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RECEIVED 25 September 2024

ACCEPTED 26 February 2025

PUBLISHED 27 March 2025

CITATION

Keefe S and Lee J (2025) Sustainable transitions in food systems: a case study of an urban agriculture farming training program in Washington, United States.
Front. Sustain. Food Syst. 9:1501877.
doi: 10.3389/fsufs.2025.1501877

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Sustainable transitions in food systems: a case study of an urban agriculture farming training program in Washington, United States

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A transition toward more sustainable and just food system is necessary to address global greenhouse gas emissions and inequitable food access. Alternative food networks have emerged as a solution to counteract the adverse impacts of conventional food systems. Urban agriculture is a type of alternative food network that strives to provide local access to food through the development of community gardens or community-supported agriculture. Farmer training programs are uniquely positioned to build the capacity of those who are interested in engaging in urban agriculture, yet little is known about whether these programs—and their graduates—contribute to sustainability transitions within the food system. We build on previous scholarship that establishes the importance of farmer training programs and use a training program in Washington, United States to understand how these programs support and encourage sustainability transitions. The multi-level perspective breaks down systems into landscape, regime, and niche levels. It provides a framework for understanding the system under which urban agriculture operates and the different actors and institutions that stabilize the existing food regime. Social practice theory emphasizes the importance of focusing on how change occurs at the local level. Thus, we use a combination of the multi-level perspective framework and social practice theory to explicate how multi-scalar dynamics of food systems poses barriers and allows for opportunities for actors at a local level to exert change on the larger system. Our results show that training programs allow a space for social learning and changes the collective practices and narratives among its graduates. We also find that the potential for graduates to exert larger change on the regime is curtailed due to the training program's limited capacity to exert vertical pressure on the systems. For regime change to occur, state and local government need to intentionally support policies that recognize the importance of urban agriculture in their sustainability agendas.

KEYWORDS

sustainable transitions, urban agriculture, social practice theory, multi-level perspective, niche innovations, alternative food networks

1 Introduction

The conventional food system has negative environmental and human impacts, including increased atmospheric greenhouse gases and increased rates of chronic disease (Girip et al., 2020; Lane and Davis, 2022). Alternative food networks (AFNs) emerged to counteract both the environmental and social issues embedded in the conventional food system; they vary from organic food to biodynamic farming systems to small scale urban and rural agriculture.

Urban agriculture is an example of an alternative food network that focuses on the cultivation, processing, and distribution of agricultural products in urban and suburban areas (United States Department of Agriculture, 2023). Urban agriculture initiatives range from community gardens and small acre farms to dispersed farms in urban or peri-urban areas. These initiatives also include selling products through community-supported agriculture or farmers' markets. In the United States, urban agriculture was promoted to increase food security during World War II (e.g., "Victory Gardens") (Mok et al., 2014). Even though cities have been involved in food production for decades, there has been a rise in the interest of urban agriculture due to its potential to address environmental issues such as the mitigation of greenhouse gas emissions related to food transportation and high-intensity agricultural practices, as well as local environmental issues such as increases in green spaces and improvement of local air quality (Mok et al., 2014). In addition, urban agriculture has the potential to address inequities in the existing food system, foster an enhanced sense of place for individuals, and build community capacity (López-García et al., 2024; Mendes et al., 2008; Mert-Cakal and Miele, 2020; Siegner et al., 2018; Zoll et al., 2018).

The potential of urban agriculture to promote social equity in addition to environmental sustainability has led many non-profit organizations to include urban agriculture programs as part of their organizations' mission. While many recognize the importance of people and the environment as beneficiaries of urban agriculture, few have developed training programs to serve those who are interested in becoming more involved in urban agriculture. Yet, building the capacity of the individuals to undertake urban agricultural practices is a necessary for urban agriculture practices to take root. For example, those who are interested in urban agriculture often need to learn technical farming skills. Those who wish to make a living from urban agriculture will need appropriate networks and venues (e.g., farmers' markets) to sell their produce and learn managerial skills on how to run a business.

While there is increasingly more research conducted on food systems and how they can contribute to sustainable transition pathways, most of the current research focuses on initiatives in Western Europe [see, for example, the study on Wales by Mert-Cakal and Miele (2020), study in Spain by López-García et al. (2024), study in Germany by Wittenberg et al. (2022), and study in Italy by Belletti et al. (2024)]. Studies in the United States have focused on existing farmers and veteran programs (Crivits et al., 2018; Donoghue et al., 2014). These studies have not focused on farm training programs specific to urban agriculture, even though farm training programs are necessary for providing interested participants with technical skills necessary to adopt specific farming techniques and the financial skills required to successfully run a small-scale agricultural business (Olabisi et al., 2020). Lastly, little research has focused the extent to which learned knowledge of urban agriculture transfers into actual practice.

Our study aims to fill these gaps. We focus specifically on an urban farmer training program to understand how graduates of the training program contribute to sustainability transitions. We also provide recommendations for how the non-profit organization that developed the program can better position itself to support graduates. Due to the unique and context-specific nature of farmer training programs, we took a qualitative approach and interviewed graduates of a training program run by Farm Foundations, an environmental non-profit organization in Pierce County, Washington, United States.

We also interviewed city and county level officials and examined how interactions among different actors and institutions foster or hinder the opportunities for sustainable transitions.

2 Sustainable transitions and food systems

Sustainable transitions examine the ways societies can change; it focuses on transitions that center "clean" and "green" technologies and practices that contribute to sustainability (Hinrichs, 2014; Keller et al., 2022). The concept of "sustainable transitions" has primarily been applied to the energy and transportation sector, though more recently it has also been applied to food studies as people recognize the multiple benefits of transitioning to more sustainable food systems given how food systems are intertwined with not only ecological objectives (e.g., more resilient ecosystems) as well as social objectives (e.g., health benefits, more equitable access to food) (Ingram, 2011; Wittenberg et al., 2022). However, the process through which we can transition toward more sustainable food systems is not straightforward due to the multiple actors and multiple scales embedded in food systems.

2.1 Multi-level perspective and urban agriculture

Urban agriculture is made of a complex set of actors and institutions at multiple levels (Campbell and Rampold, 2021; Chiffolleau, 2009). Research on food systems have emphasized the importance of multi-level policies that align with local economics and allow for adaptive governance (Belletti et al., 2024; Vaarst et al., 2018). The multi-level perspective (MLP) framework is particularly suited for understanding the potential of urban agriculture to foster sustainable transitions due to its focus on multiple scales within a system. The MLP framework focuses on larger scale societal systems, stratifying society into three levels of analysis: sociotechnical landscapes, sociotechnical regimes, and niches (Geels and Schot, 2007). Food systems reflect these three stratifications. Factors such as economic recession or growth, pandemics, and climate change affect the food system at a landscape level. Regimes are shared cognitive routines as well as institutions and associated rules that stabilize the system. The food system regime includes the production, distribution, and consumption of food based in large-scale monocrops grown with pesticides/herbicides, long distance transport of food to urban centers, and purchases made in supermarkets (Girip et al., 2020; Bonfert, 2022). Research on regime shifts can occur through top-down change, bottom-up change, and internally induced change (El Bilali and Probst, 2018).

Niches, the "lowest" level of analysis, are the level at which radical novelties and innovations emerge; niches are relatively protected from landscape and regime pressures, making them ideal for experimentation. AFNs, ranging from farmers markets to homesteading for personal consumption, are examples of grassroots innovations and alternative technologies that develop at the niche level and hold promise for re-shaping the food system. Actors at the niche have the ability to shift regimes, which is necessary sustainable transitions to take hold. Thus, examining how change can and cannot occur niche level (e.g., the level at which actors are directly involved

in urban agriculture activities such as the planting and dissemination of food, etc.) is a necessary component of transitioning to more sustainable food systems.

2.2 Social practice theory and niche innovations

Social practice theory (SPT) is useful for understanding how transformation at the radical niche level can take hold. Niches are where rules and practices “in the making” exist (van Poeck and Östman, 2021, pg. 161). The SPT framework emphasizes the *social* part of sociotechnical transitions and examines the horizontal links among the elements of a practice; the framework allows for an analysis of the links that are made, maintained, or broken during a process (Hargreaves et al., 2013). Practices are broken down into two main types: practices-as-entities (idealized and abstract forms) and practices-as-performances (grounded enactment of practices conducted amid everyday conditions) (Hargreaves et al., 2013). For example, the food system is made up of a collection of practices-as-performances: most people buy and consume food everyday multiple times a day. In urban agriculture, the “elements of a practice” encompass growing food, shopping and preparing food, and the consumption of food. At the same time, practices-as-entities reveal themselves in consumers’ images of fresh or healthy food and how they view themselves (or want to view themselves) as actors who support urban agriculture and participants in a larger community.

Embedded in the idea of social practices is how one’s identity is tied to one’s practices. As the concept of individual and collective agency becomes more prominent in discussions on the broader structures of governance in food systems, recognizing the role of individuals and their beliefs as well as connections with others will allow us to better understand how to create and sustain niche innovations that are necessary for regime and landscape level changes.

The different foci of the MLP and SPT are both necessary to properly understand sustainable transitions, especially within food systems. The MLP framework allows one to examine change at the systems scale; SPT investigates change at a more local level through looking at practices and examining the horizontal linkages at the niche level. Food systems are affected by both technology and practices; changes are reinforced both vertically and horizontally. Combining MLP and SPT frameworks to analyze urban agriculture allows us to identify and highlight points of intersection that further our understanding of how urban farmer training programs can activate pathways toward sustainable transitions.

3 Methods

We adopted a case study approach because the research question is contemporary and requires an in-depth understanding of the context surrounding the phenomena (Yin, 2003). Given that the impact of training programs on the local food system and the graduates’ role in sustainability transitions are relatively unknown, we determined that a qualitative approach was most suited for this study. We applied the MLP framework to our case study and show the actors, opportunities, and challenges at the landscape, regime, and niche level in [Supplementary material Table 1](#).

3.1 Case study context

Pierce County is the second most populous county in Washington, home to 925,708 residents (United States Census Bureau, 2023). Pierce County has urban centers, such as Tacoma and Puyallup, peri-urban areas surrounding these two cities, and mountainous regions such as Mt. Rainier National Park and National Forest land (see [Figure 1](#)). In 2021, Pierce County passed Sustainability 2030, a sustainability plan with the goal “to reduce our greenhouse gas emissions (45% by 2030) and improve the health of Pierce County residents and our environment” (Pierce County, 2023a). The plan is broken down into five focus areas: transportation, waste management, energy and built environment, carbon sequestration, and education and outreach (Pierce County, 2023a). Even though none of these focus areas reference agriculture specifically, over 80 new community gardens have been formed within the county since 2008 (Harvest Pierce County, 2023).

In 2012, the Pierce County Conservation District adopted a preexisting program that was established in 2008: Harvest Pierce County (H-Pierce County). H-Pierce County’s mission is to help everyone in Pierce County have access to healthy, affordable, and culturally appropriate fruits and vegetables. One of H-Pierce County’s programs is Farm Foundations, a free farm training program that focuses on promoting urban agriculture. The current Farm Foundations program, launched in 2018, emerged after a series of meetings with government officials who perceived problems with food security and access.

The training program is a free 9-month farm training program that combines classroom learning with field days. The program teaches no till organic farm practices that are applicable in urban and peri-urban settings, and has three specific goals:

- 1 To grow the next generation of farmers that is different than the current white and aging generation.
- 2 To address historical inequities in farming systems so that people who have historically not had access to farming opportunities – to address racism in farming.
- 3 To put environmental conservation at the heart of farming in order to promote healthy ecosystems as well as farming (personal interview H-Pierce County director).

While there are other farm training programs in the US, many are through a college or university and cost at least a few hundred dollars in tuition (e.g., Future Harvest, Rogue Farm Corps, and Rodale Institute). The Farm Foundations program recognizes that often those who are interested in urban agriculture may not have access to the resources to adopt urban agriculture practices. Yet, these are the people who often stand to benefit most from increased access to healthier food. Thus, Farm Foundations secured funding from the local government to create free training programs.

From 2018 (the program’s inception) to 2023, four cohorts, totaling 78 people, have completed the training and graduated from the program (there was no new cohort in 2021 due to COVID-19 pandemic). In alignment with Farm Foundation’s first goal, the program aims to have participants from groups that have traditionally been excluded from agriculture in the United States: people of color,

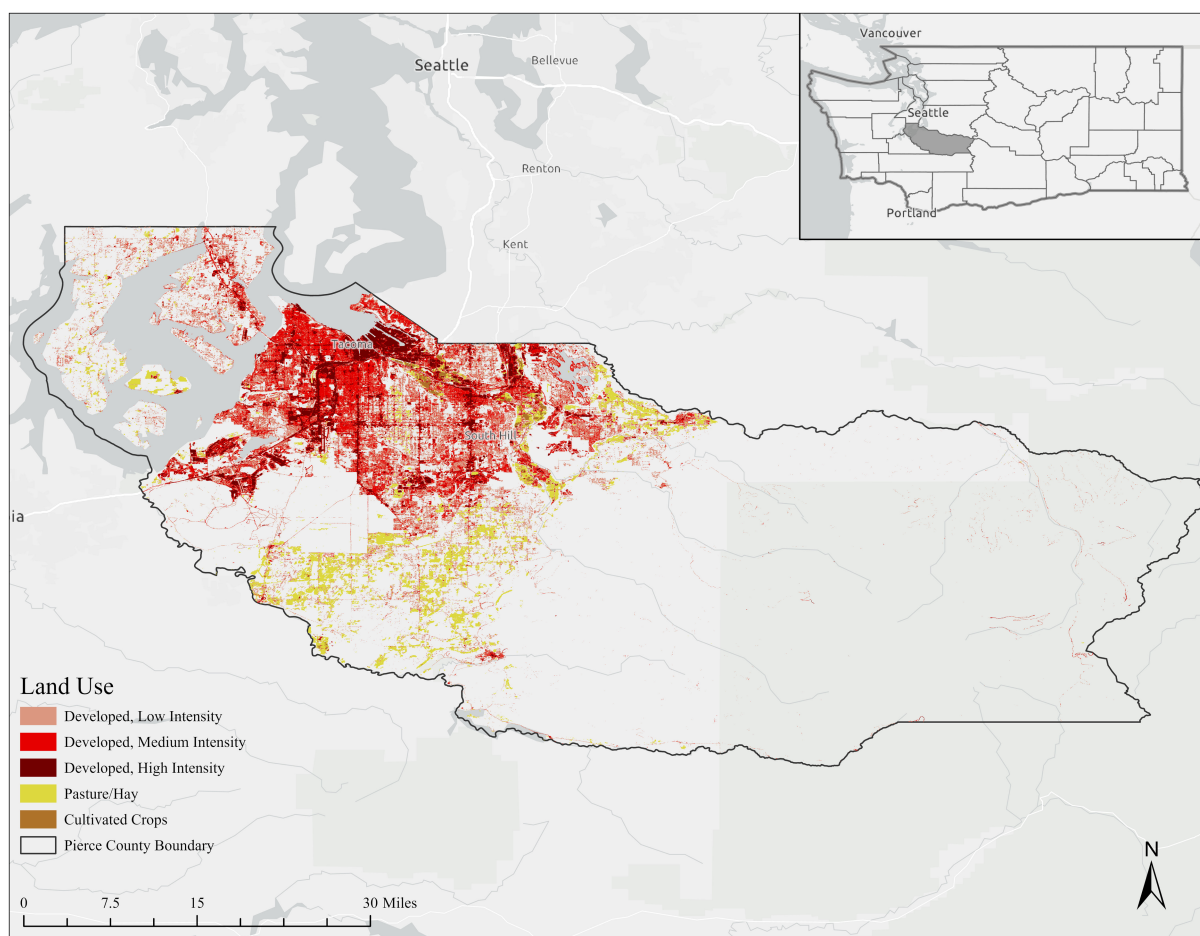


FIGURE 1

Map of Pierce County showing the developed land and agricultural land (Data Source: [National Land Cover Database, 2023](#)). The eastern side of the map is blank as much of that area is federally owned land and cannot be developed for any purpose. The map visually shows the limited land availability in Pierce County.

LGBTQIA+ individuals, and women. In the 2023 cohort, 88% of participants personally identified as belonging to one of those groups.

3.2 Data collection

We chose to conduct semi-structured interviews with participants in the program, county officials, and the program director. We determined the interview questions based on first-hand observations, site visits, document review of program activities and mission, and existing literature on the barriers in scaling up urban agriculture initiatives. Our interview questions were guided by a desire to learn about whether small-scale training programs could lead to larger scale change, as well as how the training program affected participants' understanding and perception of their interactions with the food system. We conducted two rounds of semi-structured interviews with participants of the program. The two rounds of semi-structured interviews were useful for (a) yielding deeper conversations and richer detail on the emerging themes (e.g., connections among graduates, barriers to adopting urban agriculture) and (b) understanding how these themes matter in the context of the MLP and SPT frameworks. We also conducted one round of

interviews with the program director and county officials who were involved in urban planning. Lastly, we conducted a document review of information related to the program as well as city sustainability plans to better understand the role of niche innovations and their interactions with the regime.

We reached out to all 78 individuals who had completed the Farm Foundations program from 2018 to 2020 and from 2022 to 2023; 15 graduates agreed to participate in the research (~20% response rate). Each interview lasted approximately 30 min and was recorded with the Voice Memo app and transcribed using Otter.ai. Questions ranged from why they wanted to join the Farm Foundations program to what they have done with the knowledge they gained during trainings. Any projects or initiatives that Farm Foundations alumni started were coded as innovations developing at the niche level. We examined each innovation – for example the community supported agriculture program one graduate started – individually and identified the regime and landscape actors to draw conclusions about the efficacy of urban agriculture training programs for broader sustainable transitions in the food system.

We also reached out to all seven members of both the County Council and the Planning Commission. The County Council is the highest governing body in Pierce County; the Planning Commission

is the group that makes recommendations to the County Council regarding zoning and land use. We interviewed two members from each governing body. The questions in these interviews were structured to understand decisions related to zoning and land use at the county level. We wrote down their answers to these targeted questions and these interviews lasted 30 min. We also collected county-wide data regarding housing prices to triangulate existing data. Interview questions are listed in [Appendix 1](#).

3.3 Data analysis

We took an inductive approach toward coding and engaged in multiple rounds of interviews and coding. In the first round of coding, we took an exploratory approach and looked for emerging themes in the interviews related to barriers to scaling up urban agriculture. After our initial round of coding, we revisited existing literature on sustainable transitions to identify ways one can analyze the dynamics among actors at the niche level. In the second round of coding, we analyzed how the themes we identified from the coding process fit within the MLP framework (e.g., identifying regime factors, niche innovations, etc.). We also analyzed the interviews through the lens of the SPT framework when we coded participants' reflections about the program; we sought to identify the formation of different types of horizontal linkages. We then grouped the themes that we found (e.g., barriers to implementing urban agriculture, the cultivation of a community that many graduates found valuable) into broader categories so we could better organize, conceptually as well as theoretically, how our results contribute to the MLP and SPT frameworks.

3.4 Study limitations

We tried multiple times to reach out to those who have participated in the urban agriculture training programs and were clear in our communication that interviews would last no more than 30 minutes. While voluntary response bias is still likely, given that those who have a deeper connection with the program might be more willing to respond, the experiences of those who responded to the survey are still valuable for identifying the graduates' roles in contributing to sustainability transitions. In addition, we recognize that our case study is focused on a small geographical area (one county out of the entire state), which limits its scalability. However, the purpose of our study is not to make any type of statistical generalization from our results, but rather to strive for analytic generalization, where we seek to use our case study to support the value of the multi-level perspective and advance our understanding of how social practice theory can be relevant for understanding the value of individual and collective narratives at the niche level.

4 Results and discussion

In the sections below, we share the outcomes of participation in the training program as well as discuss how the training program and its graduates can contribute to sustainable transitions within the food system. We also offer recommendations on how H-Piece County (the

non-profit organization that administers the Farm Foundation's training program) can engage with policymakers and other organizations so graduates have a higher likelihood of developing niche innovations that can destabilize the regime.

4.1 Sustaining nice innovations through social learning

Our interview data shows that participation in the training program leads to niche innovations within the food system. Graduates of Farm Foundations contribute to innovations within the urban agriculture niche. 11 out of the 15 interviewees are involved in a viable form of urban agriculture. Interviewees were involved in a variety of initiatives at the niche level, including starting their own farm, working on a farm, homesteading their own land, and starting a non-profit organization that redistributes food. Responses include "[I] started working on an organic farm in Tacoma, continuing to build up skills" (respondent 12) and "[I] homestead my own property - growing enough food to support me and my husband 9 months out of the year" (respondent 5). Graduates of the program have continued to practice urban agriculture for personal consumption or develop income-producing enterprises. These changes, indicative of a grassroots pathway of change, can lead to collective action against the dominant system in question, thereby creating the necessary vertical pressure to change the system (Gernert et al., 2018). In addition, these responses show that multiple innovations develop simultaneously within a niche and hold potential for larger system change. While some innovations may never make it past the niche level, this process of testing new ideas is key (Geels and Schot, 2007; Lachman, 2013).

Respondents discussed the value of learning alongside others. 11 interviewees highlighted the important aspect of community to their experience during and after Farm Foundations, where graduates shared how they valued the connections and how "there's gonna be days where I'm gonna have to reach out to people to come help us out. [It is] always nice to have a group of individuals willing to come help" (respondent 7). Previous studies on food systems have articulated the importance of social learning and its transitional potential within the MLP framework (van Poeck and Östman, 2021). The interview results shows that the training program fostered social learning among participants. The power of the social learning process lies not in its direct ability to change the current system but in what it represents. In our case study, learning takes place at both an individual level when they first learn about how to practice urban agriculture; double-loop learning arises when the participants identify new challenges and connect with each other to understand how to solve the problems they encounter.

The horizontal connection and increased social capital among the graduates introduces a relational element as an outcome of the training program; this focus on relationships is a critical for food system transformations (López-García et al., 2024). Strong horizontal ties where ideas are spread and reinforced are pivotal for niche innovations to be sustained over time. Practitioners of urban agriculture can drive change by altering or overthrowing everyday practices if enough practitioners make the same change; this pathway of change occurs when ideas shared horizontally gain enough momentum to have vertical disruption as well (Gram-Hanssen, 2011; Keller et al., 2022; Shove and Walker, 2010).

4.2 Cultivating shared narratives to foster collective action

10 out of the 15 interviewees noted that the training they received through Farm Foundations had an impact on practices such as food shopping and preparation. They now include more vegetables and organic foods, as indicated in responses such as “[Farm Foundations] made me more conscious of what our family eats, not just what we grow but from the grocery store” (respondent 7) and “I am all organic now. And I really pay attention to what we get and what we bring in” (respondent 3). In addition, participation in the training program led people to see food as part of a larger system, where one respondent shared that “I see nutrition as eating food that is grown in a way that is positive for the ecosystem.” (respondent 5). Respondents’ narratives indicated that their participation in the program led to changes in both their perception of sustainable food and concrete changes in individual practices. These material activities that alumni engage in on a day-to-day basis reflect a “change in practice” that is necessary for scaling up grassroots initiatives that lead to widespread change. These collective changes in practice can also lead to collective action and wider change (Shove and Walker, 2010). The shared narratives among the graduates also reveal how they want to take care of the space that they live in, with one respondent (respondent 5) sharing how they wanted to start an urban garden for their community provide students in the school district with healthier food. Fostering place attachment and a deeper sense of commitment could also motivate participants to continue with experimentation (Dickinson, 2013).

Farmer training programs’ potential to transform food systems comes not only from giving individuals the practical skills to adopt urban agriculture but also the building of a shared narrative and understanding around the importance of local food. Our results suggest that changes in practice based simply on personal preference and images of what is healthy is a necessary intermediate step that lays the groundwork for further action. While Farm Foundations has shown itself to be successful in changing consumer practices for some graduates, this change remains confined to a hyper-local context and has yet to penetrate the larger structures supporting the conventional food system.

Communities need to feel more empowered to make change sustainable and resilient (Mert-Cakal and Miele, 2020). To have a larger impact and contribute to sustainable transitions, Farm Foundations graduates need to connect their learned skills and motivations under the specific goal of pressuring the existing system to shift in favor of small-scale urban agriculture. Harnessing their strong community ties and maintaining open lines of communication will increase their likelihood of success.

4.3 Addressing lock-in mechanisms to overcome economic barriers

The responses from the graduates, and data from the county, indicate that larger structural barriers exist and prevent the scaling-up of niche-level innovations and hinders the ability of interested individuals, such as Farm Foundations graduates, to pursue urban agriculture careers in Pierce County. Graduates of the program who wished to adopt urban farming as a full-time profession faced

significant economic barriers. The lack of available and affordable land hinders the ability of interested individuals to pursue urban agriculture careers in Pierce County. Five respondents cited that a barrier to full time careers in urban agriculture was the difficulty in making full-time work in urban agriculture economically sustainable. Graduates echoed the sentiments of respondent 14, who said that “the reality of farming, it’s hard. Really hard to make a living.” Accessing affordable farmland within Pierce County was a significant barrier; respondents cited that “it [farming] is just economically unrealistic with the price of property (respondent 14)” and “we cannot compete with [the] housing market type of price [in Pierce County]” (respondent 9). Competition for scarce land is also high, with one participant who tried to start and urban farm saying that “every time we put an offer on a farm someone would swoop in out of our grasp because they had cash, and we did not have much cash” (respondent 7)."

Interview responses from county-level officials confirm the scarcity of land. Officials said that farmland preservation and urban agriculture is not a policy priority for Pierce County. From 2011 to 2021, over 10,000 acres of agricultural land have been lost to housing and commercial development Pierce County (Pierce County, 2023b) and “no one is prioritizing maintaining land and incentivizing sustainable farming enterprises... at a policy level from the county there is nothing the county can do to pump the breaks” (personal interview Planning Commissioner). In addition, “it’s not like Detroit where land is returning to farmland” (personal interview County Councilperson). The lack of direct incentives and subsidies for farmland reflect that policymakers are not prioritizing urban agriculture and its often intangible benefits when constituents advocate for tangible results such as affordable housing and economic growth.

The current land use policies in Pierce County act as lock-in mechanisms that stabilize regimes and constrain actors’ ability to contribute to sustainability transitions (Klitkou et al., 2015). These lock-in mechanisms are not unique to the food system. For example, low prices of fossil fuels and automobile-centric infrastructure keep the energy and transportation regimes, respectively, stable (Gazull et al., 2019; Kanger and Schot, 2016). This issue of economic viability of urban agriculture is made difficult by regime-level policies as well as societal values and cultural norms (Næss and Vogel, 2012). Our results show that economic challenges are due to structural barriers, and even individuals who have the training and desire to pursue urban agriculture are unable to change their practices if they do not have the money needed. Our results reinforce prior research on AFNs, a study in Wales found that AFNs were successful at the hyper-local level but faced the same structural barriers we found in scaling up related to land availability and the low financial reward of farming (Mert-Cakal and Miele, 2020). However, continued experimentation at the niche level – be it success or failure – is necessary for future success and large-scale impact (Turnheim et al., 2020).

4.4 Embracing hybridity to destabilize regimes

Our results show that participation in Farm Foundations leads to the development of new innovations within the urban

agriculture niche, cultivates strong community ties that lead to shared ideas and narratives regarding food, and influences consumer behavior. While Farm Foundations fosters horizontal pathways of change through community building and social learning, it struggles to enact larger scale change within the county due to its lack of access to vertical pathways of change (e.g., working with policymakers at the state level).

Hybridity in both conventional and experimental spaces to cultivate vertical pathways of change necessary for sustainable transitions (Le Velly and Dufeu, 2016; Saul et al., 2022). Evidence of some hybridity already exists: H-Pierce County and the city of Tacoma collaborated to secure an empty city lot for a graduate to start an urban farm. Through this hybridity, a small urban farm – a niche innovation – was possible. This collaboration serves as a powerful example of how H-Pierce County can utilize its unique position within the Pierce County Conservation District. Partnering with other local governmental agencies and creating a conducive environment for graduates to adopt urban agriculture can have positive spillover effects (e.g., more access to healthy food) that incentivize agencies to fund urban agriculture initiatives. These partnerships among different city and county level agencies suggests that niche innovations at the local level interact with regimes at multiple levels. For example, policies at the state or national level may not yet reflect the principles underlying the need for more sustainable food systems, but the county has shown commitment to fund programs such as Farm Foundations. More communication among the county officials, and demonstrated results from participation in the program, can further enhance the potential of the niche innovation to exert change on the regime.

H-Piece County—the non-profit organization that administers the Farm Foundations program—should embrace hybridity by building networks with other non-profits organizations that have similar missions. Partnerships with other organizations and actors can increase the likelihood of activating both horizontal and vertical pathways of change. Aligning themselves with initiatives aimed at protecting farmland (e.g., East Multnomah soil and water conservation district's ongoing farmland easement projects; Northwest Business Agriculture Center programs on improving the economic vitality of agriculture) can be an effective way to craft a collective narrative and empower actors and organizations to advocate for wider policy change on land use (East Multnomah Soil and Water Conservation District 2023; Northwest Agriculture Business Center, 2023). Creating a community across multiple organizations can provide the space for more radical experimentation so innovations can “breakthrough” when the conditions are right and destabilize regimes.

5 Conclusion

The case study of Farm Foundations reinforces the idea that the key to sustainable transitions requires cultivating community buy-in and pressuring both governmental and non-governmental actors to make progress toward sustainable transitions. Many

grassroots initiatives are better equipped to develop strong horizontal ties and spread changes in practices through building a shared sense of community. However, embracing hybridity and cultivating strong partnerships with other non-profit organizations or federal agencies within the regime can increase access to vertical pathways and ensure that ideas and values at the niche level break into regimes at a higher institutional level.

Removing the structural barriers that keep the current regime dominant is key to allowing the changes in individual practice and niche innovations to influence the larger food system. Our results reinforce other research related to AFNs, where removing structural barriers needs to be a priority at the county level if niche innovations such as CSAs or community gardens are to break through and influence or destabilize the regime. Until these barriers are addressed, it is still vital that niche innovations and changes in practice at a local level continue; the iterative process of learning that people engage with when working with each other transform narratives and lead participants to advocate for change from policymakers, which in turn can drive societal changes related to the value of local urban agriculture.

Lastly, our study shows the importance of focusing on the niche level when examining sustainable transitions and the value of combining the SPT and MLP framework when analyzing sustainable transitions. Our results highlight the type of pressure needed to exert change at the micro versus the macro level is different: alliances with other actors are just as important as individual action and leveraging existing networks as well as building new ones can activate pathways of change more effectively.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by Amanda Udis-Kessler, Institutional Review Board; Colorado College. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

SK: Conceptualization, Formal analysis, Investigation, Writing – original draft, Writing – review & editing. JL: Funding acquisition, Project administration, Data curation, Investigation, Conceptualization, Methodology, Supervision, Validation, Writing – original draft, Writing – review & editing.

Funding

The author(s) declare that financial support was received for the research and/or publication of this article. JL received funding from the Social Science Executive Committee of Colorado College to cover publication fees for this article.

Acknowledgments

We would like to thank colleagues for their feedback and help with this project, as well as Dr. Kristen McIvor for her mentorship during the first author's internship in H-Pierce County.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

- Belletti, G., Torres Salcido, G., Scarpellini, P., Mengoni, M., and Marescotti, A. (2024). Multilevel governance in farmers' markets: a stakeholder analysis in Tuscany. *Front. Sustain. Food Syst.* 8, 1–19. doi: 10.3389/fsufs.2024.1401488
- Bonfert, B. (2022). "What we'd like is a CSA in every town." Scaling community supported agriculture across the UK. *J. Rural. Stud.* 94, 499–508. doi: 10.1016/j.jrurstud.2022.07.013
- Campbell, C. G., and Rampold, S. D. (2021). Urban agriculture: local government stakeholders' perspectives and informational needs. *Renew. Agric. Food Syst.* 36, 536–548. doi: 10.1017/S1742170521000156
- Chiffolleau, Y. (2009). From politics to co-operation: the dynamics of embeddedness in alternative food supply chains. *Sociol. Rural.* 49, 218–235. doi: 10.1111/j.1467-9523.2009.00491.x
- Crivits, M., De Krom, M. P. M. M., Block, T., and Dessein, J. (2018). Using policy discourses to open up the conceptual space of farm education: inspiration from a Belgian farm education network. *Environ. Educ. Res.* 24, 1320–1339. doi: 10.1080/13504622.2017.1301384
- Dickinson, E. (2013). The misdiagnosis: rethinking "nature-deficit disorder". *Environ. Commun.* 7, 315–335. doi: 10.1080/17524032.2013.802704
- Donoghue, D., Goodwin, H., Mays, A., Spencer, T., O'gorman, M., Jose, S., et al. (2014). Armed to farm: developing training programs for military veterans in agriculture. *J. Rural Soc. Sci.* 29, 82–93.
- East Multnomah Soil and Water Conservation District. (2023). Land conservation. Available online at: (<https://emswcd.org/land-conservation/>).
- El Bilali, H., and Probst, L. (2018). Towards an integrated analytical framework to map sustainability transitions in food systems. *AGROFOR* 2:15T. doi: 10.7251/AGRENG1702015T
- Gazull, L., Gautier, D., and Montagne, P. (2019). Household energy transition in Sahelian cities: an analysis of the failure of 30 years of energy policies in Bamako, Mali. *Energy Policy* 129, 1080–1089. doi: 10.1016/j.enpol.2019.03.017
- Geels, F. W., and Schot, J. (2007). Typology of sociotechnical transition pathways. *Res. Policy* 36, 399–417. doi: 10.1016/j.respol.2007.01.003
- Gernert, M., Bilali, H. E., and Strassner, C. (2018). Grassroots initiatives as sustainability transition pioneers: implications and lessons for urban food systems. *Urban Sci.* 2:23. doi: 10.3390/urbansci2010023
- Girip, M., Mărăcine, D., and Dracea, L. (2020). Environmental impact of conventional agriculture. *Ovidius Univ. Ann. Econom. Sci. Ser.* 20, 372–381.
- Gram-Hanssen, K. (2011). Understanding change and continuity in residential energy consumption. *J. Consum. Cult.* 11, 61–78. doi: 10.1177/1469540510391725
- Hargreaves, T., Longhurst, N., and Seyfang, G. (2013). Up, down, round and round: connecting regimes and practices in innovation for sustainability. *Environ. Plan. A* 45, 402–420. doi: 10.1068/a45124
- Harvest Pierce County. (2023). Pierce Conservation. Available online at: (<https://piercedd.org/190/Urban-Agriculture>).

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Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fsufs.2025.1501877/full#supplementary-material>

- Hinrichs, C. (2014). Transitions to sustainability: a change in thinking about food systems change? *Agric. Human Values* 31, 143–155. doi: 10.1007/s10460-014-9479-5
- Ingram, J. (2011). A food systems approach to researching food security and its interactions with global environmental change. *Food Secur.* 3, 417–431. doi: 10.1007/s12571-011-0149-9
- Kanger, L., and Schot, J. (2016). User-made immobilities: a transitions perspective. *Mobilities* 11, 598–613. doi: 10.1080/17450101.2016.1211827
- Keller, M., Sahakian, M., and Hirt, L. F. (2022). Connecting the multi-level-perspective and social practice approach for sustainable transitions. *Environ. Innov. Soc. Trans.* 44, 14–28. doi: 10.1016/j.eist.2022.05.004
- Klitkou, A., Bolwig, S., Hansen, T., and Wessberg, N. (2015). The role of lock-in mechanisms in transition processes: the case of energy for road transport. *Environ. Innov. Soc. Trans.* 16, 22–37. doi: 10.1016/j.eist.2015.07.005
- Lachman, D. A. (2013). A survey and review of approaches to study transitions. *Energy Policy* 58, 269–276. doi: 10.1016/j.enpol.2013.03.013
- Lane, J. M., and Davis, B. A. (2022). Food, physical activity, and health deserts in Alabama: the spatial link between healthy eating, exercise, and socioeconomic factors. *GeoJournal* 87, 1–21. doi: 10.1007/s10708-021-10568-2
- Le Velly, R., and Dufeu, I. (2016). Alternative food networks as "market agencements": exploring their multiple hybridities. *J. Rural. Stud.* 43, 173–182. doi: 10.1016/j.jrurstud.2015.11.015
- López-García, D., Cruz-Maceín, J. L., and DiPaula, M. (2024). Agri vs. food? Perceptions of local policymakers on agro-food policies from a multilevel approach. *Front. Sustain. Food Syst.* 8:1399746. doi: 10.3389/fsufs.2024.1399746
- Mendes, W., Balmer, K., Kaethler, T., and Rhoads, A. (2008). Using land inventories to plan for urban agriculture: experiences from Portland and Vancouver. *J. Am. Plan. Assoc.* 74, 435–449. doi: 10.1080/01944360802354923
- Mert-Cakal, T., and Miele, M. (2020). "Workable utopias" for social change through inclusion and empowerment? Community supported agriculture (CSA) in Wales as social innovation. *Agric. Hum. Values* 37, 1241–1260. doi: 10.1007/s10460-020-10141-6
- Mok, H.-F., Williamson, V. G., Grove, J. R., Burry, K., Barker, S. F., and Hamilton, A. J. (2014). Strawberry fields forever? Urban agriculture in developed countries: a review. *Agron. Sustain. Dev.* 34, 21–43. doi: 10.1007/s13593-013-0156-7
- Næss, P., and Vogel, N. (2012). Sustainable urban development and the multi-level transition perspective. *Environ. Innov. Soc. Trans.* 4, 36–50. doi: 10.1016/j.eist.2012.07.001
- National Land Cover Database. (2023). Data. Available online at: (<https://www.mrlc.gov/data?%5B0%5D=category%3ALand%20Cover&%5B1%5D=category%3ALand%20cover&%5B2%5D=region%3ANorth%20america>).
- Northwest Agriculture Business Center. (2023). Bringing the farm to market. Available online at: (<https://www.agbizcenter.org>).
- Olabisi, L. S., Elegbede, O., and Raven, M. (2020). Insights for farmer training programs from system dynamics: a case study from northern Michigan. *Adv. Agri. Dev.* 1, 1–11. doi: 10.37433/aad.v1i2.33

- Pierce County. (2023a). "Sustainability 2030: Pierce County's greenhouse gas reduction plan." Available online at: (<https://www.piercecountywa.gov/2058/Sustainability-2030>).
- Pierce County. (2023b). "Pierce County median home Price." Available online at: (<https://internal.open.piercecountywa.gov/stories/s/Median-Home-Price/kprt-him3/>).
- Saul, D., Newman, S., DePHELPS, C., and Liao, F. (2022). Exploration of values and agency in place-based food systems. *J. Rural. Stud.* 89, 337–347. doi: 10.1016/j.jrurstud.2021.12.010
- Shove, E., and Walker, G. (2010). Governing transitions in the sustainability of everyday life. *Res. Policy* 39, 471–476. doi: 10.1016/j.respol.2010.01.019
- Siegner, A., Sowerwine, J., and Acey, C. (2018). Does urban agriculture improve food security? Examining the Nexus of food access and distribution of urban produced foods in the United States: a systematic review. *Sustain. For.* 10:2988. doi: 10.3390/su10092988
- Turnheim, B., and Sovacool, B. K. (2020). Exploring the role of failure in socio-technical transitions research. *Environ. Innov. Soc. Transit.* 37, 267–289. doi: 10.1016/j.eist.2020.09.005
- United States Census Bureau. (2023). Measuring America's people, places, and economy. Available online at: (<https://www.census.gov/quickfacts/piercecountywashington>).
- United States Department of Agriculture. (2023). Urban agriculture and innovative production. Available online at: (<https://ww2.usda.gov/topics/urban>).
- Vaarst, M., Escudero, A. G., Chappell, M. J., Brinkley, C., Nijbroek, R., Arraes, N. A. M., et al. (2018). Exploring the concept of agroecological food systems in a city-region context. *Agroecol. Sustain. Food Syst.* 42, 686–711. doi: 10.1080/21683565.2017.1365321
- van Poeck, K., and Östman, L. (2021). Learning to find a way out of non-sustainable systems. *Environ. Innov. Soc. Trans.* 39, 155–172. doi: 10.1016/j.eist.2021.04.001
- Wittenberg, J., Gernert, M., El Bilali, H., and Strassner, C. (2022). Towards sustainable urban food systems: potentials, impacts and challenges of grassroots initiatives in the Foodshed of muenster, Germany. *Sustainability* 14:13595. doi: 10.3390/su142013595
- Yin, R. K. (2003). Case study research: Design and methods. Thousand Oaks: Sage Publications.
- Zoll, F., Specht, K., Opitz, I., Siebert, R., Piorr, A., and Zasada, I. (2018). Individual choice or collective action? Exploring consumer motives for participating in alternative food networks. *Int. J. Consum. Stud.* 42, 101–110. doi: 10.1111/ijcs.12405