards and bringing in more perspectives from underserved groups. Some organizations spoke to the importance of having farmers on their board, as they recognized this would bring first-hand experience with agriculture to the leadership of the organization. *See row 33.*

Off-farm programming

Whether it be the challenges of the COVID-19 pandemic, limited carrying capacity of their physical center, a desire to reach a broader audience than their local community, a desire to make the center more accessible to a broader range of people, or some combination of these factors, many organizations offer some sort of off-farm or virtual programming.

Some notable instances of these centers expanding their philosophy and reach beyond the farm include:

- Rodale Institute has a virtual campus, offering virtual courses, conferences, and trainings (*Rodale Institute Virtual Campus*, n.d.).
- Soul Fire Farm hosts a virtual keynote presentation and "Ask a Sista Farmer" virtual show).
- Calypso Farm hosts a conversation series over Zoom that spotlights BIPOC farmers and leaders (*Conversations Series*, 2021).
- Glynwood Center hosts a virtual "Regional Food for Health Speaker Series," which examines the links between healthcare and agriculture (*Regional Food for Health Speaker Series*, n.d.).

See row 13.

Recommendations

The Framework resulting from this research outlines 10 intersecting Components for farm-based education and research centers to consider integrating into their own organizations. Within each Component, a variety of CiPs are suggested as tactical thought-starters for how this work can be accomplished. While each of these Components and their related CiPs can be considered "recommendations," the following provide high-level guidance on how to bring this Framework to life.

- **Start small.** As the saying goes and as one interviewee emphasized, "Rome wasn't built in a day." The CiPs in this Framework are intended to be "pick-and-choose." There is no need to integrate every single one, especially all at once. Prioritize those that are most relevant to the organization.
- **Consider efforts across the diverse domains of sustainable food systems.** Examining how the organization contributes to the environmental, economic, nourishment and social aspects of sustainable food systems may reveal gaps or illuminate new connections to make between existing programs. Intentionally

integrating two or more of these domains into efforts can help an organization contribute more holistically to sustainable food systems.

- **Adopt transformation-oriented metrics.** There is an opportunity for farm-based research and education centers to more quantifiably state their vision for transformative change, and then holistically capture their long-term progress against that vision. Soul Fire Farm's measurement protocol—as described in Component 8 and in the organization's Community FAQ and annual reports (Soul Fire Farm, 2022; *Soul Fire Farm Community FAQ*, n.d.)—provides a strong example of how this can be done.
- **Join in the community of other farm-based education and research centers.** There are several organizations dedicated to continually improving farm-based learning at both a national and regional level (see Appendix E). Joining and contributing to one or more of these organizations can help enrich an organization and advance the entire field.
- **Visit other farm-based education and research centers.** This study made clear that there is much to be learned from the diverse organizations working in this space. Much like joining a coalition of other farm-based education and research practitioners, stepping foot onto other farms enables networking, peer-to-peer learning, and enjoying the same sensory and experiential environment as other guests.
- **Keep a pulse on new research in this space.** The academic literature on farm-based education provides another lens to inform best practices. New research is constantly demonstrating the benefits of farm-based learning and refining how this work can be executed. This data can serve as proof points for grant applications and donor communications. It can also inform and refine an organization's own efforts, as the research often describes case studies on diverse farm-based education centers. Lastly, it can shed light on emerging concepts in this space, like the discussion around place-based versus land-based learning.

Discussion

With sustainability on the forefront of the minds of many farmers, consumers, and policymakers, farm-based education and research centers can play an integral role in food systems change. With the prevalence of organizations the researchers spoke with indicating they are going through new strategic planning initiatives, it is clear that many organizations in this space want to clarify their role within this change structure. New organizations will also undoubtedly be formed. This research, coming at this particular point in time, strives to provide a framework for farm-based education and research centers to truly maximize their potential for food systems change.

That said, the research is not without limitation or opportunity for further study. Due to presenting the research findings as a framework that can be adopted by farm-based education and research centers, key concepts were intentionally generalized in order to articulate the wide-ranging components that the research pointed towards. As a result, any single one of the components could in and of itself be the topic for its own dedicated study and report.

During the research process itself, there were no physical visits conducted to any of the organizations. Additionally, while interviews were sought with all of the organizations studied, the research team was unable to secure interviews with everyone. The literature review would also have benefited from research that had been conducted post-COVID-19 pandemic. However, the methodology utilized did not reveal any literature that met this criteria.

Future research could be benefited from an international perspective. This research focused only on organizations in the United States. However, there are likely lessons to be learned from organizations based in other countries as well. To fully judge the efficacy of programming, future research could also include a component of conducting interviews or surveys with the program participants and attendees at the farm.

Conclusion

Farm-based education and research centers play a key role in educating their communities about the local food system and agriculture. This report provides a Framework, rooted in best practices, to guide the continued and future success of farm-based education and research centers in delivering on their individual missions and collective impact. With the clear understanding that each organization is different based on their location, funding, mission, and programs, the Framework's Components can be tailored to fit each organization's individual needs and applied in a manner that works best.

Farm-based education and research centers have great potential to reconnect the public with agriculture, inspire more sustainable growing and eating practices, and transform the nature of the food system, region-by-region. Through direct youth engagement, these organizations also have the ability to shape the future generation of farmers, food and agriculture advocates, and consumers to ensure society has a resilient, sustainable food system for generations to come.

Appendices

Appendix A: Advice from your peers (interview findings)

During the interview process, each interviewee was asked, “If you could give one piece of advice to your peers working in the farm or food education space, what would it be?” The below is a compilation of the summarized answers. For anonymity and in compliance with IRB approval, the names of participants have been removed.

- Remember what you’re doing it for, remember who you’re doing it for.
- Keep yourself educated and network as much as you can.
- Take what you learn from other organizations and apply it to your specific location. Resist the urge to bring in the latest expert (from a national or international level). Oftentimes, you have experts in your backyard or prior program participants.
- Listen. Listen to the people where you are, listen to the market, listen to the land, listen to what there’s space for, what there's need for. Don’t be attached to programs or work. Be sure you are willing to pivot or change as needed. Listening and recognizing the local expertise of people and land is a place to start and don't expect a quick fix.
- The impact and importance of language. Understanding what it means when you use words like regenerative or organic and if there are any standards that go along with using those terms.
- There’s going to be challenges. Work is hard. Don’t give up, it’s so worth it. The fact that we’re growing food for our communities is very satisfying and it is hard work, but you can do it.
- Just remember your why. I think if you stay true to your reasons for starting an organization or your reasons for joining an organization, I don’t think you can go wrong there. Let that be your north star.
- High school teachers are really busy. Prioritize in-person interactions.
- Slow and steady with a sense of urgency. Be really strategic.

- Remind yourself that it’s okay, Rome wasn’t built in a day. It’s really tempting to just keep working at it and not take breaks, but breaks are important.

- Have experts in different areas on your team. Ensure that you have multiple voices sharing your message or mission.

Appendix B: Unlimited funding (interview findings)

During the interview process, each interviewee was asked, “If funds were unlimited, what is the first thing you would invest in to strengthen the impact of your organization?” Below is a brief analysis of the responses. For anonymity and in compliance with IRB approval, the names of participants have been removed.

Center One

Answer: Purchase the center myself. Give [each staff member] a $35K raise. If they can control the turnover, things would magically come into place.

Analysis: The response indicates a focus on improving staff morale and stability by raising salaries and retaining employees. The implication is that financial constraints have led to turnover issues. The strategy suggests that higher compensation might contribute to overall organizational success.

Center Two

Answer: Hire a bilingual farm coordinator (Person 1). Acquire more land to make it accessible to farmers and keep the land working in food production (Person 2). Build a range of affordable housing for staff and farmers (Person 2).

Analysis: This answer outlines several areas for investment. The bilingual farm coordinator highlights the importance of diversifying staff to better engage with the community. Acquiring more land indicates a focus on expanding the organization’s reach and impact. Building affordable housing for staff and farmers suggests a commitment to long-term sustainability.

Center Three

Answer: 1) Address infrastructure needs, the lack of funding to provide adequate staffing and fund repairs. Repairing infrastructure would keep facilities prepared to host community events or offer event rentals. 2) Invest more in diversity, equity, and inclusion (DEI) training for staff and volunteer guides. Our dependence on volunteers creates a challenge in coordinating training for volunteers. 3) Invest in programming supplies and resource libraries. Our equipment and library are both outdated. 4) Invest in internet—underground cable, wifi etc.

Analysis: Identifies various challenges related to infrastructure, staff training, equipment, and internet connectivity. Investing in repairing infrastructure and updating equipment aligns with maintaining a functional and inviting environment. Prioritizing DEI training reflects a commitment to inclusivity, while addressing Internet and technology needs suggests a desire for improved operations and communication.

Center Four

Answer: A few months back, there was a grant available so a lot of brainstorming took place. A lot is in the hiring capacity to get things done. We face time constraints. There are a lot of things we want to get done and we have to prioritize what we can get done. Hiring more people would help.

Analysis: Emphasizes hiring capacity and prioritization due to limited resources and time. Investing in more personnel underscores the need for scalability and growth. Focusing on hiring local talent can benefit the surrounding community and enhance the organization's impact.

Center Five

Answer: Invest in the people who work here. At nonprofits, the retention rates are a challenge and create stability and internal investment.

Analysis: Targets employee retention and stability. By investing in its workforce, the organization aims to foster long-term commitment and expertise. Enhancing employee benefits and creating a supportive work environment aligns with sustainable growth.

Center Six

Answer: Solar power. That gets me to ecological sustainability. There is an opportunity to demonstrate agrovoltaics. The center could have events year round with our own power supply and could have parking lot lights. I would double or triple education staff and garden staff, and quadruple my development staff. I would add a full-time farm manager who is looking for ways to make the farming enterprise profitable and bridge the gap between our pasture and production land. I would increase employee benefits, 401(k) and salaries by 50%.

Analysis: Outlines a comprehensive plan, including ecological sustainability through solar power and agrovoltaics. Expanding education and development staff emphasizes a commitment to knowledge dissemination and organizational growth. Adding a farm manager highlights the importance of bridging production gaps and improving profitability.

Center Seven

Answer: Processing and collaborating with the small- and mid-size farmers to collaborate more via regional food hub type situations.

Analysis: Suggests collaboration with smaller farmers for regional food hubs. This strategy focuses on building partnerships and networks to create a more sustainable and resilient local food system.

Center Eight

Answer: Give everyone a raise. Invest in staff as much as possible. Invest in our dairy operation (butter and cheese making/value added products). Prepare apprentices for the reality of operating a dairy. Create a formal network of folks who have been through our programs.

Analysis: Emphasizes investing in staff through raises and professional development. Enhancing dairy operations and value-added products aims to improve self-sustainability and generate revenue. Creating a network of program alumni underscores the importance of community and shared experiences.

Meta analysis

These responses focus on specific investment areas to strengthen operational impact. Areas include investments in staff, infrastructure and resources, community engagement infrastructure (physical and social), technology for sustainability and growth, and funding for collaboration with peer organizations and participants.

The most common response was around staff salary. This is a challenge and opportunity in the non-profit sector. Higher employee salaries could create higher retention rates and give organizations the ability to hire more skilled talent. Additionally, higher salaries could incentivize potential staff to move to the more rural areas these organizations are located in.

Appendix C: North star (interview findings)

During the interview process, each interviewee was asked, “What would you consider your organization's north star to be?” The researchers determined it was important to gather a more personalized iteration of the center’s mission statement. The answers enabled the research team to hear first-hand how the mission statement was internalized and understood by each center’s staff. Below is a brief analysis of the responses, comparing each “north star” to an organization’s mission statement.

Cibolo Center

Answer: Sustainability, conservation, and education.

Mission Statement: “Our mission is to promote the conservation of natural resources through education and stewardship.”

Analysis: The alignment between the interview answer and the mission statement is clear. Both focus on conservation and education as core principles.

Glynwood Center

Answer: Farmers and food are at the center of the programming and events and activities. We have a real focus on people, which really comes through in our strategic planning. Teamwork and relationships are important and trust building with the community. Improving the lives of the people who are at the heart of our work.

Mission Statement: “Glynwood’s mission is to ensure the Hudson Valley is a region defined by food, where farming thrives.”

Analysis: The interview answer and the mission statement both highlight the significance of food, farming, and community relationships. The mission statement is more general about this, however, as it does not explicitly mention strategic planning and trust building.

Hidden Villa

Answer: Stewardship of environment, animals, and space to foster connection between community and nature.

Mission Statement: “Our mission is to foster educational experiences that build connections and inspire a deeper appreciation and respect for nature, food, and one another.”

Analysis: Both the interview answer and the mission statement emphasize stewardship, community connection, and education as central elements. They are generally similar in detail.

The Land Institute

Answer: Looking for a perennial, just future. Resilient. Can come back again. Justice in the sense that we are paying attention to everyone's needs.

Mission Statement: "The Land Institute co-leads the global movement for perennial, diverse, truly regenerative agriculture at a scale. Our work, led by a team of plant breeders and ecologists in multiple partnerships worldwide, is focused on developing perennial grains, pulses, and oilseed-bearing plants to be grown in ecologically intensified, diverse crop mixtures known as perennial polycultures. The Land Institute's goal is to create an agriculture system that mimics natural systems to produce ample food and reduce or eliminate the negative impacts of agriculture. Through transdisciplinary research and collaborations, The Land Institute builds learning communities to help society cross the threshold into diverse, perennial grain agriculture."

Analysis: While both the interview answer and the mission statement center on regenerative agriculture, the interview answer adds emphasis on justice and resilience, which is not explicitly mentioned in the mission statement.

Rodale Institute

Answer: Healthy Soils = Healthy Food = Healthy People.

Mission Statement: "Rodale Institute confronts one of the world's greatest challenges: creating a resilient global food system that improves human health and the environment. Our mission is to advance groundbreaking research and best-in-class education that enables farms and farmers to transition to regenerative organic agricultural practices, thereby improving the health of the world's soil and securing the global food supply."

Analysis: The interview answer and the mission statement both emphasize the link between healthy soil, food, and people. The mission statement focuses more on regenerative practices. The interview answer functions as a 'navigational beacon' that seems to inspire the mission statement and guide execution.

Stone Barns Center

Answer: "The goal is to create both the consciousness and infrastructure for a regional food system. Create the template that becomes adaptable to every region and microregion. That's the same goal we had 20 years ago."

Mission Statement: "Stone Barns Center is a 501(c)3 nonprofit farm, education, and research center with a mission to catalyze an ecological food culture."

Analysis: The interview answer aligns with, and expands on, the mission statement of Stone Barns Center by naming specific goals, such as creating a food system template adaptable to various regions. It underscores the organization's consistent commitment to its principles for over two decades hinting that the mission may have evolved but has been guided by the same principles. Overall, the interview answer adds depth and practicality to the mission statement's broader goal of catalyzing an ecological food culture.

Stonewall Farm

Answer: Educational programming, running a CSA and community events, but really what Stonewall is best known for and the critical piece provided to the community is the educational programming.

Mission Statement: "Stonewall Farm demonstrates ecological sustainability and cultivates community through education and engagement with local food systems and our shared natural resources."

Analysis: Both the interview answer and the mission statement prioritize community engagement and education. It is clear the driving focus is education and that is more explicitly laid out in the mission statement. Coupled with the CSA aspect, education, and local food guide the mission statement.

TomKat Ranch

Answer: Environmental impact, animal welfare, social justice community, and economics. Our true mission was to inspire regenerative management on landscapes and that is key for climate change.

Mission Statement: "Our mission is to provide healthy food on working lands in a way that regenerates the planet and inspires others to action."

Analysis: Both the interview answer and the mission statement stress regenerative practices, but the interview answer delves deeper into specific aspects like social justice and economics.

Wolfe's Neck Center

Answer: Climate Change: having agriculture be a solution and not just a contributor to climate change.

Mission Statement: "Wolfe's Neck Center for Agriculture & the Environment is on a mission to transform our relationship with farming and food for a healthier planet."

Analysis: Both the interview answer and the mission statement highlight the organization's commitment to addressing climate change through sustainable agriculture.

Meta analysis

Each organization's interviewee "north star" answer generally aligns with its respective mission statements. While some interview answers provided more detailed insights into the organization's focus, values, and approaches, the mission statements often captured a broader vision of each center's core goals and philosophies.

Some respondents used their answers to provide some specific examples that were more succinct versions of the mission statement focused on encompassing ideas, values, or goals.

Appendix D: Interview guide

[INTRODUCTION AND STUDY DESCRIPTION/DISCLAIMER]

- *Do we have permission to record this interview?*

Organization Background/Purpose

1. To start, we'd love to hear more about your organization's mission and overall purpose in your own words.
2. What would you consider your organization's north star to be?
3. We understand your organization hosts a broad array of programming, but overall, what would you consider the main goals of your organization's programming to be?
4. How important would you consider the following to be to your organization? (potential question if it is not clear in the above 3 questions)
    4.1. Engaging youth or next generation of food systems leaders
    4.2. Building an evidence or research basis for sustainable farming/food production
    4.3. Shifting public consciousness about sustainable farming or food production
    4.4. Changing policies towards more sustainable food production
    4.5. Other, something else you'd add?
5. How do you define success for your organization?
    5.1. How do you measure your impact?
    5.2. How do you communicate your impact to your funders and those outside of your organization? (probe: communications channels, frequency of reporting, key standards aligned with, etc.)
    5.3. What challenges have you encountered with measuring your impact?

Communications/Public Engagement

6. Who would you consider to be your key audiences?
7. What communications channels do you use to engage current or prospective supporters? and what about with the public?
    7.1. Which channel(s) have you found to be the most impactful and why?

Fundraising

8. Can you tell me more about your major fundraising activities or sources? (probe: individual giving, grants, events, membership programs, etc.)
    8.1. What have you found to be most impactful?
    8.2. Where have you had the greatest difficulties with fundraising?

8.3. Have you tried any new approaches to overcome these difficulties?

9. How do you identify new donors, and how do you ensure they fit your needs?
10. If funds were unlimited, what is the first thing you would invest in to strengthen the impact of your organization?

Board/Organizational Leadership

11. Can you tell me more about the make-up of your board?
    11.1. What makes a good board member? (probe: what skills, qualities, etc.)
    11.2. How do you recruit board members?
12. How did you respond to the challenge of COVID?
    12.1. How did this affect your organization and how it operates?
        12.1.1. What are some of these impacts you think may be permanent fixtures of your organization post-pandemic?

Peer Organizations

13. If you could give one piece of advice to your peers working in the farm or food education space, what would it be?
14. Are there other food or farming non-profit organizations that you follow for inspiration or best practices?
    14.1. If so, which ones and why?
15. On a similar note, are there other organizations you'd recommend we speak with?

Appendix E: Farm-based education associations

Organization name	Description
American Association for Agricultural Education	“The mission of AAAE is to foster excellence in the discovery and exchange of evidence-based solutions for social science challenges in agriculture and related sciences” (*Vision, Mission, and Core Values*, n.d.).
Farm-Based Education Network	“The FBEN is a free member network created to strengthen and support the work of farmers, educators, and community leaders who provide access and experiences of all kinds on working farms. Our mission is to inspire, nurture, and promote farm-based education” (Farm-Based Education Network, 2023).
Mid-Hudson Collaborative Regional Alliance for Farmer Training (C.R.A.F.T.)	“C.R.A.F.T. is a cooperative effort of local organic and biodynamic farms organized to enhance educational opportunities for farm apprentices. Apprentices on farms that participate in the C.R.A.F.T. program experience a diversity of successful farm models and join a community of fellow apprentices and farmers” (*Collaborative Regional Alliance for Farmer Training*, n.d.)
Sustainable Agriculture Education Association	“SAEA exists to serve and connect educators, teachers, students, staff, and administrators who focus on the teaching and learning of sustainable agriculture at the adult level” (*Sustainable Agriculture Education Association*, n.d.).
Upper Midwest Collaborative Regional Alliance for Farmer Training (CRAFT)	“Upper Midwest CRAFT is built on the practice of farmer-to-farmer training where shared farmer experiences, wisdom, methodology, discussion, and place-based knowledge strengthen the community of regional growers at any and all levels of skill and experience” (*Upper Midwest CRAFT*, n.d.).

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Jacob was born and raised in Northern California where he has studied and worked for most of his life. He earned his Bachelors of Science in Agriculture, with a concentration in Crops, Horticulture, and Land Resource Management from California State University at Chico. Since graduating, Jacob has gained experience in agronomy, biological control research, regenerative agriculture, and public policy. Currently he works as the Membership and Public Policy Coordinator for Agricultural Council of California, focusing on regulatory and legislative policy in Sacramento. Living, learning, and working in one of the most productive agricultural regions of the world has provided Jacob a comprehensive understanding of the issues facing agriculture, ranging from climate concerns to food supply chain issues. Jacob's broad exposure to the diversity of the agriculture industry has cultivated an interest in regional food systems, agriculture/environmental policy, politics, and sustainable resource management.

Connor Kaeb

Connor is a Government Relations Specialist at GROWMARK, Inc., a farmer cooperative based in Bloomington, Illinois, where he works to represent the interests of the member-owners on state and federal issues. Previously he worked as a Farm Underwriter for COUNTRY Financial. He graduated from Hillsdale College with a B.A. in Politics and a minor in History. Connor's passion is for protecting and strengthening family farms and rural communities, and he grew up on a dairy farm in Illinois, where this passion was born. Connor currently lives in Wenona, Illinois, with his wife, their two dogs, and three cats.

Elizabeth Reilly

Elizabeth has over a decade of experience working at the intersection of food systems, policy and communications. At FoodMinds, Elizabeth helped organizations navigate the rapidly evolving food policy, science and media landscape by leading communications and advocacy campaigns, facilitating stakeholder engagement, spearheading thought leadership platforms and developing science-based storytelling. She has mapped the state of global food-based dietary guidelines, led an international communications campaign for a sustainable aquaculture alliance, served as a third-party expert for a global platform on public-private partnerships for nutrition, and more. Previously, Elizabeth worked for Ketchum Global Research & Analytics. There, she supported internationally award-winning research and measurement programs and led the group's Food Subject Matter Expertise team. Elizabeth graduated *summa cum laude* from Ithaca College with a B.S. in Integrated Marketing Communications. At Ithaca College,

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Kelly Sheridan
Kelly serves as the Vice President of Environmental Affairs at the U.S. Dairy Export Council, where she manages engagements with multilateral organizations representing U.S. dairy's commitment to the environment. Kelly started her career on Capitol Hill, but her interest in public policy and the impact laws created by policy makers have on society began at a young age. Kelly's enthusiasm for these topics have manifested in multiple ways including working for a law firm, campaigning for Members of Congress, and working for a fortune 500 company. When she landed a job working for a biotechnology agriculture company, her passion for agriculture and the need to understand the intricacies of how our food systems operate grew exponentially. She has a strong desire to support those who feed us with the resources required to produce food sustainably via the mechanisms of public policies and voluntary industry action. Kelly earned her B.S. in Government with a minor in Economics from Suffolk University in Boston, MA.

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