Sustainable Transitions in Food Systems: A Case Study of Pierce County WA

A Thesis

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By

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Abstract

Alternative food networks (AFNs) have emerged as a response to negative health and environmental outcomes of our current, conventional food system. This study aims to better understand what factors lead to sustainable transitions by looking at an urban agriculture training program, Farm Foundations (FF), which is located in Pierce County WA. This paper uses a combination of the multi-level perspective (MLP) framework and social practice theory (SPT) as a framework of analysis to best capture the multi-scalar dynamics of food systems. We took a case study approach to identify the horizontal and vertical pathways necessary for sustainable transitions to occur. We found that while FF is effective at changing collective practices and narratives among its graduates, the potential for large scale regime change is due to FF's limited capacity to enact vertical pressure at higher social or governmental levels. This paper reinforces the need for both horizonal and vertical pathways of change to be activated in order to have a successful sustainable transition.

Key words: sustainable transitions, alternative food networks, urban agriculture, multi-level perspective, social practice theory, Pierce County.

1. Introduction

Alternative food networks (AFNs) have emerged in response to the negative human health and climate change impacts caused by our modern food system (Girip et al. 2020 and Lane and Davis 2022). Many AFNs originally developed as grassroots initiatives, where groups of people devise and implement solutions that challenge mainstream food systems. Urban agriculture (UA) is widely considered a form of AFN that addresses the production and supply chain aspects of food systems. UA is the "the cultivation, processing, and distribution of agricultural products in urban and suburban areas" (United States Department of Agriculture 2023) and is practiced in a multitude of ways, from community gardens to small acre farms, to dispersed farms. UA initiatives have been growing in popularity over the past two decades. These initiatives have been credited with improving nutrition, community food security, climate change mitigation, community building, and enhancing sense of place for individuals (Mendes et al. 2008; Siegner et al. 2018; Zoll et al. 2017). Given these social and environmental benefits, many cities in the US have adopted new zoning codes and sustainability plans that increase the

land available for UA (Horst et al. 2021). In addition to concrete health benefits to people who participate in UA programs, UA programs also offer an avenue for cities to label themselves as "green," thus increasing their popularity and attracting more people and business (Horst et al. 2021).

UA programs hold potential to increase the likelihood of sustainable transitions, which is increasingly necessary as climate change affects all aspects of society. Sustainable transitions focus on transitions that center "clean" and "green" technologies and practices (Hinrichs 2014; Keller et al. 2022) and examines the ways in which societies can change current systems, such as those related to food, energy, or transportation to be more sustainable. Despite the high level of interest in UA to foster sustainable transitions, multiple challenges exist for cities interested in adopting and scaling up UA initiatives. UA initiatives remain hyper-localized and not able to expand to the extent necessary to impact and compete with the conventional food system on a broadly.

Non-profits have experimented with UA training programs as a way to increase the profile of UA and increase the likelihood of uptake of UA practices. However, little is known about whether these programs can be successful and the barriers they face. Our study aims to fill this gap by examining an UA training program in Washington, USA—Farm Foundations—and analyzing the factors that affect the extent to which UA can contribute to sustainable transitions In the remainder of the paper, we lay out our theoretical framework for analyzing urban agriculture, share the context and relevance of our case study, explain our methods, then delve into our results and discussion section – examining how our results add to our understanding of UA and sustainable transitions.

2. Theoretical Framework

As aforementioned, AFNs, and urban agriculture in particular, have high potential to foster sustainable transitions. Two frameworks, the multi-level perspective (MLP) and social practice theory (SPT), have been widely adopted to analyze and better understand sustainable transitions. While these frameworks have typically been applied to the energy and transportation sectors (Keller at al., 2022), adopting these two frameworks to understand different pathways of change in the agriculture sector allows us to understand the social, political, and economic drivers that affect the extent to which sustainable transitions can occur.

2.1 The Multi-level Perspective

The MLP focuses on larger scale societal systems, stratifying society into three levels of analysis: sociotechnical landscapes, sociotechnical regimes, and niches (Geels and Shot 2007). Food systems are integral to everyday life and reflect these three stratifications. The sociotechnical landscape refers to the greater context and exogenous factors that influence regime and niche actors, such as macro-economics, cultural patterns, and environmental factors (Geels and Schot 2007; Hargreaves et al. 2013). Within the context of food systems, landscape factors could include economic recession or growth, pandemics, and climate change. Food system regimes include 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 buying based in supermarkets. Niches, the "lowest" level of analysis are the level at which radical novelties and innovations emerge; this is where grassroots innovations and alternative technologies are developed (Geels and Schot 2007). Niches are relatively protected from landscape and regime pressures, making them ideal for experimentation. Forms of experimentation within AFNs range from farmers markets to homesteading for personal consumption.

Within the MLP framework, regime shifts cannot occur without niche innovations, nor can they occur without interactions among the landscape, regime, and niche at a given time. (Geels and Schot 2007) Regime changes are often due to an introduction of new technologies. Given that AFNs and UA initiatives are emerging at a local level in various cities across the US and people are experimenting with different strategies to see what works within the larger context of the landscape and regime, using a MLP approach to identify the most effective ways to build pathways to sustainable transitions is appropriate and necessary.

2.2 Social Practice Theory

SPT refocuses attention on the social part of sociotechnical transitions. Within SPT, "innovations are shaped by social practices rather than the ways in which technical systems are implicated in defining and reproducing daily life" (Shove and Walker 2010, 471). In SPT, practices are the main variable used to analyze social transitions. Shove and Walker define practices as the "sites in which systems and behaviors interact" and argue that "social practices are not merely 'sites' of interaction but are, instead, ordering and orchestrating entities in their own right" (2010). The food system in general can be analyzed within this framework because the practices of growing and consuming food are interactions between systems and behaviors

that shape society. In the context of food systems, UA initiatives are ordering and orchestrating entities trying to enact change because they are actively pushing back against the mainstream food system by changing those same practices of growing and consuming food. There are two main types of practices within SPT, practices-as-entities (idealized and abstract forms) and practices-as-performances (grounded enactment of practices conducted amid everyday conditions) (Hargreaves et at. 2013). The food system is founded in practices-as-performances because people buy and consume food everyday multiple times a day, elements of the food system are deeply ingrained in our daily life. In SPT, practices are made up of elements that interact with one another. SPT is helpful to understand sustainable transitions because it illustrates how changes in practice develop from a combination of diffused elements that all together come together horizontally to transform some aspect of a society.

In SPT, transitions are investigated by looking at the links between the elements of a practice, analyzing if the links are made, maintained, or broken (Hargreaves et al. 2013). Within the context of food systems and UA, the key practices are related to the growing and consumption of food. Within the practice of growing food is how people choose to earn an income (their professional work). The elements that go into the practice of work include the intrinsic value people find in their work, the economic viability of their work, the knowledge to be successful in a given field of work. These three elements combine to create the conditions in which people choose where and how to earn an income. Within the practice of consuming food is the practice of shopping for and eating food. The elements that go into these practices include consumer image of what is fresh/healthy food, knowledge of how to cook/eat specific foods, willingness/ability to pay for specific foods, and personal preference. These are all interacting factors that can be targeted to change a practice. The elements that make up practices within SPT are based in individual choice and only lead to societal transitions when many people make the same changes due to increased social connections within groups that have shared goals.

2.3 Complementarity between frameworks

MLP and SPT are complementary frameworks; combining them allows one to analyze the unique characteristics of AFNs and UA in particular. The MLP examines change at the systems scale, while SPT investigates change at a more local level through looking at practices. The MLP is based in analyzing sociotechnical regime changes, where regime changes are defined as the shared cognitive routines in a community which explain development based in

technology (Geels and Schot 2007; Keller et al. 2022; Lachman 2013). This MLP understanding of sociotechnical regime is based more on the *-technical* part of the term, while SPT looks at the *socio-* part as the main driver for change. The MLP framework looks at how technology moves through vertical levels of society and leads to change in larger systems, while SPT looks at how practices based in narratives and collective action affect societal transitions. The MLP framework and SPT share a foundation in a "non-individualistic multi-actor approach in which agents are both restricted and enabled by habits and routines of social action" (Keller et al. 2022). Both frameworks acknowledge that actors and institutions, nested within a broader social context, interact, and affect one another in various ways that either lead to or impede transformations.

Even though both theories aim to understand how complex change occurs, the two frameworks were often framed as in opposition to one another, with scholars justifying which single framework should be used exclusively to explain a transition. It was not until 2013, when a group of researchers published a paper in which they discuss the value of combining the MLP and SPT to examine how vertical and horizontal pathways of change interact and affect one another (see Hargreaves et al.), that scholars began using these frameworks in tandem. Since 2013, the idea of combining the MLP and SPT has gained popularity, and as of February 2021 a review study found 51 papers and book chapters in which the MLP and SPT were explicitly articulated and co-developed (Keller et al. 2022). This combination framework has also been specifically applied to food systems given that food systems are affected by both technology and practices and must be changed via both top down and bottom-up pathways (Hinrichs 2014).

While there is increasingly more research conducted on food systems and how they can contribute to sustainable transition pathways, most of the current research is based out of Western Europe and is not focused on farm training programs specific to UA. The few papers specifically written about farm education and training programs have focused on existing farmers and veteran programs (Crivits et al. 2018; Donoghue et al. 2014). However, many UA projects in the US take place in a social and political context distinct from Europe in terms of values and policies; understanding more specifically how these programs can thrive and lead to widespread change in the food system is necessary.

The different foci of the MLP and SPT are both necessary to properly understand sustainable transitions, especially within food systems. Food systems change is reinforced both

vertically and horizontally, impacted equally by niche innovations and individual's practices. Understanding both the MLP and SPT is key to understanding how to transition to a more sustainable food system and UA is a relevant area that illustrates an ability for vertical and horizontal change. Using a combination of the MLP and SPT to analyze UA highlights points of intersection that further understanding of sustainable transitions.

3. Methods and Approach

3.1 Case Study

Pierce County (PC) is the second most populous county in Washington, home to 925,708 residents (United States Census Bureau 2023). Pierce County has both urban centers, such as Tacoma and Puyallup, and their surrounding peri-urban as well as rural and mountainous regions such as Mt. Rainer National Park and National Forest land. In March of 2021, PC passed Sustainability 2030, a sustainability plan with the goal "to reduce our greenhouse gas emissions (by 45% by 2030) and improve the health of Pierce County residents and our environment" (Pierce County a 2023). The plan is broken down into five focus areas; transportation, waste management, energy and built environment, carbon sequestration, and education and outreach (Pierce County a 2023). None of these focus areas specifically relate to food systems. Despite this lack of support, over 80 new community gardens have been formed within the county since 2008 (Harvest Pierce County 2023). This circumstance where a population is seemingly engaged in UA and creating AFNs despite a lack of formal support creates an interesting landscape in which to look at transformations. There are likely dynamics at play within the county which are inhibiting UA to expand into policy and government. This case study aims to examine how transformation does or does not occur in a specific area, in this case urban agriculture and the food system in Pierce County, by looking at one training program.

In 2012, the Pierce Conservation District adopted a preexisting program that was established in 2008: Harvest Pierce County (HPC). HPC's mission is to help everyone in Pierce County have access to healthy affordable fruits and vegetables. One of HPC's programs is Farm Foundations (FF), this is a free farm training program. There was a previous program that was in the same location and also run by HPC, but this program was fairly casual. It was more of a volunteer opportunity than a structured educational experience (personal interview HPC Director). Farm Foundations developed when one HPC employee saw that there was a need for more structured farm training and hosted a number of meetings with the community to see what

form they would like that training to be in (personal interview HPC Director). This type of community-based development to address a specific problem within the current food system is a quintessentially grassroots form of development (Gernert et al. 2018), however FF is also nested within an agency of local government, giving it unique stability and access to funding (personal interview HPC Director). The current FF program, launched in 2018, is what came out of those meetings, a direct response to a perceived problem in the existing food system. FF 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 HPC 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. (Future Harvest, Rogue Farm Corps, and Rodale Institute). Since the program started in 2018, four cohorts and 78 people have completed the training (no new cohort in 2021 due to COVID-19 pandemic). In alignment with FF's first goal, the program aims to have participants from groups that have traditionally been excluded from agriculture in the US; people of color, LGBTQIA+ folks, and women. In the most recent cohort, 88% of participants personally identified as belonging to one of those groups.

3.2 Coding and Analysis

A case study approach was the most pertinent research method because the research question is contemporary and a deeper understanding of the context surrounding the phenomena is necessary for an in-depth understanding. (Yin 2014). Given that many issues related to AFNs and UA specifically are relatively unknown – such as long-term impacts and potential for expansion – semi-structured interviews were the most appropriate way to gather information about the program. In addition, first author conducted an extensive review of the documents pertaining to the program. The interviews took place in two rounds. In the first round, first author

reached out to all 78 individuals who have completed the FF program since its start in 2018. We had a ~20% response rate, 15 graduates agreed to participate in the research. The goal of this round of interviews was to understand where FF graduates are now and the visions they hold for the future of UA in PC. To best allow for interviewees to speak to their areas of expertise and experience in UA, first author conducted semi- structured interviews (Leavy 2020; Yin 2014). First author also interviewed the director of HPC in order to understand the program from an organizational and mission perspective. Each interview lasted approximately 30 minutes. First author used the Voice Memo app to record each one, and Otter.ai to transcribe them. First author went through the interview data in order to identify initiatives and projects relating to UA that FF graduates have started or become involved with over the duration of the program (or after the conclusion of the program). These projects were analyzed as niche developments or innovations. First author looked at each innovation individually, and within the context of the current regime and landscape to better understand the impact that FF is having within PC and to draw conclusions about the efficacy of UA training programs for sustainable transitions.

After gathering this interview data, the first author began to follow the theoretical propositions strategy (Yin 2014), extensively reading the academic literature related to transition studies and identifying the theoretical framework she intended to use for analysis. The first author began her second round of interviews to triangulate my data (Yin 2014). She wanted to capture the multi-scalar nature of food systems, so reached out to all seven members of both the County Council and the Planning Commission. The County Council is the highest governing body in PC and the Planning Commission is the group that makes recommendations to the County Council regarding zoning and land use. The first author was able to interview two members from each governing body. The questions in these interviews were structured in order to understand decisions related to zoning and land use at the county level. The first author wrote down their answers to these targeted questions and these interviews also lasted 30 minutes. She also collected county-wide data regarding housing prices and AFNs in order to triangulate and understand more completely the PC context regarding UA.

4. Results and Discussion

Results show that FF closely mirrors the pathways of change laid out by SPT and reflected in grassroot movements. Respondents overwhelmingly reported change in individual practices and reflected on how their narratives around sustainable food has changed as a result of participation

in the program. However, potential for large scale regime change is inhibited because FF has limited capacity to exert vertical pressure at higher social or governmental levels. Even though FF has all the components to be poised for change the larger food system, it still does not have the vertical power to lead to change. In the sections below, we discuss the specific pathways of sustainable transitions FF activates and the extent to which these pathways can lead to a successful sustainable transition.

4.1 Focusing on fostering and supporting niche innovations

Despite inevitable voluntary response bias, the overwhelming majority (11 out of 15) of interviewees are involved in a viable form of UA (see Chart 1). The data illustrates that within the niche of UA in PC people are developing a variety of innovations. These innovations encompass a range of initiatives including starting their own farm, working on a farm, homesteading their own land, and starting a nonprofit that redistributes food. These innovations also represent a change in over 50% of respondents' source of income, which reflects a change in practice, something that the SPT framework claims is important for grassroots initiatives to scall up and widespread change to occur.

Results also strongly suggest that FF participation does lead to niche developments and change in practices. FF teaches the hard skills necessary for graduates to begin developing and working full time in UA projects. "[I] started working on an organic farm in Tacoma, continuing to build up skills" (respondent 12). Participants leave the program with the knowledge to go into PC and develop UA on both a personal scale and as an income-producing enterprise, "[I] homestead my own property - growing enough food to support me and my husband 9 months out of the year" (respondent 5). This type of development within the UA niche reinforces the existing literature, that says within one niche many different innovations develop simultaneously. 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). Some scholars argue that initial failures at the niche level are necessary for future success and large-scale impact of that same innovation (Turnheim et al. 2020). Results show that even if there is failure, and the niche innovation is not adopted more broadly, niche developments that occur on the scale of a single individual experimenting with a new way to grow, distribute, or learn about food should still be cultivated. They have the potential to be adopted more widely at a later time if the regime and landscape factors have shifted to be more open to new innovations, for example, if structural barriers have

been removed. In addition, our case study on FF suggests that innovations within the UA niche, such as community supported agriculture (CSA), have the potential to take hold at a higher level, "I ended up making farming my full-time income a year earlier. And now I have a 60 person CSA" (respondent 9). This respondent was the only graduate I spoke with who has successfully made urban farming their full-time income. While the presence of CSAs is rapidly growing (Martinez et al. 2010), having more CSAs in PC could exert pressure on the regime if they were able gain a market share over the conventional food system.

While these results strongly suggest that participation in FF does lead to increased participation in, and development of UA initiatives within PC, these innovations at the niche level are unable to make the "leap" and exert change on the sociotechnical regime. Although FF has explicit goals to create the next generation of farmers, there are still very few successful farmers coming out of the program. Part of the story is simply that some FF participants complete the program and realize farming is not what they want to do full-time "when it came to [farm business] aspects such as logistics, math, spreadsheets I was like oh god I hate Excel, this is not something I could do on my own" (respondent 1), but many more cited structural barriers that make it hard to start a successful farm business.

4.2 Overcoming structural barriers that hinder regime change

One of the most commonly cited barriers to farming (4 responded this way) was accessing affordable farmland within PC, "And it [farming] is just economically unrealistic with the price of property, and I don't want to move from Pierce County" (respondent 14). Interview responses from county-level officials reinforce that this barrier is structural and due to factors at the county level, where farmland preservation and UA is not a policy priority. Landscape factors in PC, specifically rapid development leading to an increased need for housing, and housing prices increasing 156% since 2010 (Pierce County b 2023) indicate that protecting farmland is not a priority. County officials expressed that while constituents do not like the loss of farmland, "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), "it's not like Detroit where land is returning to farmland" (personal interview County Councilperson). Rather, thousands of acres of agricultural land have been lost in recent decades to housing and commercial development (Gray et al. 2013 and Pierce County c 2023) (See Map 1 for a more detailed breakdown of land use). This sentiment from

county officials illustrates a structural barrier. PC is not prioritizing preserving farmland or making it available. This means that qualified and interested individuals, such as FF graduates, are unable to pursue UA careers in PC.

These structural barriers at the county level contribute to the creation of a dynamically stable regime, where changes to the system are difficult and barriers are significant. A dynamically stable regime is able to successfully reproduce itself, making it difficult for niche innovations that would drastically change the food system to enter the sector (Geels and Schot 2007). A dynamically stable regime that is able to maintain its dominance is not unique to the food system. Barriers to niches affecting the regime have been studied in other sectors of sustainable transition as well. In energy transitions, for example, the relatively low price of fossil fuels keeps the regime stable, and in transportation transitions automobile-centric infrastructure keeps the regime stable (Gazull et al. 2019; Kanger and Schot 2016). In order for UA innovations to be adopted by the regime and change the existing food system, programs such as FF need to make addressing this barrier, cost and availability of farmland, a priority. Once some of these barriers are removed, then the many new projects developing within the UA niche will have the chance to integrate into the larger food system.

Another barrier to full-time careers in UA that FF graduates frequently cited (5 respondents), was the difficulty in making full time work in UA economically sustainable, “the reality of farming, it's hard. Really hard to make a living at” (respondent 14) “farmers get paid minimum wage, and do not get overtime until we have worked 60 hours instead of 40” (respondent 8). This issue of economic viability of UA is complicated and made difficult by regime policies as well as societal values and cultural norms (Naess and Vogel 2012). These policies and values are reflected in agricultural infrastructure and supply chains that are designed for the current food system as well as individuals’ willingness to pay for alternatives. For more people to make UA their income producing work, this economic barrier needs to be addressed but change in this area is slow-moving and not something that FF (as a farm training program) is specifically working on.

Currently there are initiatives protecting farmland and ensuring it is available to interested farmers through farmland easement projects, programs for purchasing threatened farmland (East Multnomah soil and water conservation district 2023), and other organizations focused on improving the economic vitality of agriculture (Northwest Business Agriculture

Center 2022). While these programs and organizations do support the development of UA, they are constrained by existing policies at the county level. FF graduates have not been able to exert vertical change at the degree necessary to change county level policies. However, they are poised to radically change the food system if we can remove these structural barriers.

4.3 Cultivating shared narratives to foster collective action

The results strongly suggest that participation in FF leads to a change in narratives and affects images of food, impacting the practices of shopping and food preparation. This could be indicative of a grassroots pathway of change. Based in a belief that widespread change in narrative at one level leads to vertical change in the future, based in collective action against the dominant system in question (Gernert et al. 2018). 10 of the 15 interviewees noted that FF impacted their decisions in food purchasing and cooking to include more vegetables and organic foods, "[FF] made me more conscious of what our family eats, not just what we grow but from the grocery store" (respondent 7). This change in consumer behavior is unexpected because the goals of FF are explicitly aimed at changing the food system in PC by targeting production. However, the results suggest that FF impacts these elements, "I am all organic now. And I really pay attention to what we get and what we bring in" (respondent 5).

Although people choosing to prioritize buying and eating vegetables and organic foods, is a positive change, leading to individuals being healthier, the power in this result lies not in its direct ability to change the current system but in what it represents. The fact that 75% of interviewees all noted the same change in practice reflects that this community has strong horizontal ties where ideas are spread and reinforced. Strong community ties are evident in the data, all but one participant highlighted the important aspect of community to their experience during and after FF, "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) (Graph 2).

This suggests that the horizontal connections that FF fosters are a vital benefit for most participants. Practitioners 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 followers and momentum to have vertical disruption as well (Gram-Hansen 2011; Keller et al. 2022; Shove and Walker 2010). While FF has shown itself to be successful in changing consumer practices across 75% of respondents, this change remains

confined to a hyper-local context and does not yet have the ability to penetrate into the larger structures holding up the conventional food system. The FF results suggest that these changes in practice are based simply in personal preferences and changing understandings of what is healthy, rather than being motivated by theories of collective action (Shove and Walker 2010). People making the same changes is a good intermediate step, it lays the groundwork. However, to have a larger impact, FF graduates need to connect their motivations under the specific goal of pressuring the existing food system. If these strong community ties and lines of communication could be harnessed within an understanding of sustainability transitions and the need for vertical pressure, then maybe there could be real change.

4.4 Exert vertical pressure through partnership with other institutions of local government.

Successful sustainable transitions need both horizonal and vertical pathways of change (Diagram 1). While FF is has shown its ability to drive horizontal change, it struggles to enact change within the country beyond the behavior of its graduates. FF is, however, situated in such a way that the program has the potential to exert vertical pressure on other governmental agencies within PC. Despite FF's grassroots formulation, it is a part of the Pierce Conservation District. This streamlines the process of FF partnering with other governmental bodies within PC for funding as well as working together on projects. An example of these partnerships is a pilot program between HPC and the City of Tacoma that placed one farmer and FF graduate on an empty city lot. Burgeoning relationships such as this, between FF and more powerful agencies within PC, can and should be developed in order for FF's influence to spread within PC. The country officials I spoke with were only vaguely aware of the program and its goals, "I read the [website] description but do not think I fully understood the program until this interview" (personal interview County Planning Commissioner). In order for FF to drive a sustainable transition it needs to be more widely known, and take advantage of its position within local government, even if that means moving farther from its grassroots formulation.

Our results show that participation in FF leads to the development of new innovations within the UA niche, cultivates strong community ties that lead to shared ideas and narratives regarding food, and influence consumer behavior. FF needs to embrace hybridity in order to cultivate vertical pathways of change (Le Velly and Dufeu 2016). Programs such as the one motioned above show that local government within PC is willing to partnering with HPC to further UA initiatives. This is an example of a hybrid model wherein a small urban farm was

made possible by the City of Tacoma working with HPC and an FF graduate to make the land available and the farmer is now supported by the community "I definitely feel really supported by the other farmers in the area, and other small farmers and I see farmers supporting each other" (respondent 7). One farmer successfully farming an empty city plot is by no means a fully developed sustainable transition, however, it shows the potential for FF to utilize their unique position within the Pierce County Conservation district to partner with other local governmental agencies in order to further its goals. While hybridity and working within the system is necessary to develop vertical pathways of, it is not a final solution, and must be treated as an intermediary step only.

5. Final Recommendations and Conclusions

The case study of FF reinforces the idea that the key to sustainable transitions is having a balance between cultivating community buy-in and pressuring both governmental and non-governmental actors in order to activate both horizontal and vertical pathways of change. Many grassroots initiatives are better equipped to develop strong horizontal rather than vertical pathways of change. However, strong partnerships with institutions within the regime can be one way to cultivate vertical pathways and ensure that their ideas and values are being brought to systems and institutions at a higher social or governmental level. As we mentioned earlier, this is a hybrid model of driving change. Contrary to some scholars, we do not believe that a hybrid model should be conceptualized as a sustainable transition. Hybridity can be a helpful step in order to allow niche innovations to impact the greater system. However, overvaluing hybridity can allow burgeoning AFNs to stall and remain in this hybrid state where narratives and individual practices are affected, but there is no widespread systematic change due to the foundational structures being left unchanged.

Removing the structural barriers that keep the current regime dominant is key to allowing the changes in individual practice and niche innovations to affect the larger food system. Our results reinforce other research related to AFNs. One study in Wales found that AFNs were successful at the hyper-local level but faced structural barriers in scaling up related to land availability and the low financial reward of farming (Mert-Cakal and Miele 2020). While removing these barriers needs to be a priority at the county level, it is not something that AFNs on their own can achieve. Until these barriers are addressed, it is still vital that niche innovations and changes in practice continue. More people experimenting in the UA niche would be one way

to pressure the county to prioritize preserving and making farmland available. In turn, this could drive societal changes related to the value of farming that would make UA a more economically sustainable work choice.

Scale is another factor to take into consideration, the type of pressure needed to exert change at the micro vs. macro level is different. A key benefit to small scale AFNs is the strong community and develops. Scaling programs up to have a macro impact could threaten those very connections. While this study highlights the need and ways for AFNs to expand, it is important to acknowledge that this expansion should perhaps be limited to the county level. AFNs do, to an extent, need to develop separately within their local context in order to maintain true alternativeness and community ties. With the idea of change at a particular scale in mind, this study serves as a reminder that seemingly small changes or innovations at the niche level should be celebrated. Even small changes can indicate larger systematic transitions towards a greener future.

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Declaration of Competing Interest

The author(s) declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Map, eefCharts, and Diagram

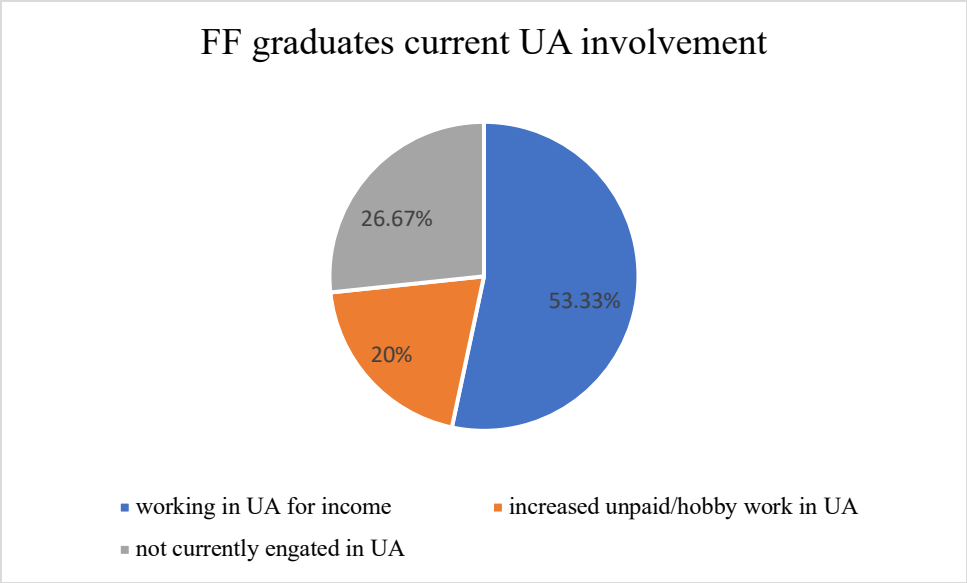


Chart 1: The results from FF graduates related to their current engagement in UA enterprises.

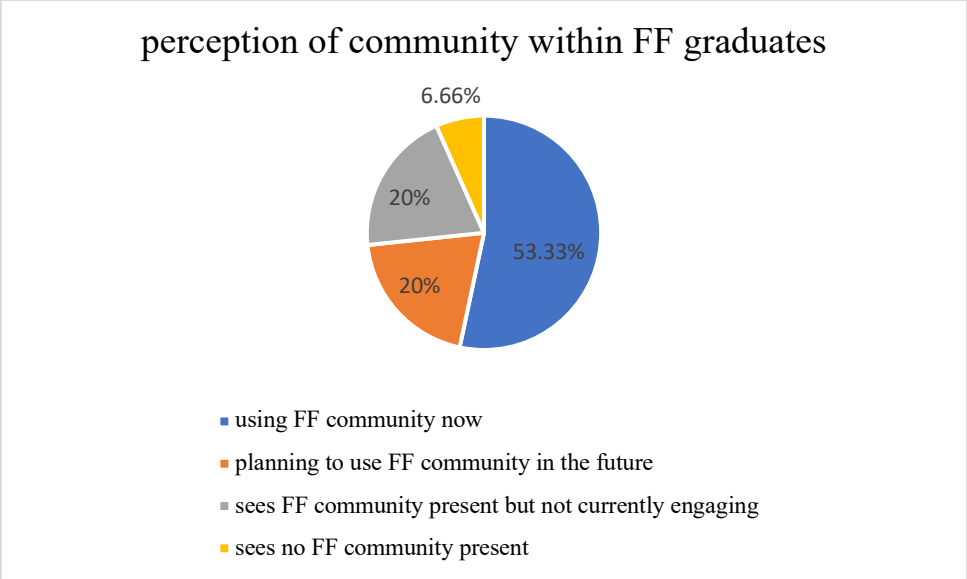


Chart 2: The results from FF graduates regarding their current engagement in the FF community.

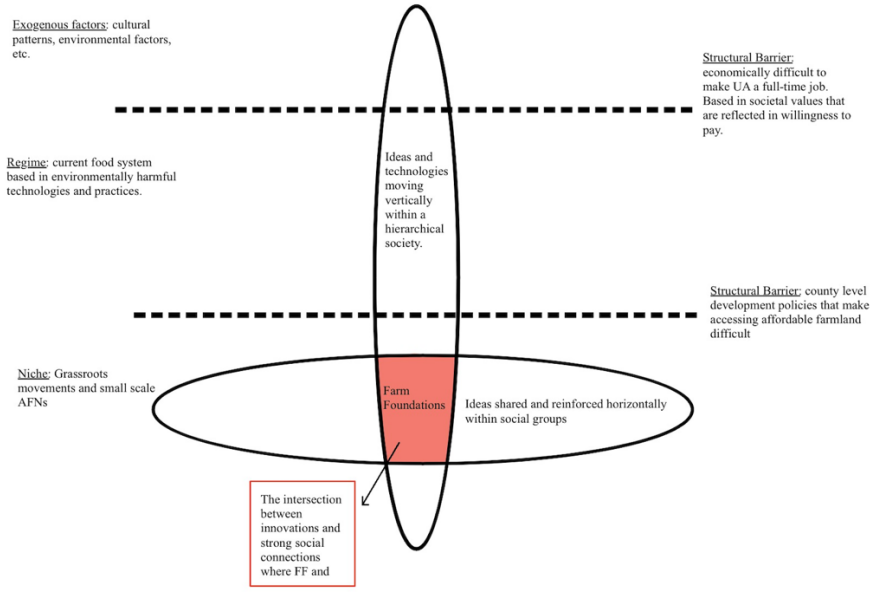
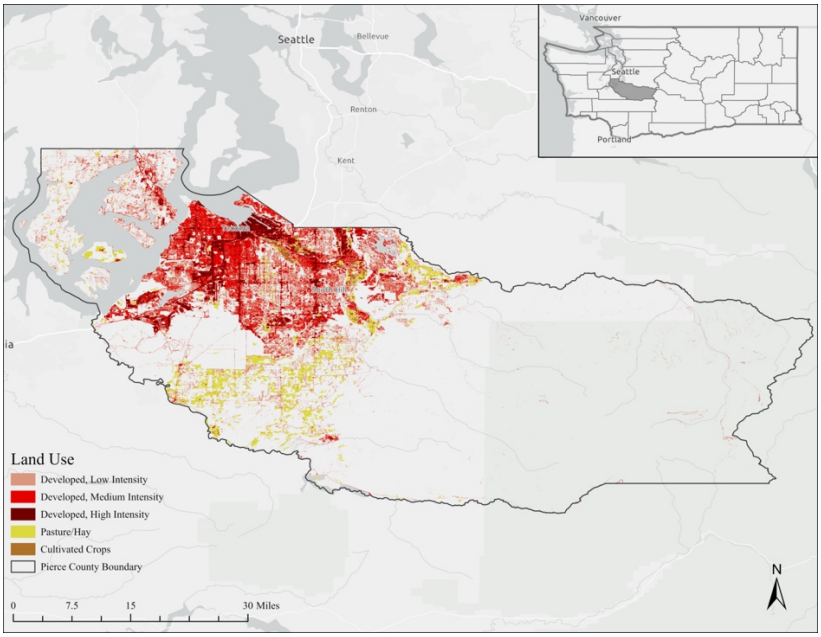


Diagram 1: A visual representation of the results within the framework of the MLP and SPT.



Map 1: Map of Pierce County showing the developed land and agricultural land. The eastern side of the map is blank as much of that area is federally owned land (National Land Cover Database 2023).

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