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By

Adam J Calo

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Committee in charge:

Professor Alastair Iles, Chair
Professor Kathryn De Master
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Abstract

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An aging domestic farmer population and depreciating rural sector provokes "good food" activists and policy makers alike to ask, "Who will farm?" One proposal is the aspirational narrative of beginning farmers, where a new generation eschews urban ambitions for a rural life based around environmental stewardship and food systems transformation. This ideal replicates a classic American imaginary: the self-made yeoman farmer as the foundation of society. In doing so, the beginning farmer movement demonstrates a critical blind spot: How will these new farmers get onto the land? Learning from farmers seeking to fulfill this new agrarian dream in California, this dissertation shows how the problem of land access threatens to dead-end the aspirations of the beginning farmer movement.

First, I examine how sociocultural and relational constraints impede land access for former immigrant farmworkers aspiring to independent farming in California's Central Coast region. Here, I argue that landlord–tenant farmer dynamics dominate and thus complicate beginning farmer narratives. Then, I analyze the flagship federal support program for beginning farmers, the Beginning Farmer and Rancher Development Program (BFRDP). Analysis of the BFRDP's funding history and discourse reveals a "knowledge deficit" based program focused on the technical rather than the structural aspects of beginning farming. This is contrasted with qualitative analysis of beginning farmer experiences in California's Central Coast region. The discrepancies between the farmer experiences and the national structure of the BFRDP program ultimately reveal a policy mismatch between the needs of beginning farmers and the programs intended to support them. Finally, searching for methods to re-envision the standard beginning farmer narratives, I explore how web-mapping tools may attend to the entrenched problems of land access. Land access problems are found to be inherently spatial, opening the possibility of mapping interventions. I describe the development of the Farmland Monitoring Project (FMP), a web-mapping framework that interrogates multiple elements of the land access barrier. The reflection-in-practice of the FMP helps explore the juncture between critical GIS and beginning farmer land access dilemmas.

In summary, I argue that the antiquated yeoman myth limits the transformative potential of beginning farmer aspirations. I offer suggestions for how to escape such a narrow narrative construction. In principle, without structural attention to land redistribution and access, the ideal of the new farmer will remain a niche phenomenon.

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DEDICATION

This work is dedicated to the dream of a dignified agricultural life.

CHAPTER 1 – INTRODUCTION

> Let me speak to you as a familiar, because of all the years I've cherished members of your tribe. […] I remember the uniqueness of every intern, WWOOFer, and summer weed-puller who has spent a season or two on our family's farm. Some preferred to work without shoes. Some were captivated by the science of soils, botany, and pest management. Some listened to their iPods, or meditated, or even sang as they hoed and weeded, while others found no music among the bean beetles. A few confessed to finding this work too hard, but many have gone on to manage other farmers or buy places of their own. In these exceptional souls I invest my hopes.
>
> — Barbara Kingsolver in *Letters to a Young Farmer: On Food, Farming, and Our Future* (Kingsolver 2017, 15)

WHO WILL FARM?

Aging farmer demographics and declining agricultural trends provoke policy makers, farmer advocacy groups, and food system scholars to ask, "Who will do the work of farming in the future?" After years of steady increase, the average age of farmers in the United States is now over 58 (USDA 2013). The United States Department of Agriculture (USDA) estimates that 370,000 farmers have departed from the farm sector between 1982 and 2012 (USDA 2014). Farmland also continues to disappear. As pressures intensify to use land for other "productive" uses like housing or infrastructure, farmland acreage nationwide has decreased (Ikerd 2013; Olson and Lyson 1999). In California alone, 1.4 million acres of farm and grazing land were lost between 1984 and 2014, a decrease of about 50,000 acres per year (State of California Department of Conservation 2015). Much of the remaining farmland, as aging farmers look to retirement buyouts, appears to be up for grabs. The most recent national census of farmland ownership reveals that 10% of farmland owners expect to dispose of their farm properties in the next five years (USDA NASS 2016).

The dominant government, non-profit, and farmer movement response to these trends is encapsulated within the goal of "creating new farmers[1]" to farm in the future (U.S. Committee on Agriculture, Nutrition, and Forestry 2010). It is a broad call-to-action that emanates across political and geographical domains (Figure 1). Without promoting the entry of new farmers into agriculture, the trends of disappearing farms and aging farmers point towards an irreversible, inevitable depreciation of agrarian life (Stone Barns Center for Food and Agriculture and Hodgkins 2017).

The worry over the devaluation of the plummeting numbers of farmers is not new. Wendell Berry's *Unsettling of America* is a well-known polemic about industrial agriculture's push toward the hollowing out of US rural livelihoods (Berry 1977). There, Berry laments at the loss of family farm agrarian culture spurred by the government's embrace of industrial agriculture and corporate consolidation. What is new in the 2010s is a decidedly entrepreneurial

[1] The then USDA Secretary Tom Vilsack famously urged the Senate Committee on Agriculture, Nutrition, and Forestry to use the Farm Bill to create 100,000 additional farmers. He added "Why not create a venue where new farmers can get help with business planning, with marketing and the other ingredients of successful entrepreneurship?"

rebranding of farming as youthful agrarianism, which simultaneously articulates with the expansion of direct-to-consumer and "good food" marketing. The growth of direct-to-consumer and "local food" purchasing—increasing in size of market share, but not value—suggests an opening window for new small-scale, alternative, sustainable production arrangements. The economic logic of the new farmer[2] programs emerging over the past decade contrasts with the traditional youth agricultural initiatives, like the 4-H program that support existing agricultural activities in rural spaces.

The modern form of beginning farmer programs emphasizes creating new interest in agricultural life amongst urban populations, through new farm marketing workshops, sustainable farming webinars, and intensive live-in farming incubator programs. Fledgling federal policy supports are now aimed at supporting new farmers. Notably, in the 2012 Farm Bill, Congress directed the USDA to establish the Beginning Farmer and Rancher Development Program (BFRDP) with an earmark of $100 million over 10 years. In the upcoming 2018 US Farm Bill reauthorization process currently underway, early indications are that Congress will continue to fund this program. This federal program, the largest of its kind, complements a constellation of private sector activity with the goal of creating new farming enterprises.

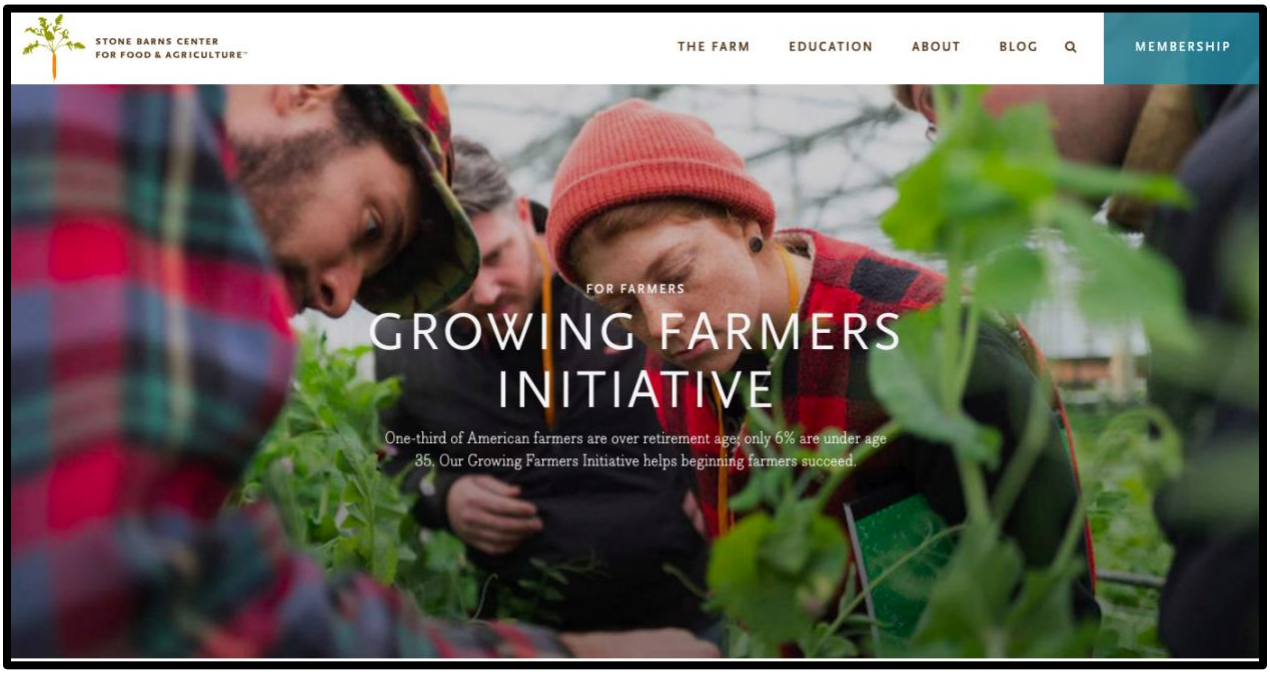

Figure 1 – The Stone Barns Center for Food and Agriculture website urges the need to "grow new farmers" to stem the demographic shift towards aging farmers (https://www.stonebarnscenter.org/engage/for-farmers/).

[2] Throughout this dissertation, I use a variety of terms to describe "beginning farmers", like new entrants, young farmers, new farmers, and aspiring farmers. The USDA defines beginning farmers as farm operators with 10 years or less experience. But definitional problems exist. Should a long-term conventional farmer who switches to a new mode of agriculture be considered a "beginning farmer?" What established farmers who immigrate from a different state or country looking to start anew? The term new entrants is quite a broad inclusive definition, but it may not be specific enough to match the visions placed on such individuals. Thus, my choice of terms, aware of their problematic nature, is mainly an outcome of editorial choice and flow of prose. Perhaps, by the end of the dissertation, after exploring the mythology of young or beginning farmers, readers can choose precisely what term to use.

Non-profit, research, and extension activities also promote new farmers. The Stone Barns Center for Food and Agriculture, noted for its connection to pioneering the farm-to-table restaurant Blue Hill, hosts an annual "Young Farmer's Conference" in the Hudson Valley in upstate New York. The New Entry Sustainable Farming Project at Tufts University, whose mission is "working with new farmers to build strong businesses, expertise in the field, and a resilient food system," focuses on the capacity building of new farmers. They produce guidebooks, hold frequent skills webinars, and direct new entrants to existing resources (Agudelo and Overton 2013). They also receive BFRDP funding. Farm incubators, like the University of California - Santa Cruz Center for Agroecology and Sustainable Food Systems, offer long-term farm apprenticeships. There, aspiring farmers spend six months living on the 30-acre campus farm, completing 1000 hours of practical and technical instruction. Overton (2014), identified 62 operational farm incubators in a national survey. Agricultural lobbying groups, like the National Sustainable Agricultural Coalition, produce policy briefs targeted at strengthening federal beginning farmer legislation.

Across this network of institutions and movements, the call to create new farmers emerges as a key aspirational food systems reform pathway (Figure 2). In this vision, young and beginning farmers will seize the transitioning lands from retiring farmers and bring with them an alternative system that is ecologically minded, open to new innovations, and politically engaged. The call is particularly appealing because this pathway circumvents the herculean challenges of re-working the entrenched structures and mechanisms of the industrial food system. A beginning farmer movement could, the idea goes, simply go out onto the land and create an alternative, more sustainable agriculture. This outcome occurs without having to reform the logics of the corporatized agricultural system. It is a pathway that avoids the "lock-ins" (Smith, Voß, and Grin 2010) that plague proposals to change the global agribusiness food regimes (Hinrichs 2014). It is a hopeful narrative that is repeated in academic articles, alternative agriculture conferences, USDA policy platforms, and in the popular press (Niewolny and Lillard 2010; Freedgood and Dempsey 2014; Jablonski et al. 2017; Bradbury, Von Tscharner Fleming, and Manalo 2012; Bittman 2015).

This narrative, however, risks becoming an uncritical trope. The blind spots of the beginning farmer aspiration result in dire consequences for the hopes of food system transformation, weakening the potential for beginning farmers to reproduce dignified and productive agricultural livelihoods. How this theory of food system change is conceptualized and its consequences for farmers and rural livelihoods demands critical examination.

This dissertation examines the collision between the aspirations of the beginning farmer movement and the challenges of 21st century agrarianism. I will explore the discourse of the movement's many actors and practitioners. I will represent lived experiences of beginning farmers in California as they attempt to gain a toehold on the food system. I will analyze federal policies aimed at "cultivating the next generation of farmers" and work together with farmers to develop a new tool for identifying available farmland.

Who are thought to be beginning farmers? What barriers do they face, and how do these barriers challenge farmers of different racial, ethnic, and class groups? How do beginning farmer imaginaries shape the systems designed to support them? To what extent is the concept of beginning farmers organized towards equity, social justice, and political action? I engage these questions with a variety of qualitative, quantitative, and participatory research methods with farmers and NGO actors in the California Central Coast growing region. Participant observation, focus groups and in-depth interviews with farmers searching to scale-up or begin their farm

operations reveals rich description of the challenges of being a new farmer. I use a comprehensive analysis of federal beginning farmer funding programs to understand the character and contradictions of such programs. Finally, I use a participatory design process with beginning farmers that leads to the development of alternative tools for farmers seeking land.

I contend that beginning farmer aspirations are grounded in a narrow imaginary of agrarian life. The dominant vision of beginning farmers will be shown as grounded in concepts of individual improvement, technical agricultural proficiency, and private property ownership. Attempting to fit the complex realities of farming in the US today into such boundaries ultimately limits the potential for beginning farmers to transform the food system. I will show how the problem of gaining equitable *land access* for beginning farmers confounds these narratives, and demands political intervention rather than entrepreneurial pluck. The experiences of beginning immigrant farmers throughout this dissertation reveals structural ethnocentrism amongst landlords and beginning farmer interventions. The result is a policy mismatch where publicly funded beginning farmer programs, narrowly aimed at technical capacity building, merely benefits the elites of the beginning farmer landscape. Finally, I will demonstrate how geospatial interventions may intervene with regards to land access for beginning farmers, taking a step towards policy-relevant interventions.

Before the presenting the chapters that make up this dissertation, I will lay out a description of the dominant beginning farmer narrative and its blind spots. In doing so, I will reveal the key theoretical underpinnings of the research. I combine three disciplinary and theoretical traditions to more deeply understand the beginning farmer aspiration and its consequences: agricultural sociology; science studies and the politics of expertise; and critical GIS studies and participatory mapping. Finally, I will give a primer to the three research chapters that make up the dissertation.

THE BEGINNING FARMER ASPIRATION

Who are seen as beginning farmers? What kinds of activities are they supposed to do on their land? What are their motivations? Examining the prevailing beginning farmer discourse—through a sample of the many media, non-profit activities and imagery being propagated—reveals a narrow interpretation of the answers to these questions.

A group perhaps carrying the banner of beginning farmer aspirations is The Greenhorns, operating out of the Hudson and Champlain Valleys in upstate New York and now Maine. Their mission reads, "promote, support, and recruit young farmers in America" (Greenhorns 2018). The Greenhorns began with a feature-length documentary about the burgeoning beginning farmer movement. The group now publishes a variety of media, runs farm training workshops, and supports knowledge sharing among aspiring farmers. The group started the "Farm Hack" program, where young farmers share their agricultural innovations online, like a solar powered chicken plucker and a "moveable landworkers cabin" (Greenhorns 2017). In 2015, the Greenhorns delivered 6,400 pounds organic produce from Maine to Boston via a revolutionary era schooner. Its founder and board member, Severine von Tscharner Fleming, interviewed for a 2010 *Grist* article "Meet a Young Farmer Leading a Greenhorn 'Guerilla' Movement*"* commented:

> Jefferson knew. Washington knew. The new agrarian movement knows. […] We have the advantage of youth. Brave muscles, a fierce passion, and probably pretty savvy marketing

insights. We have the advantage of eager eaters, dilapidated (but standing!) barns, plus sophisticated e-networks to access seeds, nursery stock, rare livestock breeds, training opportunities, season extension technologies, etc. […] We have a country that needs us to step to the plate, swing that pick, and plant the future — now! (Hoffner 2010)

For the Greenhorns, the youthful beginning farmer movement is at once a return to the wisdom of an agrarian past, but also a high-speed embrace of the technically proficient and business savvy moment.

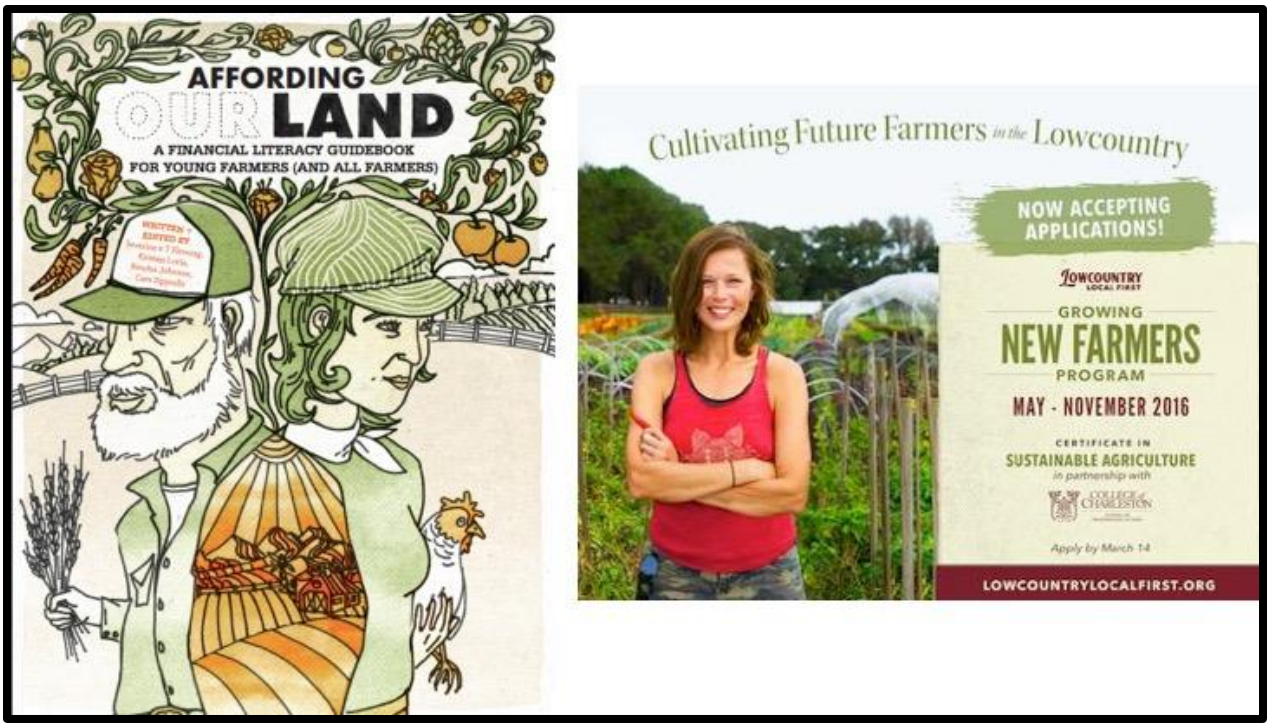

Figure 2 – A Greenhorns financial literacy guidebook and a flyer for a South Carolina beginning farmer certificate program.

Beginning farmer stories periodically crop up in major journalistic outlets. Typically profiling a few representative farmers, the articles dependably lay out a problem of aging farmers in America, then depict a bucolic story of young atypical farmers as the hope for the future. The first paragraph always starts with a wistful image of manual labor. In these narratives, we are instructed that beginning farming is very difficult, but beautiful work, designed to make a "difference" towards ecological and social goals (Figure 3).

In a *Washington Post* article in the business section entitled, "A growing number of young Americans are leaving desk jobs to farm," the trope of the beginning farmer unfolds:

> Liz Whitehurst dabbled in several careers before she ended up here, crating fistfuls of fresh-cut arugula in the early-November chill. The hours were better at her nonprofit jobs. So were the benefits. But two years ago, the 32-year-old Whitehurst — who graduated from a liberal arts college and grew up in the Chicago suburbs — abandoned Washington for this three-acre farm in Upper Marlboro, Md. She joined a growing movement of highly

> educated, ex-urban, first-time farmers who are capitalizing on booming consumer demand for local and sustainable foods and who, experts say, could have a broad impact on the food system. (Dewey 2017)

Here, the young, white heroine of the story, is identified by her college education and her choice to take up farming. The article briefly mentions that through a recent purchase of land she is a property owner and her residence, also owned, is also adjacent to the farm property.

Like the farmer profiled above, a *New York Times* article about young, second career farmers in Oregon focuses on the alternative politics of the new farmers in question:

> Now, Mr. Jones, 30, and his wife, Alicia, 27, are among an emerging group of people in their 20s and 30s who have chosen farming as a career. Many shun industrial, mechanized farming and list punk rock, Karl Marx and the food journalist Michael Pollan as their influences. The Joneses say they and their peers are succeeding because of Oregon's farmer-foodie culture, which demands grass-fed and pasture-raised meats. (Raftery 2011)

The article encloses the identity of beginning farmers to those motivated by politics, a fruitful rural existence, and bolstered by the foodie culture. The article then notes the Timmses, a pair of ex-engineers looking to become farmland owners:

> The Timmses had arrived at the Joneses' 106-acre farm the day before and were staying in a run-down Victorian house on the property. As they waited for their hosts, they sipped a microbrew in a kitchen overlooking wooded farmland. They said they were drawn by the state's beauty and its 120 farmers' markets.

Figure 3 – The Joneses, the couple featured in the New York times article: A New Generation of Farmers Emerges in Oregon (Rafferty 2011).

The author of a long-form piece in the environment-focused *Orion Magazine* titles their article "The New Farmers," probing at the motivations of the new cohort. Above all, the piece taps into the environmental dimension of beginning farmer motivations. The author, freelance journalist Lauren Markham, profiles a number of upstart farmers, some of whom she knew from her time at Middlebury College:

> Miller met her partner at a farm education program in Santa Cruz, and the two relocated to a plot of family land to try their hand at cultivating organic vegetables, fruits, and flowers. The two are part of a growing demographic of young, beginning farmers — farmers by choice, not by heritage — who have committed themselves to small-scale agriculture. Often with strong educational backgrounds and urban or suburban upbringings, these young people have chosen their vocation over many other options available to them, and, like Miller, they've done it largely out of a deep environmental ethic. (Markham 2014)

Finally, Kristin Kimball, an urban journalist who decided to take up the work of farming in upstate New York, chronicles her experience in *The Dirty Life: a memoir of farming, food, and love*. The narrative of city dweller turned (temporary) rural laborer, describing its challenges and charms, is now part of the beginning farmer aspiration. This device is put forth by heroes of the good food movement like in Pollan's *Omnivores Dilemma* and Kingsolver's *Animal Vegetable Miracle.* Kimball, describing her first experience on the farm in an NPR interview said, of farm work "When I started doing the work, I was shocked at how viscerally I responded … I think that in some way, human beings are in some way hard-wired to be agrarians." Kimball's comments are notable because of how clearly she puts forth her vision of the "appropriate" values behind the effort to re-populate rural America.

> Farming is our vital connection to the earth. If you believe that is important, hold this place here in rural America. Be the yeoman; provide your family and your community with that one thing we all share in common, three times a day—Food. If you are not there yet, begin. If you are doing it, then be brave, find your scale, the scale that is right for you. (Kimball 2011)

These depictions are examples of a particular impression of what it means to be a new farmer that dominates media coverage, policy-making, and the beginning farmer movement writ large. They frequently tell a story of an individual who is motivated by environmental change, someone who forgoes an urban life for rural activity, someone who is self-made and well-educated, someone who lives on the farm which they own. The heroes and heroines of these farmer narratives embrace farming as a social change mechanism. With a focus on alterity towards the industrial agriculture system, they aim to create self-sufficient foodsheds that do not rely on mechanization, synthetic inputs, or long-distance trade. They are characterized as carrying out innovative farming mechanisms, like the planting of perennials, intercropping, animal crop rotations. Importantly, the farmers profiled in these popular narratives are often young and white (Alkon and McCullen 2011).

THE YEOMAN MYTH

Such visions uncannily replicate an old American agrarian imaginary of the self-sufficient private property owner, the yeoman (Figure 4). The yeoman farmers were a group of white male landholders who were thought to be self-sufficient, egalitarian masters of their domain, and thus ideal participants in a democracy in the 18th century (Scholl 2008). The yeoman farmers are often associated with a Jeffersonian ideal of agriculture and civic life, where the rural landholders were seen as self-sufficient, and insulated from the urban mercantilism. Jefferson, speaking of the newly landed citizenry, famously wrote:

> Cultivators of the earth are the most valuable citizens. They are the most vigorous, the most independent[sic], the most virtuous, & they are tied to their country & wedded to its liberty & interests by the most lasting bonds. As long therefore as they can find employment in this line, I would not convert them into mariners, artisans or anything else. (McEwan 1991)

Jefferson managed a plantation, thus had no experience as an owner-operator. At the outset, then, the yeoman ideal was a *vision* of rural life, projected by urban and land-owning mentalities like Jefferson's.

Figure 4 – Early (18th century) and modern (21st century) young farmer imagery. The picture on the left is a recruitment brochure for an 1865 Grange Hall Association meeting. The image on the right is from a resource brochure from the National Young Farmers Coalition. (Strobridge & Co. Lith. 1873) (Shute 2011).

Nevertheless, the Yeoman ideal has proven to be a durable and powerful imaginary of American agrarianism (Mariola 2005). As evidenced by the beginning farmer story, it is an imaginary that has not faded. Built upon the visions of frontier heroism and westward expansion, one of the key features of the Yeoman rhetoric has been to transform agricultural challenges into narratives of individual triumph and sacrifice (Peterson 1990). This imagery persists, even though historical review of the yeoman farmer questions if there ever was such a group as they were characterized. Notably, the groups of agriculturalists referred to as American yeoman

farmers were identified as distinct from the landed gentry in feudal Europe because of their libertarian self-sufficiency, but have since been widely understood as completing their agricultural tasks with a broad deployment of slave or indentured labor (Scholl 2008). Furthermore, the individuals called the yeomen, never faced a land access barrier, as they were essentially gifted newly enclosed properties from the forced expulsion of Native Americans.

The power of this myth shapes the logics and policies designed to fulfill the ideal of the self-sufficient farmer. For example, the yeoman ideal is thought to be the rhetorical driving force behind such policies as the Homestead Act, where citizens were granted the right to claim up to 120 acres of public land at substantially subsidized rates. This Act, resulting in 420,000 square miles of new private landholdings, was central to the formation of smallholder private property regimes and individual home ownership (Neufville and Barton 1987). If the yeoman myth is indeed driving beginning farmer narratives and imaginaries, what are the consequences for farmer livelihoods and policies?

Embracing the yeoman farmer imaginary entrenches ideas of "correct" forms of agrarian life. This narrow vision has direct implications for the types of interventions aimed at reversing the aging US farmer population. Clearly, as seen in the examples of beginning farmer images, those who are seen as viable, even desirable, newcomers will match the yeoman myth closely: white, privileged, self-sacrificing, herculean. In the yeoman myth, new farmers simply need assistance to help them learn how to farm and how to set up farming businesses. Place the right type of hard working individual on the land and they will prosper.

BLIND SPOTS OF THE YEOMAN IDEAL: LAND, JUSTICE, AND LAND JUSTICE

An immediate concern is how the embrace of such antediluvian agrarian mythology attends to the challenges faced by beginning farmers at the bottom of a capitalist and industrialized food system. In particular, the dominant approach to "creating new beginning farmers" maintains two crucial blind spots: How will these new farmers actually get onto the land? And in parallel, what kinds of farmers have the ability, in practice, to benefit from the projected ownership transition of American farmland? The fundamental problem of gaining land access pervades beginning farmer life, particularly for farmers who do not fit the yeoman myth, and current policy and non-profit sector interventions struggle to address this issue.

As niche markets for organic, sustainable, and local foods in urban centers create an opening for new direct-to-consumer enterprise, farmers must increasingly chase land-use in peri urban and urban fringe environments, in order to reach these markets more readily. In an era of rapid suburbanization, even exurb-ization, these lands are also highly sought after for residential use, and increasingly threatened by other urban encroachments (Kathy Ruhf et al. 2003; Kathryn Ruhf 2013; Plaut 1980). The predictable result is a land access dilemma for new entrants: In order to access the markets of the direct-to-consumer and farm-to-table ideals, farmers must operate in spaces of maximum land value (Johnson 2008). The result is the rise of renting as a dominant land tenure model for beginning farmers (Calo 2016). In California, 48% of all farmland is rented out, increasingly by absentee or non-farming landlords. This rate of rented farmland increases to 60% when grazing lands are excluded (Bigelow, Borchers, and Hubbs 2016).

As tenants, farmers have less autonomy to make long-term management decisions on their land—decisions which have broad implications for farmer incomes, environmental sustainability, and social responsibility (Calo and De Master 2016; Reganold et al. 2011). The

realities of the land access dilemma run at odds with the owner-operator ideal associated with a yeoman mythology. While the imagery and discourse of beginning farmers imagines Jeffersonian small-scale landowners, tenant farming, and the dynamics associated with being a low-income renter, dominate. Even when a new farmer is successfully able to acquire title to the land, it often requires a substantial line of credit. This long-term mortgage burden (essentially the bank owning the land) also limits the autonomy of land-owning farmers (Williams and Holt-Giménez 2017).

The informal, socially-mediated dynamic of farmland renting highlights racialized power dynamics in the food system. The last USDA census measures that 97% of all agricultural land is owned by someone who identifies as white. As land access is increasingly mediated by landlord-tenant interactions, the social and cultural capital required to secure tenure favor white, educated, and second career or "hobby" farmers. Socially disadvantaged farmers of color, facing structural discrimination, undergo additional barriers to entry. Being undocumented, for example, prohibits access to any direct federal beginning farmer supports.

Furthermore, while much scholarship on beginning farmers depicts the expected transfer of agricultural land to new ownership as an opportunity for food systems transformation (Agudelo and Overton 2013), there is no guarantee that land transfer will favor new entrants. In fact, trends of farmland consolidation (Heffernan, Hendrickson, and Gronski 1999; Howard 2016), financial investment in farmland (Fairbairn 2014), and the increasing rates of family trust instruments (Bigelow, Borchers, and Hubbs 2016), all indicate that a suite of powerful actors will out-compete new farmers in land acquisition. The land access dilemma and its consequences for beginning farmers threatens to dead-end the growth of the beginning farmer movement.

BRINGING ABOUT FOOD SYSTEMS CHANGE: THE PROCESS BLIND SPOT

A third blind spot in the beginning farmer imaginary is the attention to *what* the beginning farmer movement is and *should* be, does not always include *how* it should be manifested, or *who* should drive the decision-making. The tensions within the new farmer movement, and between sub-altern groups and government policy-making, attest to the necessity of recognizing a much more diverse variety of people as potential new farmers, rejecting the yeoman myth, and affirming their agency. This means a more critical eye to who is participating in and creating the beginning farmer movement. To explain this dynamic, I highlight a recent notable incident at a prestigious food system event: The 10th anniversary of the "Young Farmer's Conference" at The Stone Barns Center for Food and Agriculture in December 2017.

At the event in Pocantico Hills, NY, food system scholars, farmers, activists, celebrity chefs, food venture capitalists, and New England policy makers, gathered in upstate New York to contemplate the shaping of alternative food systems. Along with Ricardo Salvador, Mark Bittman – former New York Times columnist, cookbook author, and now lecturer at Columbia University – gave the keynote address to answer the question, "Where is the food movement going from here?" From a food scholar's perspective, Bittman's response showed an evolution of thought on transitions to sustainable agriculture. While Bittman began his journalistic career focused on taste and quality as a food system reform strategy (namely, "vote with your fork"), his contemporary response was decidedly political, reflecting his growing interest in social justice. His answer, in brief, was land reform. He said,

> Now we hear a great deal about ageing farmers and what we are going to do to keep people on the land in the US and so on and so forth, but to a large extent, it is a question of about how to get land into the hands of people who want to work on it. And I know that everyone in this room believes is that the people who want to work on it ought to be people who want to grow real food. […] So, the question then is how to make that transition. And the answer to that question is a dirty word or a dirty two words. And those dirty two words are "land reform". And no one discusses "land reform" because as soon as you discuss "land reform," you are a communist. But you are actually not a communist, you are a militant. You are a life-long activist. You are someone who wants to put land in the hands of people who deserve it and who will do right by it. And I can speak in shorthand here because we are among friends. And we really are among friends and comrades. Everyone knows what I'm talking about. But the question is "How are we going to get to a place where this land—and of course some of it is the best land in the world, best farmland in the world, held largely by descendants of white and still largely are white men, who were given it or took it in the 19th century—How are we going to get that land which has already been parceled into properties and which some of it has developed so that it can only be farmed by machine? How do we transition that land into the hands of y'all as we say, and other people who want to farm it? And the answer to that question is land reform.

Bittman thus presented a proposal for public policy reform. He addressed the structural origins of the land access barriers and acknowledged the historical dispossession of Native American lands and their disproportionately uneven distribution to white males. His proposal spoke of class differences and included a tone of Marxist political economy. His response described a shift from the current yeoman ideal of transforming the food system to a systemic change focusing on land transfer. However, the notably negative audience reaction to his ideas showed how the *process* of enacting these interventions also requires attention. Specifically, the process demands authentic notice of the power relations that prevail in agriculture broadly and in new farmer movement specifically. Nadine Nelson[3], an African-American chef, activist, and food entrepreneur asked:

> How do you hold yourself accountable to communities of color and vulnerable communities? […] How do you hold yourself accountable to the things you say that you aspire to change, especially in regard to people of color and with regard to people of color being at the table to have a voice in the future as our population changes?

Bittman, visibly frustrated, offered a dismissive reply. The following exchange took place:

> Bittman: Ok, well fair enough.
> Nelson: You aren't going to answer the question?
> Bittman: I don't know what the question was. I don't know what "holding accountable" means.

[3] The partial exchange was covered in Bloch, Sam. 2017. "Young Black Farmers to Mark Bittman: We Don't Need Your Land Reform." *New Food Economy*, December 7, 2017. https://newfoodeconomy.org/young-black-farmers-mark-bittman-land-reform/.

> Nelson: How are you going to create real change rather than just pontificating about it?
> Bittman: I don't think I pontificate and I swear I've spent my life trying to create real change. So, If I'm a failure at that I apologize, but I've done the best I can.

Bittman's proposal made several assumptions. He spoke in a conspiratorial fashion, using phrases like "I can speak shorthand because we are among friends" and the ubiquitous use of "we"[4]. Acting as the "expert", he dictated a solution for the beginning farmer movement. His remarks presumed to speak for all of the new farmers in the room, including those from underrepresented groups. His solution-making revealed the power that elite expert and policy-makers assert to determine the best courses of action, without heeding the changes in power relations required to implement such a proposal.

This elision invites a key critique of food system reformists who generally tend to avoid questions of racialized power relations. Leslie and White (2018), highlight this omission from those within the food systems change movement:

> [W]e need to move beyond the idea of inclusivity to address power asymmetries and interconnected structures of oppression. Doing so involves changing the rhetoric of diversity to the action of disrupting structural racism. This demands that white activists adopt a self-reflective, critical stance toward the impacts of their own whiteness and reasons for participating in the movement. As practitioners engage in the process of decolonization, racism must be tackled simultaneously with interlocking systems of oppression, such as patriarchy.

The audience member Nelson's question aligned neatly with Leslie and White's appeal to food movement actors. Claiming to seek food justice for socially disadvantaged groups is not the same as doing the work of "disrupting structural racism." While Bittman's recognition of past land dispossession, as well as his goal of redistribution and reparations, suggests that he is aware of injustice, this alone does not guarantee that the land access process he proposes will not simply entrench existing disparities. A race-blind land reform policy, for example, may simply serve to deepen white farmland ownership. Ongoing lawsuits against the USDA's Farm Service Agency have shown to favor white farmers through decades of its loan program (Cowan and Feder 2013). Without an equity lens, policies aimed at facilitating farmland access may result in elite capture (Putzel et al. 2015).

The Stone Barns experience is indicative of the convergence of the food systems and science and technology (S&T) literature. While *some* actors in the food movement are warming to long-standing calls of policy action, there is much work to be done on *how* these policy changes should be brought about (Garzo Montalvo 2015). Who will be the actors in this process of reform? How will the expert model of agricultural decision-making and its entrenched power relations be re-oriented? The lack of attention by policy makers, researchers, and many non-profit groups to the root causes of the land access dilemma also provides a way forward for

[4] Bittman later offered an apology via Twitter: "It's clear that I offended people at last night's gathering; I apologize for that. I realize my inability to effectively address the question of how I hold myself accountable to people of color justifiably made people angry and upset, and I regret how I (mis)handled that moment; my inadequacies were on full display." And "I regret especially that this was missed opportunity to say something meaningful to a mostly white audience about racism, because that's an important part of being accountable."

research, innovation, and action. By re-orienting the ideas underlying support for beginning farmers towards meeting the challenge of equitable land access, the beginning farmer movement can gain new relevance for all its potential constituencies.

DECONSTRUCTING EXPERTISE IN AGRICULTURE

A final piece of the beginning farmer challenge is the role of technical assistance, expertise, and knowledge, in empowering diverse people to become farmers within the context of powerful structural conditions. Bittman, taking the role of expert decision-maker, was confronted about how his proposals were to be actualized in a democratic fashion amidst a centuries-old legacy of structural racism in agriculture. Critics of the embedded power imbalances found in the expert decision-making regime argue that it is not enough for food system experts to focus on policy change: technical experts must also devolve their entrenched status of holding powerful authority to lay decision-makers in meaningful ways. And those lay people must be affirmed as makers and sharers of knowledge in their own right. They are experts too. The relationships between the public, experts, and policy makers broadly need to be re-imagined. As Jasanoff (2003) writes,

> The issue, in other words, is no longer whether the public should have a say in technical decisions, but how to promote more meaningful interaction among policy-makers, scientific experts, corporate producers, and the public. (Jasanoff 2003)

Jasanoff calls for re-orienting technical work towards ways of making interaction between the powerful and the powerless more equitable, epistemologically congruent, and ultimately "more meaningful." The approach is to salvage the meaning-making ability of science, while still understanding that the power of science itself is based on a set of social agreements that scientific knowledge is objective and authoritative (Latour and Woolgar 1986). In a realm of pervasive uncertainty and social concerns, such as those being faced in agricultural research and practice, science studies scholars argue, science itself must embrace a "post-normal" age (Funtowicz and Ravetz 1993). The previous ideological belief in objective science as means to uncover unimpeachable truths must give way to new methods of involvement, where a more diverse set of societal actors—not only scientists—practice extended peer review of new knowledge claims. It must also find ways to bridge scientific knowledge production and civic knowledge production.

A variety of distinct forms of scientific inquiry have emerged to address this call. Citizen science is research where "non-scientists" or "lay people" are invited to engage in some component of the research process (often data collection) (Bonney et al. 2009). Citizen science is often notable for its "crowdsourcing" character: a number of lay people are able to take on larger and more distributed data collection efforts than a single researcher (Sullivan et al. 2009). In turn, Participatory Action Research (PAR) stresses a deep collaborative research process, where communities and citizens are actively helping generate the initial themes and questions that a science research project should pursue (Fals Borda and Rahman 1991). In an agricultural setting, PAR is increasingly linked to the development of successful agroecological farming (Méndez et al. 2017).

These approaches aim to accomplish more meaningful interaction between S&T experts and publics, but their actual success in democratizing science is contested. Citizen science and

PAR can be co-opted by powerful institutional actors to meet their own goals, and they face strong barriers to normalization (Fortmann 2009). Roiling the field of citizen science are debates about achieving "legitimacy" within academic, peer review, and policy-maker networks. Because the methods of knowledge production stray from the expert domain, the results of such work can be disregarded as "junk science" or un-professional (Ottinger 2010). In agricultural learning, the lessons from participatory efforts compete with alternative practices from top-down agricultural extension actors (Kerr et al. 2007; Henke 2008).

Scholars have shown how the process of participation in participatory research can be contested, allowing for exploitative efforts by powerful institutional actors to claim participation is taking place, in order to move forward with policy change or development action (Leal 2007). Many citizen science efforts, for example, tend towards affirming the traditional STEM research model, by leveraging the "free" labor of citizen volunteers to pursue an agenda that researchers set, often targeting research questions in the biological sciences (Arnstein 1969; Bonney et al. 2016).

One way forward in this domain of contested science is to leverage the power and ubiquitous uptake of digital and spatial representations to "scale-up" and institutionalize mechanisms for democratized scientific learning communities (Haklay 2013; Haklay, Singleton, and Parker 2008; Wright, Duncan, and Lach 2009). In the case of agriculture, the history of government-subsidized knowledge delivery mechanisms of agriculture extension reveals how powerful visions of industrial agriculture have permeated the "science" of farming (Hightower 1972; Roling and Wagemakers 2000; Henke 2007; Warner 2007). Proponents of alternative agricultural pedagogy and learning communities offer a powerful counter proposal. Undoing the entrenched top-down knowledge delivery pathways in agriculture is a critical means with which to challenge the dominant agricultural system itself (Rosset et al. 2011; Holt-Giménez 2006). This is why agroecology is described not just as a suite of technical practices, but a praxis of bottom-up, participatory, experiential, peer-to-peer learning and also the sovereignty to make decisions (M. Altieri 1995; M. Altieri 2004; Iles and Montenegro de Wit 2015). Such laborious, power-aware, and deep attention to process is notably absent in beginning farmer narratives.

OVERVIEW OF THE DISSERTATION[5]

The yeoman myth has the effect of over-simplifying beginning farmer experiences, ultimately obscuring the root causes of beginning farmer challenges. Yet, because the myth dominates in the American imaginary, non-profit, academic, and public policy interventions attempt to fulfill a wistful agrarian dream. The result is a grand mismatch of intentions and consequences, where beginning farmer interventions fail to address entrenched structural barriers to entry, like land access and structural racism. For those who farm by choice, with the resources to support their second careers, the myth prevails. But for broad sections of farmers, a focus on pathways to land ownership and commodity agriculture bely alternative visions of agricultural production.

Just as agricultural sociology scholarship has warned of the ready embrace of "good food" interventions (DeLind 2010), it follows that the same critical lens should be applied to the existing beginning farmer approach as a theory of change. By interrogating this narrative, I hope

[5] I am following a "three paper model" for the dissertation. Chapters 2, 3, and 4 correspond to three stand-alone investigations into beginning farmer aspirations. Published versions of Chapters 2, and 3 can be found in (Calo & De Master 2016) and (Calo 2017). A published version of Chapter 4 is forthcoming.

to show how the dominant approaches to supporting new farmers are problematic, and even damaging, to the publicized goals of the movement. By exploring the lived experiences of new farmers trying to gain a toehold of agrarian life, I reveal the overlooked structural problems elided by dominant new farmer narratives. The yeoman myth renders invisible structural barriers like access to land and capital, racism, and policy. By making visible the hidden aspects of the challenge of new farming, I hope to show how this movement can be more inclusive, restorative, and thus more politically powerful and socially just.

If the yeoman myth is driving beginning farmer narratives and imaginaries, and intersecting with top-down agricultural extension models of knowledge-making/sharing, what are the consequences for farmer livelihoods and for actual recruitment of new farmers? This dissertation explores this overarching question.

For this inquiry, I describe lived experiences of new farmers in the California Central Coast. Situated in an agricultural valley, but proximate to booming coastal urban areas like Santa Cruz and the San Francisco Bay Area, the Central Coast is an ideal location to understand beginning farmer pathways. Many beginning farmer narratives are situated geographically in the Northeast, where parcel sizes are small, and industrial agriculture is slow to penetrate. California, by contrast, pits small scale and beginning farmers against the colossus of industrial agriculture and commodity production systems. Understanding the experiences of farmers in the midst of the industrial agricultural sector helps to quickly reveal the upstream and structural barriers to entry.

The following questions guide the approach to my research and correlate to the chapters of the dissertation:

(1) How do barriers to entry manifest across different racial, ethnic, and class beginning farmer constituencies? What can the experiences of immigrant farmers tell us about the challenges of being a new farmer that are usually hidden? Presenting narratives about beginning farming that challenges the yeoman myth is essential to crafting new farmer policies that can promote secure agricultural livelihoods.

In Chapter 2, I conduct an in-depth qualitative analysis on beginning farmers in the Central Coast. In this work, I use participant observation, focus groups, and in-depth interviews to inductively characterize beginning farmer challenges. This chapter identifies structural and social obstacles impeding successful transitions to proprietorship for participants (most of whom were formerly farmworkers) in a well-established California organic farm incubator program (Agriculture and Land-Based Training Association (ALBA)) in California's Salinas Valley. This work highlights the mechanizations of the land access dilemma, demonstrating the ways in which the search for suitable farmland is imbued with power relations between tenants and landlords. Analysis of this process reveals how the land access barrier for transitioning farmers is mediated through social, environmental, and political relationships. I suggest that to achieve the goal of securing new farmers on land, targeting these relationships is a leverage point for change. Conventional approaches to resolving land access challenges, like conservation easements, micro loans, and individual improvements neglect these power relationships in their approach.

(2) In what ways do the beginning farmer narratives and interventions align with the upstream barriers to entry? What types of activities are carried out by the flagship BFRDP? In what ways do federal beginning farmer policies exhibit a political or epistemological character? Here, themes of knowledge politics and knowledge production from science and technology studies help explain why a policy mismatch may persist.

In Chapter 3, I expand on the theme of barriers to entry to test if there is a policy mismatch between beginning farmer interventions and the needs farmers face. By analyzing eight years of grants from the BFRDP, I investigate how the program as a whole expresses a particular theory of change in the beginning farmer landscape; giving farmers more individual technical farming skill and business acumen will lead them to overcome the barriers they face. Specifically, I explore the extent to which this theory of change aligns with the USDA's stated goals to support new farmers? And, more pointedly, to what extent does this approach actually respond to the real world barriers that farmers endure? The result is the identification of a widespread "knowledge deficit" approach to resolving beginning farmer challenges. This model appears across beginning farmer interventions such as incubators, marketing workshops, business education, and apprenticeship programs. This approach, long studied in a variety of domains like education and public health, is grossly inadequate to resolve the structural barriers farmers face. In fact, this approach deepens disparity among farmers.

(3) What processes—particularly innovative technological interventions—can be leveraged to address the overlooked problems of the beginning farmer narrative? If the problem of land access, pervading all this work, is structural rather than technical, what forms of beginning farmer interventions can match the scale of the problem? Perhaps developments in critical GIS can begin to represent the problem of consolidated land ownership and tenant farming.

In Chapter 4, I describe the Farmland Monitoring Project (FMP), a suite of participatory mapping tools intended to give tenant farmers more power in land use negotiations. If access is predicated upon one's ability to appeal to authority, like a landlord or zoning commission, those concerned with the future of beginning farmers can work to develop interventions that work in this domain. Suitable interventions must break an authority's absolute power in determining land access or strengthen the ability of tenant farmers to make their appeals credible in the current system of powerful decision makers. To match the scale of private farmland ownership, I ask, "How can GIS tools be used to create stronger appeals to authority? How can participatory mapping tools explore the spatial and political aspects of the land access barrier?" Work from the field of Critical GIS can inform the design and implementation of such interventions. As part of this research, I engaged in technology research and development, building the FMP with the support of a team of UC Berkeley colleagues, beginning farmers, farms support organizations. Each decision about the tool was predicated by collaborative testing and feedback on the suite participatory mapping technologies employed. While early learning insights from the FMP engender caution as well as enthusiasm, it is an important case to explore how to contest other uses of spatial technologies in agriculture.

Each of these chapters provides evidence of how the yeoman myth operates in beginning farmer imaginaries, with potential material outcomes for actors in the food system. I conclude with a discussion about how each chapter paves the way toward new research and ultimately a proposal for alternative directions for the beginning farmer movement. I leverage the evidence of my dissertation to argue that land access could ground debates around what it means to be a new farmer. Yet, as Bittman's Stone Barns experience reveals, and Jasanoff warns, it is not enough to orient the movement conceptually without attention to the democratic and equitable process that maps a way forward. Research on land access issues must therefore reimagine how access claims are offered legitimacy and institutionalized. They must consider how structural racism limits an equitable decision-making process and deliverance of expertise. They must propose alternative mechanisms of research that are attuned to power dynamics. Above all, bold attention to land

access is a way of uncoiling the myth of the yeoman to open much more room for transformative change in agriculture.

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CHAPTER 2 – AFTER THE INCUBATOR: Factors Impeding Land Access along the Path from Farmworker to Proprietor[6]

Trends in declining US farm numbers, including a loss of 370,000 farmers between 1982 and 2012 (USDA NASS 2014), correspond with projections estimating as many as 400 million acres of farmland will transition out of current forms of production in the next 20 years (Ross 2014). Considerable agricultural analysis emphasizes the deleterious impacts of this trend for rural communities, economies, and the ecological land base (e.g. see Lyson et al. 2008; Parsons et al. 2010; Ruhf 2013). In an effort to address impacts associated with the shrinking US agricultural sector, the USDA has provided over $100 million in programmatic funding for Beginning Farmer and Rancher Development Programs (BFRDP), with close to 19 million available funds slated for 2016 (NIFA 2014, Brasch 2014). Farm incubators represent one specific set of beginning farmer initiatives supported by USDA BFRDP programs (Hamilton 2012), county extension offices, and a range of alternative agriculture initiatives and non-profits (Ewert 2012) all allied in efforts to reduce risks for beginning farmers and enhance their long-term viability. Hamilton (2012) suggests that USDA support for these programs "represent[s] and exciting opportunity to revitalize and re-energize the work of the USDA" (532).

Incubator initiatives typically provide targeted training in agricultural production practices and business and marketing skills, and they frequently also offer farmland leases at subsidized rates (e.g. Overton 2014; Agudelo 2013; Ewert 2012; Hamilton 2012). In 2010, Niewolny and Lillard suggested that a primary reason for the initial emergence of incubator initiatives was "because traditional forms of education are not addressing [beginning farmer] needs" (Niewolny and Lillard 2010, 71). Ruhf (2001) similarly identified a need for alternative forms of training to address barriers to entry for beginning farmers, noting that, "As much as many new farmers have passion and adequate skills for farming, insufficient economic return may be the biggest barrier of all" (3).

Incubator initiatives may also have particular contemporary salience in light of changing beginning farmer demographics—seen, for example, in increases of minority-operated farms, including a 21% surge in Hispanic-operated farms from 2007-2012 (USDA NASS 2014), as well as increases in the number of women farmers (USDA NASS 2012, see also Ewert 2012). Importantly, many incubator programs explicitly target diverse populations: immigrant farmworkers, refugees, former prisoners, and military veterans. For example, the National Farm Incubator Initiative conducted a survey of 65 incubator programs and found "over 50% aim[ed] to serve refugee and immigrant communities" (Agudelo et al. 2013, 14). In a 2013 national survey of 42 farm incubators, Overton (2014) similarly found that nearly 43% served refugees and immigrant farmers (65). Incubator programs may thus provide mentorship to help mitigate myriad vulnerabilities faced by immigrant farmworkers hoping to farm independently. As Ewert concluded in a 2012 comparative study of 3 US beginning farm incubators, "The real promise of incubator farm programs seems to be in helping new farmers make the transition from farmworker to farm operator" (Ewert 2012, 129).

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However, a variety of structural barriers can impede the efficacy of incubator initiatives, including farmland availability and consolidation (e.g. see Parsons et al. 2010; Howard 2016), land costs and startup capital requirements (Ahearn and Newton 2009; O'Donoghue et al. 2010), and farmland valuation patterns skewed toward highest use value rather than agricultural production (Guthman 2004a; Parsons et. al 2010). These structural constraints may present particular obstacles for beginning farmers with various existing social, cultural, or economic vulnerabilities. As Ruhf (2013) notes, "Within the beginning farmer demographic, socially disadvantaged, minority, women, immigrant, refugee, and veteran farmers have unique challenges in accessing land to farm" (p. 4; see also Parsons et al. 2010).

By creating a composite scale of 11 primary obstacles beginning farmers face, Overton's 2013 national survey analysis of farm incubators examined whether these programs were able to address specific "barriers to entry—access to land, capital, education, markets, and equipment" (Overton 2014, 17). Overton's findings indicate that in general, "farm incubators do address the common barriers to entry faced by new and beginning farmers" (Overton 2014, 71). Ewert's 2012 comparative case study analysis of three farm incubators similarly found that successful aspects of incubator programs included "access to knowledge and information; access to physical infrastructure; access to land; and support and camaraderie" (Ewert 2012, 129). However, Ewert's study also noted challenges within incubator programs that generally included "…organizational structure, farming itself, group dynamics, and poor physical infrastructure" (Ewert 2012, 133). Additionally, for one particular farm incubator in Rhode Island, land access emerged as a specific, primary obstacle for those aiming to transition from the incubator program to independent farm proprietorship (Ewert 2012).

Our case study analysis explores obstacles impeding successful transitions to proprietorship for participants (most who were former farmworkers) in a well-established California organic farm incubator program with the Agriculture and Land-Based Training Association (ALBA) in California's Salinas Valley. As one of the nation's oldest incubator and farmer education programs, ALBA distributes organic produce (particularly strawberries) throughout the Central Coast region. Through a targeted recruitment effort, ALBA recruits beginning farmers from immigrant and farm labor backgrounds. Thus, our investigation of proprietorship transitions for beginning farmers[7] represents the specific concerns of immigrant farmworker experiences. We observed numerous benefits for beginning farmers completing the ALBA program, include high quality organic production training, marketing channels, networking, and business support. However, as noted in the Rhode Island incubator case (Ewert 2012), we also found land access with secure tenure to be a key transitional impediment for beginning farmers. In this paper, we examine some key factors mediating that land access.

Typically, barriers to securing farmland for beginning farmers are framed as contextually influenced by larger trends, such as land prices and overall farm profitability. For example, the *Land for Good* initiative reports that "Rising land values, competition for good land, and declining farm profitability make it harder and harder for entering farmers to acquire land—either through purchase or rental."[8] As most beginning farmers do not inherit land (e.g. see

[7] Throughout this chapter, when we employ the term "beginning farmer," we reference the USDA definition of a beginning farmer as those farmers or ranchers who have "materially or substantially participated in the operation" of a farm or ranch for 10 consecutive years or less, as a sole operator or with others who have operated the farm or ranch for 10 years or less, who will.

[8] Land for Good, accessed November 27, 2015, http://newsite.landforgood.org/tl_files/v1/01%20-%20Holding%20Land/hl_principles_2.pdf

Ahearn and Newton 2009), costs of purchasing agricultural land are frequently cited as an obstacle to successful farming (Ewert 2012). Our case study analysis found that while land costs may prove an impediment to secure tenure, farmland access for beginning farmers aspiring to farm proprietorship proves far more multidimensional than simply the price of land, available acreage or capital, or a formal system of rights. Instead, complex social negotiations between actors in the food system also condition access for beginning farmers in this region. These negotiations include landlord-tenant relations, including lease arrangements, as well as sociocultural and relational barriers, including race relations.

We structure our analysis by beginning with a concise overview of some of the historical and contextual conditions faced by California farmworkers generally. We then further contextualize our discussion by examining how historic land arrangements and resource access patterns in California's Central Coast region have typically favored large-scale producers, creating conditions in which small-scale producers completing incubator programs are relegated to farming on marginal or residential land with insecure tenure. Next, we detail the methods of our qualitative study that include 33 in-depth interviews (including 26 with beginning farmers and seven with incubator/organizational staff), participant observation, and two focus groups. Drawing upon access theory as a theoretical frame, we then discuss our findings and analyze of the contours of farmland access.

WORKING THE LAND: CONTOURS OF CALIFORNIA FARM LABOR

Working California's large-scale commodity agricultural land holdings has always fallen to a low-wage, devalued, racialized (Walker 2001), labor force. In his essay "In the Strawberry Fields," Eric Schlosser cites historian Cletus E. Daniel, describing how California has historically sought what he termed "the search for a peasantry," and explaining that since the 1920's, "the vast majority of California's migrant workers have been Mexican immigrants, legal and illegal…Most of California's produce is harvested today exactly as it was in the days of the eighteenth-century mission fathers" (Schlosser 1995, 16). While farm labor organizing, grape and lettuce boycotts, and labor unions in the 1970s secured remarkably progressive victories for farmworkers—including a minimum wage for farmworkers, collective bargaining, and unemployment compensation—contemporary labor scholars recount myriad injustices immigrant farmworkers experience.

For example, as Brown and Getz (2011) detail, in spite of California's progressive labor reforms, "significant improvements in farmworkers' material conditions have failed to materialize and food insecurity and hunger remain widespread within farmworker communities" (Brown and Getz 2011, 123). They further cite the "striking evidence of farmworkers' devalued position [in] the decline in real wages over the past several decades" (Brown and Getz 2011, 125). Martin articulates the demographics of farmworker inequity, confirming a decrease in farmworker wages over time of over 50% since 1985 (Martin, in Schlosser 1995). Martin and Jackson-Smith (2013) also report that "Average wages for foreign-born crop workers are lower than those paid to US-born workers. Although some farmers have increased worker wages and improved working conditions in recent years to retain hired workers, most have not raised worker compensation" (Martin and Jackson-Smith 2013, 2).

Injustices faced by farmworkers extend beyond wage inequity and food insecurity to additional effects of agricultural practices on worker health. Harrison (2006, 2008, 2011) has detailed environmental health injustices regularly experienced by California farmworkers

through pesticide exposure, through "naturalizing regulatory neglect" and "normal" accidents (Harrison 206, 506; see also Perrow 1984). Similarly, in a participant action intervention study with California strawberry workers in the Salinas Valley, Salvatore et al. (2015) demonstrate how pesticide exposure extends to farmworkers' children, as farmers carry residues into the home. Holmes' detailed (2013) ethnographic account also delineates ways that racism and anti-immigration sentiments toward migrant farmworkers mediate their access to health care, in spite of farmworker conditions involving regular assaults to bodily health, such that the life expectancy of the average California farmworker is 49 years of age.

In spite of these trenchant and well-documented inequities, the story of farm labor injustice in California is far from uniform. Miriam Wells (1996), for example, has deftly traced the unique and textured history and uneven politics of production in the strawberry fields of California's Central Coast region. Wells' case shows how the decline in the Mexican bracero program in the mid-1960s, that had previously facilitated nearly unlimited wage laborers to California agriculture, catalyzed the reintroduction of the sharecropping system in this region, partially in response to labor shortages. This political shift precipitated a subsequent change in the labor landscape. Sharecropping embodied unique contradictions: it fostered a family-based system of social labor relations. Economically, sharecropping frequently engendered debt for vulnerable share tenants bound to the most labor-intensive form of produce production in California. Wells also shows how powerful families maintained the agricultural status quo in this region through social relations. Wells' explorations of the ways that family power dynamics and social relations influence subsequent farming arrangements demonstrate that the social and ecological landscape is far more complex than a purely economic analysis would suggest.

Similarly, what is particularly notable and relevant about Wells' finding to our case study analysis are the ways in which the dynamics surrounding agricultural labor relations and land access are conditioned primarily by a complex set of social negotiations, rather than a formal system of rights. We explore this theme further as we describe the historical context of land access in California, followed by a discussion of resource access theory, which will afford us a lens with which to empirically explore how these social negotiations influence farmland access in our particular case.

HISTORICAL CONTOURS OF CALIFORNIA FARMLAND ACCESS

Historically, access to farmland in California was mediated by access to capital. Unlike many other regions of the U.S. where yeoman farmers cultivated smaller land plots, farming in California never replicated the agrarian, Jeffersonian archetype (Guthman 2004b; Schlosser, 1995; Taylor and Vasey 1936). Rather, California agriculture began with large market-based operations on grand estates acquired from Spanish and Mexican holdings. These operations used industrial, mechanized techniques and, as described above, employed a devalued and racialized labor force (Walker 2001). Entering farming in California meant entering a large-scale capitalist enterprise.

The early capitalist nature of agriculture influenced land valuation, ensuring that agricultural land was valued by its maximum *potential* use value. These calculations were based upon the productivity of a preceding or neighboring industrialized system (Guthman 2004a, 2004b). Cycles of crop bonanzas or high value specialty crops, such as those seen with wheat (Schlosser 1995), wine grapes (Guthman 2004a, 2004b), sugar beets, or (most recently) leafy greens (Henke 2008), exacerbated this tendency. These land valuation dynamics typically favor

larger-scale producers, relegating even successful small-scale farmers to steeper hillsides, poorer soils, and regions ignored by industrial agriculture operations (Liebman, 1983). Small-scale farmers most frequently aim to secure a price premium based on niche markets emphasizing product quality, rather than competing with large-scale volume-driven neighbors. Nevertheless, when smaller-scale farmers secure farmland tenure at scales meeting their production needs and capacity, previous rounds of agricultural land valorization typically influence their land rents or mortgage costs. These factors frequently exclude new entry farmers with little access to startup capital (Beckett and Galt 2014).

Farmland access in California's Central Coast region was also historically influenced by ways in which the University of California Cooperative Extension helped facilitate the success of large commodity production systems. Henke (2008) shows how researching and promoting mechanization in this region served to strategically devalue the social power of labor union organizing. Henke describes how in an effort to shore up domestic sugar production sugar during WWII, the Spreckels sugar company and other grower associations enlisted the mutual support of the UC Cooperative extension to research and deploy mechanized beet thinning technologies. These ultimately rendered farm laborers and their unions redundant. For Henke, actions like these in the Salinas Valley represented a long social history of what he terms the "maintenance" of the agricultural system, in which powerful institutions and individuals exert their influence to uphold the prevailing production vision. As early as the 1940s, critics of the agricultural system in California advocated regulating land ownership patterns by breaking up large estates (MacWilliams 1939), but the pattern of large land holdings remained entrenched.

DEFINING ACCESS

Since the problem of land access for beginning farmers is frequently framed as a problem of land availability and financial means, solutions to this problem often begin with a focus on measuring and tracking metrics like startup costs associated with renting land, the acreage of farmland likely to change hands, and trends in average farmer age (Ahearn and Newton 2009; USDA 2013). Consequently, programs to address problems with farmland access focus on improving the economic viability of beginning farmers and/or increasing total land availability. For example, low interest farm loan initiatives and increased markets for beginning farmers attempt to effectively lower the prohibitive startup costs of beginning farming while land linking programs attempt to match previously unavailable parcels with prospective farmer tenants (Sureshwaran 2011; Ziegler 2000). Programs like farmland trusts and legal mechanisms such as agricultural easements can *simultaneously* lower the cost of land and increase the acreage of available farmland by providing forms of long term preservation while offering subsidized rent to particular applicants (Johnson 2008).

Yet recognizing how social relations condition land access, our study seeks to understand how a variety of actors (farmers, landlords, realtors, policies, and farmland) act together to provide access to some and restrict it for others. In their articulation of access theory, Ribot and Peluso (2003) define access as the *ability* to benefit from a natural resource stream, rather than being guaranteed use by a formal right. With respect to farmland access, the resource stream in question can be considered as the productive capacity of the land of which a formal structure of rights is designed to guarantee benefits. And yet, despite those rights, it is the actors in the food system who mediate access to those benefits through social and relational mechanisms of inclusion or exclusion, including knowledge, sociocultural identity, authority, markets,

technology, and social relationships. For example, the USDA's Farm Service Agency (FSA) offers beginning farmers crop insurance and low interest loans as a formal and rights based system of support to gain access to land. However, these supports tend to benefit those with particular sociocultural positions and/or familiarity with federal bureaucratic paperwork. Cowan (2013) demonstrates that established white male farmers receive the bulk of these supports, and a review of the demographic makeup of FSA disbursements reveals a relative absence of minority farmers.

Importantly, understanding access through this lens may reveal weaknesses of land access intervention programs solely emphasizing economic or entrepreneurial solutions, providing insight into novel innovations to address the social aspect of land access. This lens also allows us to focus empirically on the "range of powers—embodied in and exercised through various mechanisms, processes, and social relations—that affect people's ability to benefit from resources" (Ribot & Peluso 2003, 154). A focus on social mechanisms can also demonstrate, for example, how the wielding of legal authority can be linked farmland consolidation through systems of social exclusion, thereby continuing to devalue farm labor through predatory contract arrangements (Geisler 2015). In the following sections, we explain how we researched specific factors mediating farmland access for the farmers in our study. We then delineate our findings and conclude by discussing potential ways to address the obstacles faced by these new entry farmers.

APPLIED RESEARCH METHODS

Our case investigation primarily employed qualitative methods— including 33 in-depth semi-structured interviews (including 26 with beginning farmers and seven interviews with incubator/organizational staff members), extensive participant observation, and two focus groups— to explore challenges faced by beginning small-scale organic farmers in the Central Coast region. In collaboration with two regional community partners, ALBA and California FarmLink[9], we examined the complex barriers and opportunities farmers encounter as they transition from ALBA's incubator program to proprietorship. In the exploratory research phase, we conducted informal interviews with farmers and organizational leaders and held focus groups to collectively generate key research questions and themes. Particularities associated with land access emerged as a central barrier to entry for proprietorship.

We selected the interview participants through a purposive network sampling approach, following recommendations of organizational leaders and ALBA farmers. Our primary goal with our sampling technique was to interview a diverse range of beginning farmers who could provide insights regarding the transition from farm laborer to proprietor. We interviewed 19 farmers who were current incubator program participants farming at the ALBA site, as well as 7 farmers who had transitioned to farming independently off-site. Of the 26 farmers we interviewed, 21 were former immigrant farmworkers. Eight beginning farmers were women, while 18 were men; all farmers interviewed were under age 50 and had been farming for less than 10 years. In addition to farmer interviews, in an effort to glean the fullest picture possible of the beginning farmer experience, we also triangulated our sample by interviewing 7 staff members at ALBA and

[9] California FarmLink, a statewide nonprofit, links farmers and ranchers to land and resources to support their farming aims. FarmLink aggregates local land listings, engages in outreach with landowners, provides administrative assistance with agricultural leases, and offers microloans directly to entering farmers.

California FarmLink. Most farmer interviews (n=20) were conducted in Spanish by [the first author]; the remainder (n=6) was conducted in English. Interviews were translated by [the first author]. All interview requests were granted, and no one with whom we requested an interview declined to be interviewed.

Interviews took place at ALBA's office in Salinas or individual farm fields and were often conducted in between daily tasks such as packing strawberries or harvesting crops. Questions focused on individual farming history, farmer motivations and goals, the challenges and opportunities associated with transitioning from the incubator program, the process surrounding farmland identification, and farmer experiences of land tenure. Most interviews were audio recorded; when farmers did not wish to be recorded, we took detailed hand notes. We carefully coded and analyzed these interviews for key themes; our findings helped us understand how new entry growers in the Central Coast navigate the complex process of acquiring farmland.

In addition to the interviews, we conducted 2 focus groups. The first focus group was designed to co-define the research problem of farmland access with participants in ALBA and California FarmLink. The members present were the elected farmer liaisons between the incubator cohorts, beginning farmers, and ALBA staff and also included beginning farmers. The focus group process involved a group discussion to broadly define the major barriers to farming success. In the second focus group, the barriers identified in the previous session were presented with the goal of prioritizing their relative importance and then narrowed to a single research topic.

In addition to interviews and focus groups, we triangulated the data with ongoing participant observation to contextualize farmers' daily experiences. We shadowed farmers during daily operations such as hand weeding, sowing crops, filing paperwork, and scouting new land parcels to rent. We attended professional development meetings at ALBA's main office, California FarmLink presentations, and mixers with landowners and land seekers. We recorded detailed observations in a research journal; these observations helped inform the development of codes and themes for the interview analysis. Participant observation allowed us to foster on-going dialogues with research participants and glean in-depth, textured narratives from farmers.

As we integrated the coded themes and analyses from the interviews with participant observation findings, several primary findings emerged. First, we found farmers were highly motivated and wished to shape their livelihoods on their own terms. However, as mentioned previously, in addition to common land access impediments—suitable land availability and financial capacity—key sociocultural factors influence beginning farmers' ability to achieve autonomy. These include landowner and tenant farmer relationships and complex sociocultural relations. Below we detail some motivations and benefits beginning farmers participating in the ALBA incubator program experience, followed by a discussion of key barriers to proprietorship.

RESULTS

INCUBATING PROPRIETORSHIP: MOTIVATIONS & BENEFITS

As they aspired to transition from farm laborer to small-scale organic farm proprietor, a primary motivation for a majority of the farmers in our study was achieving autonomy in their work. This contrasts sharply with their previous work harvesting, packing, or weeding in various large-scale Central Coast commodity crop operations. In a typical conversation, one farmer described his interest in independent farming this way:

> I realized I could do the same kind of work on my own, making money, but with less stress. I could be making my own decisions, because a lot of the time you are doing your best and one person above you doesn't value you. And it's very frustrating when you're working hard and someone comes and says, 'No, you need to work harder'…

In addition to a desire for autonomy, some farmers in our study expressed a preference for organic production methods, to protect their health and emphasize quality. They contrasted this with their previous work in conventional farm operations. A strawberry grower in the incubator program explained,

> Actually, probably the conventional fruit is bigger…[but]…the quality is what people comment on ... I saw that the organic product without fertilizers and rapid growth could have a better taste … we can see that without chemical residues it's healthier. So apart from economic support those are the two things I want to leave for my family, that they have a good meal and can be healthier.

A common theme that emerged for many beginning farmers in our study was that farming independently also allows them to imagine a better life for their children and grandchildren, in contrast to difficulties they faced as immigrant farmworkers. As one farmer described,

> …[P]eople who don't know how an immigrant lives won't understand; like living in an apartment of two or three rooms, two or three families, where children live on top of one another and can't go outside...[like how]…I lived when I arrived in this country. So, I don't want that for my grandchildren…I want them to run, to have space, to run around outside in the fresh air, to play with dirt, and with rocks like I once did. I wish for them to have something to eat, to have an abundance of food…strawberries, watermelons, cantaloupes, tomatoes…so many things to eat. The biggest motive that I had [to become a farmer] was that if I had grandchildren, this is the way I wanted them to grow up.

The ALBA incubator program provides considerable support to aspiring beginning farmers, including: small-scale organic production training; a distribution service option to buy low product volumes; farm business development; and information on regulatory compliance and organic certification. Farmers can rent equipment from ALBA, and they often share resources like irrigation tubing and tractor attachments. Beyond these supports, ALBA owns 170 acres in Salinas and Watsonville and rents land to qualified applicants at subsidized rates. Farmers begin by renting low acreages (between 1-3 acres) at below market rates. Each year a farmer stays with the program s/he may add acreage; gradually s/he pays full market rent.

One farmer in his second year with the incubator program described the benefits of delivering produce orders directly to ALBA's onsite facility, without needing to secure his own marketing channels:

> …I don't know how to move my product out into the greater market. For me it's an advantage to have someone who helps to sell my product…thanks to ALBA I can be sure that my product is going to be sold, and I won't have to throw it out.

For many farmers in our study, the thought of leaving the supportive environment and subsidized land offered through ALBA is troubling. One farmer explained this widely held sentiment this way: "ALBA is good for me because they give me a good price for the land in addition to all of the support they provide. If I could, I would stay with ALBA forever. Outside of ALBA is a whole other world."

ALBA offers myriad tools to help beginning farmers succeed. They provide substantial agricultural training and offer farmers a safety net that allows them to innovate and experiment with their production models. However, it also appears that these supports insulate new farmers from structural barriers that exist outside of subsidized land and programmatic support. As the program director conceded "Our transition services are relatively undeveloped."

LAND ACCESS: BARRIERS TO PROPRIETORSHIP

An ALBA staff member articulated the farmland access problem succinctly during an early focus group. "The problem isn't in how to farm," he explained. Rather, finding land matching his productive vision and farming capacity represented the critical challenge. One farmer reaching the end of his tenure with ALBA's incubator program described a typical transition challenge for beginning farmers, explaining how finding suitable land represents a key barrier to independent farming:

> Well [it has been] really bad. I haven't been able to find anything. It's been about three years, and I haven't found anything that is satisfying, like the quality [at the incubator]. Yeah there are parcels around, but sometimes they don't have water, or they have other characteristics, like they are really far away, or they are not good for strawberries and that is what I want to put in.

Beginning farmers thus face tenuous transitions after completing ALBA's incubator program. ALBA encourages members to eventually vacate the subsidized land they rent to allow space for incoming participants. In these cases, producers without farmland access report the need to leave farming or seek alternative work, including returning to farm labor. According to ALBA's current executive director, as of 2013, 45 ALBA farmers have completed the incubator program and moved on from the subsidized farmland ALBA maintains. Of these, 12 continue to farm, 13 have ceased to farm, and 20 have lost contact with the organization. Initially, as ALBA maintained enough farmland to accommodate all incubator participants on an ongoing basis, some farmers continued cultivating ALBA plots after completing the program. Recently, however, most ALBA land is fully utilized, and the organization more strongly encourages farmers to move on after completing the program.

Beginning small-scale organic farmers transitioning away from the incubator to independent proprietorship may face challenges accessing land related to insufficient startup capital and equipment, and they may also struggle with finding an affordable parcel of adequate size that fits their growing practices or has adequate water for irrigation. Land rents for level agricultural land with good soils and adequate water availability range between $1200 and $2200 per acre in Monterey and Santa Cruz counties—cost prohibitive for most beginning farmers. In nearby San Benito County, land rents range from $500 to $1200 per acre, but farmers indicated that these plots frequently have tenuous water security. Those with significant financial capital

can invest in a well and irrigate with abandon, but small-scale new entry farmers must rely on the county water or put in their own well—a costly endeavor. In some cases, farmers may enter into a lease, invest in a particular crop plan, and then fall victim to county drought restrictions. This is particularly relevant for farmers who enter into leases on ranchette or other residential properties.

However, in addition to startup capital costs and available finding suitable land, in interviews with aspiring beginning farmers, we found that relational and sociocultural factors mediated and created barriers to land access in complex, nuanced ways. We now detail these specific elements and show how new entry small-scale organic growers must engage in complex relational and sociocultural negotiations to access farmland.

LANDOWNER—TENANT FARMER DYNAMICS

While many farmers we spoke with had concerns over land suitability—including water security, proximate access to markets, and soil quality—these concerns were strongly articulated with landlord-tenant farmer relational dynamics. These relational dynamics between landowners and farmland seekers in the Central Coast region help explain how land access generally, and agricultural leases specifically, are negotiated. As one farmer explained, "The ability to get into a piece of land is more than just knowing about it. It … has to do with the relationship with the landlord." Most small-scale new entry farmers in the region must engage in informal, semi-formal, or tenuous lease arrangements on residential properties. A landowner may reside on these properties or may intend to sell the land in the future, creating insecure tenure for new entry farmers. This fosters a dynamic in which farmers are tenants first and farm proprietors second.

The landlord-tenant relationship necessarily influences their production, financial, and operational investment planning. According to employees of California FarmLink, no standard agricultural lease agreement exists, especially for rural residential properties. The nature of the leases dictates agricultural production strategies. Tenant farmers must negotiate who will pay for water, assume responsibility in case of erosion, or bear the costs of repairing or improving a domestic well. Thus a primary aspect of FarmLink's consulting involves developing agricultural leases on a case-by-case basis. Without a formal lease, the tenant farmer faces considerable risks to their operation. Yet few farmers we interview possessed formal agricultural leases. A FarmLink employee revealed a case in which a group of tenant farmers were in conflict with their landlord:

> …Four growers in the room…only one spoke English and limited English. They were really excited that I could speak to them in their language and understand all of the ins and outs of their situation and that I could represent them in conversation with the landowners. For about 10 or 11 years they have been on a month-to-month lease…that shouldn't even be standing, but they just happened to be in this situation and didn't have the resources to negotiate.

The challenges associated with securing more stable leases or owning land affects long-term production strategies. As one farmer explained:

> …If I were an owner I would put in some raspberry, that takes three years to grow and then 6 years of harvest, but how am I going to invest in something over 10 years from now if the owner can kick me off in three years? I can't leave half my investment, that's for sure.

Similarly, complex landlord-tenant farmer negotiations surround capital improvements on rented farmland. On a site visit with a new entry farmer to a prospective 6-acre parcel, the soil quality, rental price, and proximity to markets and access roads were ideal. However, the irrigation infrastructure was underdeveloped. This farmer described how there would not be sufficient water pressure to irrigate the upper parts of the parcel. While the prospective tenant farmer and landowner discussed who might incur costs for improving the well, the negotiation was characterized by uncertainty. Without the landowner's assurance of shared risk, this new entry farmer hesitated to pursue the lease. Often, the tenant may be expected to incur the entire cost of a capital improvement, even though the added value of the property is largely transferred to the landowner. This was the case when a farmer decided to invest $20,000 into a new well for a rental property in San Benito County. He explained:

> The owner didn't want to help us [pay for a well], and that's one of those things where, if you decide to put it in you can't bring it with you when you leave. I mean, how are you going to take it out if it is however many feet under the ground?

Similarly, since many leases operate on ranchette properties, where the landowners envision benefitting from a future residential property value, long-term agricultural lease tenure is consistently insecure. One aspiring small-scale organic farmer lamented the problems associated with temporary leases, describing,

> I think it's what's possible right now. Think of who's moving to Hollister to own a house? It's a lot of people who are commuting up to the Bay...they want to be able to afford to buy a house, a larger house, maybe a little bit of land, and with farming, are you really going to be able to make enough money to buy at the price that's here? ... [F]or a small beginning farmer, unless you come from money and you can just come in and buy?

Thus, to successfully transition to proprietorship, beginning farmers must manage not only the complexities associated with farm operation but also navigate complex relationships with landowners to negotiate even insecure land tenure. Competition for suitable land that matches their growing practices also influences farmland access for small-scale farmers; social relations, too, mediate this. For example, participants described how available land is commonly offered in larger parcel sizes, between 50 and 150 acres. Farmers described how landowners prefer to lease single large parcels to one renter. As one farmer explained, “I’m thinking that I can’t get land with a large rancher, because they will want to rotate 100 acres, not five or six with a person like me.” Larger-scale organic companies employ staff dedicated to identifying land and negotiating contracts with landowners. Farmers and organizational leaders from ALBA and California FarmLink described how area landowners often favor the established successful business models of larger organic commodity growers, particularly since larger-scale growers can assuage landowner concerns by pointing to a history of responsible land use. Additionally, while most large-scale farming operations overlook smaller, more marginal properties, small-

scale beginning growers may nevertheless compete with larger organic commodity growers for those properties too, if they are organically certified.

Moreover, some interview participants described how some complex land deals never appear on any formal, visible public market. Instead, direct negotiations frequently take place between landowners, realtors, new buyers, and pre-identified tenants. As these negotiations occur in social spaces not usually frequented by beginning farmers, their access is limited, and a matter as simple as a language barrier or ethnic identity can impede access. This underscores what Ribot and Peluso (2003) describe—that social relations mediate access to resources, even when a system of formalized rules regarding land transactions exist.

Given the fierce competition for farmland, mediated by social relations, small-scale organic growers in California's Central Coast region therefore tend to farm in marginal conditions: on slopes, distant from markets, and on residential properties with absentee or live-in landowners. Finally, while farmers may pursue various strategies to improve the land suitability for their operations, these changes may or may not match landowner objectives. In one extreme case of this tension, for example, a beginning farmer began to make improvements to a rented residential parcel, only to be confronted with the landowner's objections:

> My employer told me about [a piece of land of potential interest] and gave me the lady's number, and I called her, and I met her and she agreed. But later on the very next year when she saw me, you know, putting up a tunnel for my transplants and other stuff and saw that I was planting strawberries. She freaked out on me and she said, you know, I think you are doing more than what I might – I don't want my place to – she was afraid about the water, the pump actually. She said I don't think I have enough water for you to be doing this, so I need to move out. I had just planted those strawberries and so she gave me a 30-day notice and that was my, you know, my 401(k) investment money.

In this particular instance, the types of improvements the farmer implemented were not fully explicated in the lease, which gave grounds for the landowner to revoke the farmer's tenancy. However, this example highlights how a landowner's vision of land use may easily conflict with a tenant farmer's agricultural production plan and foster insecure tenancy. Also, given the aforementioned complexity surrounding landowner-tenant lease negotiations, as well as sociocultural barriers, this reinforces the complex dynamics surrounding land access for beginning farmers in California's Central Coast region.

SOCIOCULTURAL OBSTACLES

In order to gain farmland access, farmers must first identify and assess suitable parcels. They must then negotiate leases with landowners and agree on capital investments. Finally, they must secure startup capital and equipment. The sociocultural identity of the aspiring beginning farmer mediates each of these steps.

Sociocultural identity was linked to the perceived credibility of beginning farmers. One farmer who rents land on a ranchette near Salinas noted that the most important characteristic of prospective farmland was securing a future lease where the owner does not live, to avoid constant scrutiny. During one interview a tenant farmer paused while passing the large ranch

house saying, “Look at this house that *el señor* has. They are doctors and they are always looking at what I’m doing or what I don’t do.” He continued,

> There are some owners that have the heart to rent to small-scale farmers, but there are very few people like that. One of the hardest problems is credibility. Cultural credibility. The large part of property owners are Anglos, *gringos*, and the majority of us that are looking for small parcels are Latinos. So, culturally we disagree sometimes. And if there isn’t anybody to intervene for you, it can be really hard.

This farmer’s perception that his cultural identity influences his credibility aligns with recent data from the USDA that indicating 92% of all agricultural land in California rented to individuals or partnerships is made up of white landowners (USDA NASS, 2014).

Another example illustrates the role of social position in finding and accessing farmland. When seeking assistance to identify properties to lease, some farmers work with realtors specializing in agricultural properties. Many aspiring beginning farmers who are former immigrant farmworkers, however, eschew realtor assistance. As one farmer explained,

> There are some [realtors] in Hollister, but it's never occurred to me to speak with them ... I went once, but it was for a house, not for farmland. Four or five years back it was OK for that, but now … They're asking for legal status…they are going to ask you for all of those things.

This farmer worried that he may need to demonstrate proof of legal status, in addition to financial stability. While realtors can ask for identity documents in order to assess the financial capabilities of the prospective lessor, it is illegal in California for realtors to screen prospective tenants for citizenship status (California Civil Code - CIV § 1940.3, 2008). Nevertheless, this prospective farmer felt that his citizenship status would be used against him in the establishment of his farming credibility. In this case, California civil code formally guarantees resources access to a resource. But as Ribot and Peluso (2003) describe, informal social relations between the realtor and aspiring farmer influence actual resource use. The farmer’s social position further complicates this dynamic.

Acquiring loans and operational financing also represents a barrier to some new entry farmers who perceive their sociocultural position will influence the loan process. For example, farmers seeking local or individual loans or lines of credit may assume they will be automatically discounted as reliable loan recipients, even if rules of the loan application process officially guarantee fair, legally protected access. As one farmer explained,

> [L]ook, the first need is a line of credit. No one believes in us, absolutely nobody, not one bank, nor the agriculture companies because they say ‘prove to me that you know what you're doing'. Okay, how am I going to prove it to you? It's like saying … say you are an architect but I never give you a building project, and then I ask to see proof that you are talented? … How are you going to do it? You have to have an opportunity to demonstrate. And with us there isn't one...

Another farmer explained a similar barrier: “I was working with [the NRCS] one time, to get support for a greenhouse, but I couldn’t get the funds because they want a valid social security number.”

The experiences of the few beginning farmers we interviewed who do not come from an immigrant farmworker background reinforced the theme of sociocultural barriers to land access. These farmers typically have greater access to resources, including farmland, primarily based on their social position and cultural background. In one instance, a new farmer began negotiations to rent a rural residential parcel in Santa Cruz County. In order to secure the lease, he described a required presentation he made to a group of neighborhood stakeholders:

> And I'm trying to think that if I was in anyone else's shoes...I don't know, [if I] didn't have the education I had, access to FarmLink ... if I didn't speak English very well, if I wasn't completely literate, like this would never have happened. And it's like impossible to ignore the implications of – I don't know – race and class that goes into this. Everybody that lives here is elderly, white, upper middle class. I doubt, and I'm saying this with total honesty if I wasn't white, that none of them would have said yes, which I hate to say, but that's what I felt.

Thus, this obstacle to land access for beginning farmers is amplified by informal social relations, in which landowners may envision ideal agricultural renters, not based on farming skills or even access to capital, but on sociocultural variables.

Finally, when small-scale beginning farmers occasionally navigate land access successfully, this entails a rare interpersonal savvy and ability to overcome considerable sociocultural barriers. It may involve not only finding a suitable farmland parcel where s/he can productively farm but also identifying a well-financed investor willing to purchase marginal or residential land and then lease it to a beginning farmer. In one unusual instance, a beginning farmer initially identified a potential farmland parcel. He then approached a prospective investor with a proposal that the investor purchase the property and then allow the farmer to sign an agricultural lease. In this uncommon instance, the plan succeeded, and he described the process:

> They [knew] how to invest. They have the capability, the financials to buy it. So they got it and since they knew that I was the one that told him about it, the guy started investigating and looked at my background and who I was. I met him several times and he said I want nobody else but you to farm it, so you have first shot. And that's how I got here.

In this particular case, the beginning farmer was able to overcome sociocultural barriers to farmland access, including personal scrutiny into his background. However, this success—though inspiring—was not typical of the farmers we interviewed, most of whom were seeking secure land with limited success.

DISCUSSION

In this paper, we describe a case in which former farmworkers seeking agricultural proprietorship as means towards a more autonomous, healthy, and secure livelihood strategy face structural barriers to accessing secure, fair, quality farmland. The barriers they encounter align

with theories describing resource access as a "bundle of powers" rather than a "bundle of rights" (Ribot and Peluso 2003). In this frame, we have traced a series of social negotiations that beginning farmers must navigate in order to access and benefit from a resource that centrally defines their livelihood: affordable, secure, suitable farmland.

Each of the barriers we discuss has a strong structural component. Farm incubators, by design, initially insulate beginning farmers from some of these structural problems. These initiatives endeavor to bring transparency, equity, and affordability to farmland lease arrangements. They closely align sociocultural and economic needs with programmatic training and support. Incubators farms such as ALBA—particularly those that sell and distribute produce grown on site—also have a collective interest in maintaining land quality, water access, and long-term agriculturally oriented infrastructural investments. But when faced with barriers accessing land after tenure with an incubator, farmers must face *structural* obstacles with *individualist* or entrepreneurial strategies. Farmers may be forced to seek lawyers for legal arbitration, negotiate lease contracts with landowners, and scrutinize land for attributes particular to their individual operation. They may attempt to secure personal loans to pay for well installations, farming equipment, or other capital improvements. Within this context, the beginning farmers we interviewed face unique land access constraints reflecting their sociocultural position (see also Parsons et. al, 2010). Therefore, gaining access to California's Central Coast farmland as a new entry farmer entails considerably more than motivation and skill. It requires overcoming a host of structural barriers.

In California's Central Coast, access to agricultural land is treated as an individual, private good. Yet the resilience of the agricultural system benefits public interest. Thus, farmland access dynamics are characterized by a prevailing system of concentrated costs and widely distributed benefits. Perhaps the most troubling aspect of farmland access barriers is the way that these obstacles generate yet another "maintenance" mechanism (e.g. Henke 2008) to preserve the status quo of modernized commodity agriculture in the California Central Coast region. Those with the ability to navigate the barriers may represent an incipient wave of motivated, ecologically sensitive beginning farmers. But those who do not navigate these barriers may remain devalued farm laborers, serving to maintain "race-to-the bottom" agriculture. We suggest that these exclusionary features of land access dynamics should provoke practitioners involved in new entry programs to ask precisely *who* is to be the next generation of farmer, given these structural constraints.

In spite of the transitional challenges faced by those completing incubator programs such as ALBA, the success farmers experience *within* these initiatives may prove instructive to beginning farmers facing challenges to their viability. One potential strategy for viability for farmworkers transitioning to proprietorship may be found in replicating and scaling up elements of the cooperative structure ALBA affords. Rather than encouraging bootstrapping independence, incubator transition services might help foster new models for land-based cooperatives outside the incubator farm structure. As Ewert (2012) noted, "It seems valuable…to give more recognition to the importance of these connections among producers. Incubator farms are not the only way producers build relationships with each other; grower cooperatives and farmer networks also cultivate these deeper relationships" (Ewert 2012, 143; see also Hassanein 1999).

Importantly, however, while incubators might help to foster more cooperative models for transitioning beginning farmers, simply suggesting the scaling of incubators themselves is an insufficient strategy. It fails to consider that increasing acreage is already a part of many

incubator mission statements, and the national median land base of farm incubators is only 10 acres (Overton 2011). Moreover, we ask: should the task of mediating these larger structural issues fall to incubators alone? Arguably, adequate attention to the barriers our findings contextualize would demand not simply a comprehensive transition program, complete with legal training or services, training in negotiation, and tools to facilitate land suitability analysis, but more sweeping changes to land access regimes generally. Additionally, while incubators could feasibly help facilitate productive dialogue in landowner – tenant negotiations, this intervention may not overcome deeper structural obstacles like ethnocentrism involved in the selection of tenants in a competitive and ethnically lopsided rental market.

Instead of submitting that incubators simply take on these additional programs and responsibilities, our findings corroborate calls for a renewed look at the public good dynamics of agricultural land as a part of a regional planning conversation (Ikerd 2013). In this view, land with the potential to contribute to regional well-being through quality food provisioning would be re-zoned and insulated from nonagricultural value. Such a public policy-based approach to overcoming land access barriers is consistent with calls of innovative and place placed land tenure reforms, instead of relying on historical models of farmland transfer (Ruhf 2013). Incubators might prove ideal tenants or owners of publicly supported farmland, given how they can transparently consider access barriers associated with landowner-beginner farmer dynamics. These regional planning initiatives would not only be a commitment to beginning farmers and regional food ways, but also an effort to stabilize the farmworker to proprietor pathway.

CONCLUSIONS

Our analysis suggests that well-intended efforts to facilitate the dual aims of helping former farmworkers transition to proprietors may face limited success if various land access barriers are not addressed structurally. In this particular case study analysis, beginning farmers faced substantial social and structural barriers to land access, in spite of benefitting from robust agricultural training and myriad business and operational supports. As incubator models become more established nationally, exploring participant transitions through additional comparative research would help understand how these programs influence regional food systems. We recognize that in other national regions and sociocultural contexts, farmworkers aiming to transition to proprietorship face may unique challenges, including more seasonal work patterns or lack of access to incubator farms altogether. Too, while sociocultural factors conditioning land access may indeed prove relevant to many small and midsized beginning farmers nationally, other contextually specific factors may prove more relevant; we therefore suggest that future research should include comparisons with other cases. The analysis we offer here allows us to begin asking *how* new farmers will emerge? And, importantly, under what social, economic, and ecological structural conditions can they thrive?

We suggest posing and addressing these questions is critically important, particularly for former immigrant farmworkers seeking proprietorship in an effort to determine their livelihoods and futures on their own terms. A conversation with a struggling beginning farmer illustrates both the importance of land access for a viable transition to proprietorship, as well as the fragility of efforts toward that transformation, absent meaningful, structural change. When asked what might do if he cannot find a farmland site after leaving the incubator, he explained,

Farmer: Well if I don't find another place, I'll get a job … to keep supporting my family.
Interviewer: What type of job will you look for?
Farmer: Most likely in the field, once again, because I know how the equipment works, how to do some repairs, tractors all that… The field is where I've been given work, the field is where I work now and I can work there again if I give up on this.

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CHAPTER 3 – HOW KNOWLEDGE DEFICIT INTERVENTIONS FAIL TO RESOLVE BEGINNING FARMER CHALLENGES

INTRODUCTION

At a 50-acre farm in the California Central Coast[10] region, I spoke with Alejandra, who personifies the ideal outcome of the beginning farmer movement[11]. Coming to the United States in the mid-1980s, she described herself as the latest of "three generations of migrant farmworkers" from the Mexican state of Guerrero, following in the footsteps of her father and grandfather, who emigrated for contract labor in earlier decades. In 1995, with the Rural Development Center in Salinas, she completed a three-year training course in organic agricultural practices. Since then, she has successfully distributed her farm products to high-value urban farmer's markets and restaurants in the San Francisco Bay Area. Building on this success, she acquired a loan to purchase a parcel with a homesite near Hollister, where land prices are far lower than the prime farmlands of the Central Coast valleys. This drive to gain new skills and knowledge allowed her to find an alternative to the monotony of working as a field laborer, becoming a diversified farmer in her own right. But her story is also punctuated by a series of structural challenges that defy her expertise, willingness, and capacity.

In the summer of 2015, the well on her property collapsed. The required repair represented a major re-investment, one that she was struggling to afford. When I visited for an interview, the field was fallow. With no crops, she could not meet the demands of her farmer's markets and had to give up her participation as a vendor. She managed to cobble together an additional 10 acres of leased land nearby, irrigated with water supplied by the county. But by then, she found herself at the bottom of a waiting list to re-enter her usual farmer's markets. She was thus forced to sell to a regional wholesaler at lower prices, a fact she lamented after so many years of premium direct markets. While touring the abandoned vegetable fields, the farmer presented me with a leather-bound valise of recommendations she had received from a plethora of organizations including a "certificate of appreciation" from the USDA. Pointing at them, she expressed frustration at a hypocrisy in these accolades:

> What good is it to me? They say, "What great work you have done organizing with farmers, how good that you are a leader, what a good example you are." … What good is it to have recommendations from all these organizations… and trainings! I have done programs, courses to educate myself more, learn more about business ... what good is it for me? What good does it do me to travel to New Mexico to receive a training? Tell me! It doesn't make any sense.

For Alejandra, there is a clear and troubling disconnect between her proven individual capacity to learn, labor, and improve as a farmer and her ability to overcome the structural

[10] I use the term "Central Coast" to refer to the growing regions of Santa Cruz, San Benito, and Monterey counties in California.

[11] This chapter can be found as a published proof: Calo, Adam. 2018. "How Knowledge Deficit Interventions Fail to Resolve Beginning Farmer Challenges." *Agriculture and Human Values* 35 (2): 367–81.

challenges she faces when farming as a primary livelihood. In a sense, her history follows an ideal skills-building playbook for beginning farmers. Yet, nevertheless, she finds that following this path of self-improvement has left her in a precarious position. The frustration of being in this state after so much commitment to her craft is summed up in her question: "What good is it to me?"

This farmer's question captures the essence of the policy mismatch that motivates this paper. At the national level, there is growing momentum towards the goal of creating and supporting new farmers with novel programmatic supports of training, capacity-building, and loans (Niewolny and Lillard 2010; Sureshwaran et al. 2011; Freedgood and Dempsey 2014). Yet farmers who participate in these programs may find that their training does not provide them with the tools to address the dire problems they face. I argue that the dominant model of beginning farmer supports is limited by its subscription to a "knowledge deficit" model. This logic assumes that new farmers are primarily held back by lack of skills and information and that remedying this gap will catapult them into successful farm operations. To critically appraise such logic, I juxtapose thematic analysis of the Beginning Farmer and Rancher Development Program (BFRDP) with narrative data from Latino beginning farmers in California. I show that the deficit model transcribes a technical rationality into the beginning farmer space, embracing values of individual improvement, self-sufficiency, and market-based interventions.

The knowledge deficit model at work in beginning farmer support mechanisms reveals the underlying assumptions about how the food system works that are held in both "expert" (agronomists, non-profits, extension agents, researchers) and "lay" (farmers, BFRDP participants) communities. In investigating the potential consequences of basing support programs on these assumptions, I expand on Alejandra's original question, "What good is it to me?" to ask: How does the BFRDP align with the USDA's stated goals to support new farmers? And, more pointedly, to what extent does this approach respond to the barriers that farmers face? If the breadth of strategies under a knowledge deficit model falls along individualistic, entrepreneurial, or market-based mechanisms, then structural barriers are left unaddressed. This oversight in intervention approach raises concerns about which farmers will be preferentially supported by beginning farmer programs and which farmers are left to fall through the cracks.

I begin with a brief literature review that traces the contours of the beginning farmer "movement" and sketches the knowledge deficit model and its associated outcomes. This literature review lays the groundwork to explore ethnographic accounts of beginning farmers who experience structural barriers in California's Central Coast region. With these structural barriers in mind, I analyze the efforts aimed at solving beginning farmer problems by analyzing the funded proposals of the BFRDP. I conclude that beginning farmer interventions overwhelmingly adopt a knowledge deficit intervention model, rather than address structural barriers. The resulting policy mismatch elides power imbalances and may serve to entrench disparities in the food system. Finally, I propose alternatives to the knowledge deficit model that could make the BFRDP and other efforts to support beginning farmers achieve the goals that the movement supposes.

THE BEGINNING FARMER "MOVEMENT": GOOD FOOD REDUX?

The need for new farmers is underlined by the prospects of an aging (and shrinking) farmer population (the average age is now 58) and the 91.5 million acres of US farmland

projected to change hands in the near future (USDA NASS 2016). Politically, supporting beginning farmers through government programs is a bid to revitalize disappearing rural livelihoods (Reid 2013). In addition, proponents of alternative agricultural systems see the support of new farmers with an environmentalist ambition as a way of sidestepping political transformation of a food system resistant to change (Bradbury et al. 2012; Markham 2014). Over the past decade, activist groups, non-profit organizations, and federal agencies have tried to set up new support programs to address these overlapping issues (Hamilton 2011). They believe that finding ways to attract new farmers into agriculture will instill new agricultural production values that will grow in future generations. Instead of relying on traditional methods such as inter-generational family training and agricultural colleges, special programs are thought to be needed to deliver knowledge to people who have not farmed previously.

Since 2008, the U.S. Department of Agriculture (USDA) has provided over US $100 million in funding for the BFRDP, with US $20 million in available funds earmarked in 2016 (OPBA 2016). This support represents 3.1 % of all USDA Research, Extension, and Economics spending in 2016[12] (DeLonge et al. 2016). The Federal Farm Credit Association, for example, has a dedicated loan program for farmers under the age of 35 and in 2013, the network of lenders made over 58,000 new loans totaling US $8.35 billion to eligible borrowers (FCA 2014). In a number of states, legislators have introduced and passed bills that will provide partial student debt forgiveness as long as participants commit to farming for a designated number of years (e.g., the New York State Young Farmers Loan Forgiveness Incentive Program).

In concert with federal and state priorities to generate new farmers, there is a general surge in non-profit and alternative food activity. Advocacy and research groups, like the National Young Farmer Coalition, Land for Good, the Farmer's Guild, Stone Barns Center for Food and Agriculture, and the New Entry Sustainable Farming Project, are targeting new farmers in outreach, networking, training, and policy advocacy events. Farm incubators, which provide agronomic training while offering subsidized farmland, have increasingly become established nationwide (Overton 2014). These research, extension, and industry efforts coincide with a popular sense of environmental activism and "back to the land" ethos by young farmers committed to redefining agriculture through innovative agronomic and marketing practices. Farming in this sense is in part defined by practices that avoid chemical use, protect biodiversity, reduce greenhouse gas emissions, and create rural revitalization. These ideals appear in venues like the Farm Hack startup, films like *The Greenhorns*, the celebrity chef laden annual MAD symposium in Copenhagen, Canada's New Agrarians, and the new stylish *Modern Farmer Magazine*. These spaces of reform are notably middle class, educated, and white (Guthman 2011).

As excitement ballooned for alternative food movements in an idealistic wave, the prescriptions for good food reforms like "vote with your fork" and "eat local" were tempered by scholars who questioned market-based or neoliberal solutions to food system problems they saw as structural issues rather than errors of individual choice (Guthman 2000; Goodman 2004; DuPuis and Goodman 2005; Guthman 2007). Critiques from a justice and political economic focus have pressured alternative food system proponents to increasingly focus on policy and process over purely market-based mechanisms (Holmes 2013; Alkon and Agyeman 2011; Guthman 2007). But as the lists of institutionalized beginning farmer activities and their

[12] The USDA Research, Extension, and Economics (USDA REA) budget is a rather small portion of the total USDA budget, which includes items like subsidies and crop insurance. In 2016, the USDA REA was less than 2% of the total USDA budget.

underlying sentiments attest, a tendency to romanticize farmers engaged in "good food" abounds (DeLind 2010).

Critical work in this vein emphasizes how agricultural reform interventions tend to end up replicating entrenched visions of government. Guthman (2008a) shows how contemporary agricultural activism intersects with the embrace of neoliberal rationalities by fostering strategies based on consumer choice, localism, diet-based self-improvements, and food entrepreneurism. Morris (2008) shows how the use of conservation easements to protect agricultural land for the future relies on the rationality of private property and thus contributes to "roll-out" neoliberalism. The outcome of this neoliberal embrace, both authors argue, is the narrowing of political possibilities in food system efforts. Minkoff-Zern's work among minority farmer populations goes further to show how neoliberal imaginaries in food system reform efforts produce unequal benefits, often exacerbating disparities among low-income farmers of color (Minkoff-Zern and Carney 2015; Minkoff-Zern 2014). Given this commentary on food system intervention writ large, it follows that a similar critical examination of beginning farmer interventions is warranted. While some supports for new farmers may succeed, the benefits are unequal, creating a selective pressure on the types of farming and farmers that can truly enter the system.

THE KNOWLEDGE DEFICIT MODEL: A DURABLE PROGRAM OF GOVERNMENT

I invoke the concept of the knowledge deficit model to characterize the dominant approach to beginning farmer interventions. The model, and its theoretical history, is a useful concept of expert-lay dynamics within public understanding of science frameworks (Hansen et al. 2003; Einsiedel 2000). A review of knowledge deficit literature reveals an ossified political strategy for remedying social problems with predictable outcomes and associated mentalities of governance.

In a knowledge deficit model, environmental and social problems are often attributed to lay people who lack the knowledge to make appropriate decisions or to behave more sustainably. For example, many government officials assume that farmers are causing land erosion through their improper soil management practices, because of a lack of understanding of the mechanisms of soil loss (e.g., Blaikie and Brookfield 1987). The solution, then, is to provide lay people with the missing knowledge and thereby correct their misconceptions and gaps. This can be achieved through one-way dissemination of knowledge from credible, officially recognized experts (Irwin and Wynne 1996; Jasanoff 2005). This sets up a contrast between a knowledgeable expert and an ignorant public, obscuring the social construction of both expertise and ignorance (Cortassa 2016). Lay people are treated as passive receptacles of information and as having no role in helping produce or evaluate the knowledge. The knowledge is meaningful precisely because experts have recognized, defined, and validated it. In doing so, the knowledge deficit model produces a state of "non-knowing" defined in comparison to some authoritatively determined ideal of expertise (Irwin and Wynne 1996). In other words, experts are the ones whose knowledge matters most.

Critics of the knowledge deficit model have identified several core weaknesses, which are instructive for better understanding the beginning farmer intervention landscape. First, campaigns to rectify a knowledge deficit have been shown to be ineffective at "improving" understanding as experts would define it. In the case of publicly funded science literacy campaigns in England, post intervention surveys of participants revealed little improvement in

the metrics of science understanding, thereby undermining the validity of the approach (Miller 2001). Additionally, case studies showed that those individuals who did experience measurable gain in scientific literacy did not uniformly change their attitudes towards scientific issues, remaining asymmetrical to expert opinion (Durant et al. 2000). Even though there was new knowledge produced by these campaigns, the knowledge did not influence decision-making or behavior in a meaningful way.

This critique, based on utility, paved the way for science studies scholars to question the privileged status of expert knowledge embedded in the deficit model in the first place (McNeil 2013). Scholars argued that specialized knowledge is not the most important nor the only type of understanding at work in complex systems (Funtowicz and Ravetz 1993). Instead, the knowledge deficit model was shown to undermine local knowledge and values through unilateral delivery of expertise, deepening divides between "expert" and "lay" (Fricker 2002). These contributions showed how the content of the outreach offered by professional institutions ends up coproducing technocratic values (Brunk 2006) without questioning the power structures embedded in those systems (McNeil 2013).

Reflection on the privileged status of expert knowledge in public spaces dovetails with the results of substantial research focused on traditional agricultural knowledge (Altieri 1995), horizontal and peer-to-peer learning among farmers (Rosset et al. 2011; Holt-Gimenez 2006), and critiques of historical cooperative extension models (Warner 2008; Warner 2011). The legacy of the land-grant system has been a top-down technology program from the academies and experiment stations to the landed agriculturalists of the nation (Warner 2008). Scrutiny of this legacy shows the social construction of such expertise, often used as a tool to drive desired forms of agricultural production (Henke 2008; Hightower 1972). This work has led to alternatives to the vertical model of knowledge dissemination in agricultural extension, including state-sponsored funding on horizontal farmer-to-farmer networks (Warner 2007) and participatory approaches to sub-domains like plant breeding (Kloppenburg 2010) and sustainability learning (Pretty 1995).

Despite the critiques of the deficit model, state-sponsored knowledge delivery programs to solve social problems are ubiquitous, appearing in domains such as public health (Corburn 2003), public understanding of policy (McNeil 2013), and public education (Pitzer 2015). One way to characterize such a durable strategy for solving social problems is what governmentality scholars identify as a "program of government," or designs put forth by state and non-state actors to "configure specific locales and relations in ways thought desirable" (Rose and Miller 1992). Programs of government are the mechanisms that embody certain political rationalities, translating the ideals of authority into lived experience. The replication of subjectivities through such programs and their associated technologies, is what is thought of as "government from a distance" (Rose et al. 2009).

Importantly, scholars in disparate fields have situated the knowledge deficit model within neoliberal rationalities (Petrovic and Kuntz 2014; Dutta 2015). Indeed, the knowledge deficit articulates strongly with neoliberal hallmarks like a programmatic commitment to market solutions for societal problems, the abdication of state subsidy in favor of self-sufficiency, and the favoring of entrepreneurism (Peck and Tickell 2002).

APPROACH

I investigate how BFRDP programs respond to the structural challenges of beginning farming by: 1) exploring the drivers of beginning farmer challenges and 2) describing the overall

intervention logic of the BFRDP. To understand the nature of barriers that farmers face, I use interviews and participant observation with farmers in California. The resulting narratives aim to contextualize barriers to entry emblematic of the beginning farmer experience. To understand the dominant approach of the BFRDP, I analyze the themes and content of funded grant proposal documents. This analysis reveals the scope of interventions within the funded BFRDP programs. These two bodies of evidence allow for a contrast between the structural barriers farmers experience and the USDA's institutional effort aimed at remedying these challenges.

Beginning farmer challenges are described through semi-structured interviews and farm and facility visits in the Central Coast growing region. I focused on observing and interviewing farmers in periods of transition, particularly farmers who are planning to scale up their operations. The experiences of 35 farmers were analyzed, including 26 who gave in-depth semi-structured interviews. All farmers had less than 15 years of agricultural experience and were under 50 years old. Of the farmers interviewed, 21 were former immigrant farmworkers, and 20 of the interviews were conducted in Spanish. Interviews were carried out on farm fields or in community meeting rooms. I shadowed farmers though daily activities such as sowing crops, business planning, filling out paperwork, hand weeding, and visiting potential parcels of land to rent. I also attended multiple instances of regional development programs, including workshops on marketing, business management, crop production, land acquisition, and tax preparation.

To analyze the institutional response to beginning farmer challenges, I examined the 215 BFRDP funded proposals between 2009-2015 available on the USDA National Institute of Food and Agriculture database (NIFA 2016). Using a thematic analysis approach, I coded each proposal by the type of beginning farmer problem the grantee institutions aimed to address and the principal grant funded activities planned. I also measured the distribution of proposals that focused on beginning farmer land access barriers, because previous work identified land access challenges in the study area (Calo and De Master 2016). The project activity codes were characterized by the BFRDP's intended list of suitable grant activities and were thus coded deductively from the Request for Proposals (NIFA 2016). If the proposal activity did not align with one of the BFRDP's suggested grant activities, they were labeled accordingly. The proposal's main problem frame was coded inductively from the problem statements of each proposal. I also examined proposal discourse that was representative of the main problem frames and grant activities. Finally, I took note of proposals that appeared as outliers in their approach to beginning farmer challenges both in problem frame and proposed activities.

FAILURE TO LAUNCH: STRUCTURAL BARRIERS IN THE CENTRAL COAST

The challenges of being a beginning farmer in a food system dominated by large-scale and capital-intensive agriculture are relatively well known. Among other challenges, farmers entering the system struggle with acquiring the necessary start-up capital, securing markets for their produce, and identifying or acquiring suitable farmland (see Ahearn 2013, Gillespie and Johnson 2010, Parsons et al. 2010, Galt 2013, and Beckett 2013 among others). Farmers adapt to these access barriers in a variety of ways, like renting less than suitable land in residential areas, supplementing farm revenues with off-farm income, and establishing novel and niche consumer chains (Minkoff-Zern 2017). While these barriers are sometimes attributed to the political economy of an agricultural system that encourages consolidation, global market chains, and economies of scale (e.g. Lyson 2004, Gillespie and Johnson 2010, Beckett and Galt 2014, Wittman 2017), less clear are the leverage points for intervention so that challenges can be

reversed or remedied. Work in this area explores how key challenges like access to land, capital, and markets are institutionally mediated through mechanisms like direct regulations, informal customs, and racial discrimination (Morris 2008, Minkoff-Zern 2017). This work suggests that for the goals of the new farmer movement to be realized, these structural issues need to be clarified and addressed (Wittman 2017).

In this section, I concentrate on two key structural barriers that challenged farmers who were attempting to scale up their fledgling operations. These barriers are noteworthy because they stand out as persistent in the face of successful access to more agronomic or entrepreneurial knowledge: 1) access to land that is mediated by landlord negotiations and 2) ethnocentric preference embedded in beginning farmer supports that regularly favors white English-speaking farmers. These structural barriers—whether rooted in informal social networks or systemic ethnocentrism—hold back some beginning farmers who otherwise energetically apply themselves to overcoming their individual knowledge deficits. Understanding the structural aspect of these challenges frames the analysis of the BFRDP, as the major national program aimed at alleviating the challenges farmers face.

"One decision can put you out of business" – Access to land

When examined closely, the land access barrier is linked to a number of structural and institutional challenges. As high costs of land ownership and encroachment of non-farm land-use in agricultural regions (Katchova and Ahearn 2016) relegate new farmers into tenant relations, farmer experiences in California show how access to land is mediated by the unequal power relationship between tenant and landowner. One farmer who is reaching the end of his tenure at a regional incubator program described how he has been searching for land for a long time but has struggled to find something that meets his production vision. Even though he has proven his ability to produce quality organic produce and market his goods at the incubator, his difficulty finding more permanent farmland is representative of how land access acts as a structural barrier.

> Well [it has been] really bad. I haven't been able to find anything. It's been about three years, and I haven't found anything that is satisfying …. Yeah there are parcels around, but sometimes they don't have water, or they have other characteristics, like they are really far away, or they are not good for strawberries, and that is what I want to put in.

Access to information about where there are available and suitable parcels at first seems like a problem that is remedied by providing more knowledge. But interviewees describe how gaining preliminary access to a parcel is often the result of a series of informal negotiations between prospective tenant and landlord. In these circumstances, the unequal socio-economic and cultural power of the landlord comes to the fore. These dynamics are widespread, playing out in an ethnically skewed distribution of land ownership. In California, 45% of all farmland is rented out to others (Bigelow et al. 2016). Non-operators (defined by the USDA as landlords who lease farmland but do not themselves individually or as a corporate entity manage the activity of farming) dominate leased land both nationally and in California (87% and 83% respectively). In the last USDA census of 2012, 97% of all principal landlords are classified as white (80% in California) (USDA NASS 2016). Even when farmers can secure a lease with satisfactory terms, tenant farming brings incredible risk, especially in cases where owners are looking to sell the land. Farmers add value to unfarmed land, often investing substantially in

infrastructure to support their operations, and then learn that their landlord may want to sell the property. While "lease to-own' provisions do exist in some agricultural leases, they were very rare among the beginning farmers I interviewed.

At an 18-acre parcel near Prunedale CA, I met Ernesto, whose diversity of crops were on display in the spring; rows of marigolds stood next to vibrant strawberries and following those, tomato starts propped up with freshly purchased pinewood stakes. Greeting me for the first time, he gave me a very firm handshake and switched easily and frequently from English to Spanish during our conversations. The farm sold over 110 varieties of crops over the course of the growing season and sold almost exclusively to direct markets or boutique retailers that pay high prices. Two times a week, Ernesto transported his product to farmer's markets in Tracy and San Francisco (about a 2-hour drive). Some of his crops were prearranged with advance contracts to organic vendors (e.g., 500 lbs. of early girl tomatoes were earmarked for an organic ketchup company in the San Francisco Bay Area) and smaller regional groceries. Despite this background, he tempered his success by noting the precariousness of his position:

> If you don't have a good relationship with whoever the owner is, things might go sour. So [being a renter] influences the way you are farming, and it's another issue that you always worry about. Is this a place where I'm going to stay? Because you don't own it so somebody else can make a decision that will put you out of business.

Like Alejandra, Ernesto appears to fit the model for using individual capacity and entrepreneurism to make inroads into California agriculture. He succeeded in gaining high-quality agronomic skills through training programs. He learned business and marketing strategies and applied them to build a resume that would appeal to potential land leasers. He took advantage of a variety of sources of start-up loan programs. Despite all this, his status as a tenant farmer remains precarious, where his lack of autonomy could destroy his ability to reproduce his livelihood through agriculture. He adds tremendous value to the land, but would not receive that value if the land was sold. Essentially, the positive outlier among the set of interviewees is nonetheless embedded in a sort of neo-feudal relationship. The land access barrier is one that defies individual capacity.

In California, where tenant farming dynamics dominate beginning farmer demographics, the power of the landowner exerts a strong effect on access to land. Farmers may pursue various strategies to improve the land suitability for their operations, but these changes come with a risk attached, because the value of these investments cannot be taken with the farmer if they move to a different lease. Absent of any agriculture-specific provisions in a lease, the tenant may be expected to incur the entire cost of a capital improvement, even though the added value of the property is transferred to the landowner. This was the case when one farmer decided to invest $20,000 into a new well for a rental property in San Benito County. He explained:

> The owner didn't want to help us [pay for a well], and that's one of those things where, if you decide to put it in you can't bring it with you when you leave. I mean, how are you going to take it out if it is however many feet under the ground?

In this particular instance, the types of improvements the farmer implemented were not fully explicated in the lease, which put the onus of construction entirely on the tenant.

Negotiations between actors in the food system, like in the case above, may also be mediated by unequal ethnocentric preference, as described in the next section.

"IF YOU ARE ILLEGAL, YOU AREN'T ELIGIBLE FOR ANYTHING"—ETHNOCENTRISM AMONG FARMER SUPPORT MECHANISMS

Minkoff-Zern has written extensively about the position of Latino farmworkers who seek to become farm operators both in California and nationwide (see Minkoff-Zern et al. 2011 and Minkoff-Zern 2017). This work shows how racialized discrimination puts a unique set of pressures on these farmers, ultimately shaping the forms of agriculture they are able to pursue. A lack of Spanish language programs in state supports, a system of benefits that mandates legal status, and daily exclusion from beneficial resources based on race ultimately constrains these farmers into a unique form of agriculture that relies on family labor and excludes costly inputs when possible.

Here, I show how sociocultural identity can mediate the many access points in the process of acquiring secure tenure and other supports as a beginning farmer. If landowner-tenant dynamics are fraught with ethnic disparity as regional statistics indicate, then ethnic identity can be connected to the perceived credibility of a prospective farmer. This can lead to ethnocentrism among landlords. As one farmer notes:

> There are some owners that have the heart to rent to small-scale farmers, but there are very few people like that. One of the hardest problems is credibility—cultural credibility. The large part of property owners are Anglos, *gringos*, and the majority of us that are looking for small parcels are Latinos. So, culturally we disagree sometimes. And if there isn't anybody to intervene for you, it can be really hard.

In this view, those who decide to rent to a small farmer must have the right "heart" or sense of charity to take on someone with less "credibility." The farmer then connects this sense of charity with ethnic identity, suggesting the default choice for an "Anglo" landlord would not be a Latino farmer.

Among the interviewees, a common manifestation of ethnocentrism was the requirement of legal status for access to agricultural supports. Farmers report their inability to apply for Farm Service Agency (FSA) loans because of the federal requirement of listing a social security number. This extends to fear of utilizing a realtor because the office may inquire about legal status. One farmer describes the scenario:

> [Realtors are asking about citizenship status] because they have to ensure for the landlords that you can pay for the land and that you are currently employed and that you are good for the money.

Even though California legal code prevents businesses from screening based on legal status, the farmer still felt excluded from the services of the realtor based on the possibility of being screened. An additional barrier associated with ethnocentric preference among supports is legal status and cultural difference between small scale farmer needs and the agency programs:

> I'm very frustrated in how little support there is for the small farmer. There being so much money within the agencies, within the government programs. Legal status is such an additional and terrible barrier, because if you are illegal, you aren't eligible for anything …

This farmer views her position as a series of structural slights by the powerful agricultural agencies who overlook her person and her vision of agriculture. The seemingly simple language barrier that persists between some beginning farmers and members of agriculture support agencies is viewed as a much more severe sociocultural barrier.

> There is supposed to be support, but for certain reasons, maybe who's doing the outreach, the help doesn't get through! If they show up at your office, and if you speak English, well that's all right. But if you don't speak English, as they say in Mexico…"you're screwed". There is no one to help you, okay? So, I believe it will be a long time until the small-scale farmer is supported as they should.

From her position, the beginning farmer interventions she has experienced are insufficient and, at times, unjust. Her solution is not more or better or innovative training, for in her view she has accomplished these steps without attaining the promised benefits. Instead, she questions the policies that govern agriculture and calls for structural change.

> The majority of the programs, the funds and the resources that come from the government are designed solely for the big farms. This is where change should come. This is what you should be writing about, because we can jump, we can scream, we can cry, but we have nothing. No one listens to us, no one, no one is going to take the time to say, "Oh, we have to change governmental policies to generate more support for the small farmer".

Similarly, Minkoff-Zern's (2017) recommendation for farm policy is to include the unique challenges of transnational peoples into beginning farmer interventions. Otherwise, these farmers will continue to be constrained, regardless of individual capacity. This section has shown how the key beginning farmer challenges of access to land and ethnocentric preference are structural in nature and are blind to the technical proficiency of start-up farmers. In the next section, an analysis of BFRDP proposals helps to show how the USDA and grant recipients visualize the key problems facing new farmers and their intervention approach.

THE BFRDP: A KNOWLEDGE DEFICIT PROGRAM

The USDA received authorization to establish the BFRDP in the 2008 farm bill, and has approved continued funding until 2018. The BFRDP is the flagship governmental program that supports new entry farmers and carries the mission "to enhance the sustainability of the next generation of farmers" (NIFA 2016). The program represents the dominant public model of how to support beginning farmers and funds many beginning farmer intervention programs. The "Purpose and Priorities" section of the federal program states:

> The primary goal of BFRDP is to help beginning farmers and ranchers in the U.S. and its territories to enter and/or improve their success in farming, ranching, and management of nonindustrial private forest lands, through support for projects that *provide education, mentoring, and technical assistance* to give beginning farmers the *knowledge, skills, and tools needed to make informed decisions* for their operations, and enhance their sustainability. (NIFA 2016, emphasis added)

In its call for proposals, the program frames the beginning farmer problem as one of a knowledge deficit model. As discussed above, this model assumes that presence or absence of official expertise—the "*knowledge, skills, and tools needed to make informed decisions*"—makes the difference between a farmer that succeeds and one that fails. BFRDP-funded projects act upon knowledge deficits through programs that train new farmers in agronomic techniques, farm business planning, and marketing strategies.

The NIFA program analyzed lists 215 proposals funded over seven years (2009-2015), with a total funding disbursement of $105,877,521. In terms of BFRDP funding priorities, the beginning farmer problem is predominantly framed as a problem of knowledge gaps (40% of all proposals indicated a gap of agronomic, business, or awareness of technical assistance as the main justification for their proposal: Table 1).

Table 1 BFRDP funded projects and their principal problems targeted

Problem frame*	Count	Occurrences (%)	Total funding ($)	Funding (%)
Under-represented farmer challenges	63	29	31,975,937	30
Farm business knowledge gap	*33*	*15*	*15,723,127*	*15*
Unaware of technical assistance	*25*	*12*	*12,504,325*	*12*
Lack of service outreach	24	11	11,936,584	11
General agricultural information lack	*17*	*8*	*9,891,904*	*9*
Access to land	15	7	6,296,017	6
Agronomic skills gap	*11*	*5*	*5,442,604*	*5*
Capital gap	9	4	3,918,727	4
Urban agriculture problems	9	4	3,705,528	4
Lack of adequate curriculum	4	2	2,244,246	2
Other	5	2	2,238,522	2

*Emphasized rows are proposals that fall most clearly into the knowledge deficit approach

The logic of these programs suggests that if farmers overcome their lack of training in farming, marketing, and farm business management, they can overcome the diversity of barriers to entry into agriculture facing them. Likewise, this logic signifies that failure is a result of individual lack. Some proposals state this explicitly:

> Many beginning farmers do not have the knowledge networks, the personal relationships, or the capacities to take advantage of the myriad programs and services available to help make them successful.

Another proposal places the problem in the "shortcomings" of the unknowledgeable farmers: "Shortcomings by participants include lack of farm knowledge, lack of capital, and lack of equipment."

The assumption is that if the program can remedy these informational shortcomings, farmers will be successful. Another proposal that represents the entrepreneurial deficit category adds an additional layer of assumption about the beginning farmer landscape in their desire to focus on farm business training:

> *These new farmers tend to be college educated and deeply committed.* They are driven by an intense desire to learn about all facets of owning and operating a farm business. Significantly, many start with no farming background. Recognizing this experience gap, [we] worked with a group of new and established farmers to design and create a two-year new farmer training plan we call our Journeyperson Program. emphasis added)

This proposal defines the beginning farming problem as one of prospective, highly educated entrepreneurs who lack the farm business acumen to carry out their desires. Indeed, with farmers who have the resources to attend and thrive at a 4-year university, the only missing piece to their success is actual on-farm experience.

While the problem frames of proposals are somewhat diverse, the proposed activities coalesce around horticultural training and entrepreneurial training (65.8% of all proposed activities, Table 2). These technical trainings take the shape of outreach materials, training workshops, incubator programs, webinars, and business training consulting services.

Table 2
BFRDP funded projects and their principal proposed grant activities

Main proposal activity	Count	Occurrences	Total funding $	Funding (%)
Technical agronomic training	64	30%	33,567,133	32%
Entrepreneurial or business training	76	35%	35,629,165	34%
Marketing strategies	15	7%	7,353,479	7%
Land access	13	6%	6,813,750	6%
Farmland transfer	11	5%	5,421,444	5%
Financial training	10	5%	5,153,194	5%
Farm safety training	4	2%	805,358	1%
Curriculum development	7	3%	4,725,771	5%
Natural resource management training	6	4%	2,034,059	2%
Policy-advocacy	3	1%	1,977,159	2%
Other	6	3%	2,397,008	2%

The tensions of the knowledge deficit model are particularly visible in proposals that invoke a dominant problem frame of "underrepresented farmer challenges" (29% of proposals, Table 1). These programs indicated the primary problem they aimed to solve was the unique challenge that underrepresented groups face while working towards becoming farmers.[13] Many

[13] The USDA BFRDP maintains a funding goal of 25% funding towards proposals that focus on underrepresented groups. My analysis shows that the BFRDP is meeting or exceeding that goal. There was tremendous diversity among the proposals in how grant writers identified these groups including veterans, women, youth, urban farmers, distinct ethnic groups, low-resource, refugees, etc.

programs in this category invoke structural barriers in their problem frame, such as the weakness of federal outreach, language barriers in accessing agricultural supports, and in some cases, historical dispossession of farmland. The proposed activities of these programs nevertheless fell dominantly along entrepreneurial or individualistic program activities as their mode of intervention (36.5% proposed technical agronomic training, 31.7% proposed farm business training, and 9.5% proposed teaching marketing strategies). One representative program in this category describes their plan to meet the needs of socially disadvantaged farmers through entrepreneurial and production practices:

> [Immigrant farmers] frequently lack financial or production skills, are unaware of technical resources, or lack English-language proficiency for accessing technical information. The objective is to assist these beginners with development of small scale farm enterprises through training and technical assistance that will: (1) improve participants' financial and business skills, (2) connect them with a network of resources, and (3) gain and improve production skills.

In this instance, the structural problem areas of lack of access to adequate finances, social disadvantage, or lack of familiarity with English among immigrant farmers frame the difficulty of beginning farmer success. The program activities proposed are notably individualistic and merit-based, focused on improving business skills and fine-tuning production *as a means of* overcoming the structural barriers explicitly identified. Many programs proposed pedagogy that recognized some structural barriers. These proposals planned to offer training in the native language of participants, the production of pictorial agronomic curriculum, or, in a proposal that focused on training women farmers, the hiring of female instructors to teach technical skills. However, while innovative and culturally-specific pedagogy is a crucial part of addressing structural blind spots of the knowledge deficit model (McNeil 2013), the theory of change of these programs remains firmly rooted in individualistic and market mechanisms. Indeed, overall, the proposals resoundingly focus the site of intervention within the individual farmer. One proposal states this in clear terms: "The project's objectives are designed to change the behavior of our target audience."

Webinars, new curricula, online resource sharing, horticulture classes, and credential programs all intervene by asking individual farmer learners to take on new skills through dedicated application to these programs. Farmers are asked to diversify their business acumen in addition to their farming practices. Beginning farmer success is defined as the mastery of these entrepreneurial skills. In this sense, the majority of BFRDP programs align with, and thus reify, a modern neoliberal vision of agriculture.

A key consequence of this logic is to individualize responsibility for overcoming structural barriers. A focus on how the BFRDP attends to one specific beginning farmer challenge, land access barriers, highlights this dynamic. Access to land is a prime concern of beginning farmers and often a chief reason that prevents farmers from succeeding (Shute 2011; Ruhf 2013). A history of uneven land ownership, large parcel sizes, and ballooning land values all restrict a new farmer's ability to get on the land (Beckett and Galt 2014). Furthermore, farmers who do find suitable land within their budget face an informal vetting process as they seek to align with landlord values (Calo and De Master 2016). A look at the proposal activities focusing on the land access barriers further define the implications of the deficit model at work.

First, the structural problem of land access is frequently omitted from proposal problem frames (43.2% of proposals, Table 3).

Table 3 The presence and absence of land access within BFRDP proposal problem frames

Presence / absence	Total funding ($)	Percent total	% Funding
Absent	44,176,320	43.2	41.7
Present	61,701,201	56.7	58.3

In these omitted cases, proposals leave the challenge of land acquisition up to the individual farmer to solve, or target farmer audiences who already have secure land access. When proposals in the BFRDP do identify land access as the major problem, the grant activities fall along similar individualistic logics. Thirty-six percent of proposals indicating land access as a major problem propose entrepreneurial training followed by 23% proposing horticultural training (Table 4). These programs understand the land access problem as one of microeconomics. If the cost of leasing or buying land is cost prohibitive, then increasing the economic buying power of the beginning farmer through improved entrepreneurism removes the barrier.

Table 4 Proposals aimed at addressing the land access barrier

Main proposal activity	Count	Percent of proposals
Entrepreneurial or business training	44	36.1
Technical agronomic training	28	23.0
Land access	13	10.7
Marketing strategies	10	8.2
Farmland transfer	9	7.4
Financial management training	6	4.9
Natural resource management training	4	3.3
Policy-advocacy	3	2.5
Farm safety	2	1.6
Curriculum development	1	0.8
Other	2	1.6

Twenty-two programs addressed the land access problem through focusing on mechanisms for farmland transfer, agricultural lease workshops, farmland matching, or strategies for increasing farming on conservation easements. While these programs addressed the land access problem more head-on than say, improved marketing strategies, whether or not these techniques address the structural barrier of land access is less clear. Previous work challenges the use of conservation or agricultural easements to support beginning farming (Morris 2008). By prohibiting development, these tools simultaneously reduce market lease rates and increase the total farmland available (Johnson 2008). While these mechanisms are indeed a policy tool, they still fall mainly under a market incentive or disincentive approach. Morris (2008) argues, through a review of conservation easements in California, the increase in easements and the decrease of

state action in preserving farmland is a prime example of 'roll out neoliberalism' and serves to accrue value to existing private landowner structures.

OUTLIERS

Clear outlier proposals offered activities that either defied categorization, took a systems approach to addressing beginning farmer programs, or proposed activities to address structural barriers. The systems perspective outlier programs (Ruhf 2013) tended to invoke multi-level collaborations, like one proposal to investigate the legal framework of the FSA to increase inclusivity. Another outlier collaborated with immigrant rights groups to analyze and advocate for the legal mechanisms for land ownership among farmers without clear citizenship status. Finally, one program leveraged their association's connections to fund visits to the state capitol for legislative meetings with agricultural decision makers in their region. These outliers were similar in that they tended to challenge automatic privileging of specialized, expert knowledge.

Another type of outlier proposed activities that tended to address structural barriers more directly. In one such program, an urban agricultural beginning farmer proposal earmarked a living wage salary for participants as it sought to create new farmers from post-incarceration populations. Through the program, the status of the underrepresented group, post-incarcerated persons, was re-imagined through an employment opportunity. The proposal did not assume that through urban horticultural training alone the participants would remove their social disadvantage. A final outlier offered to train absentee landowners (identified as living in distant urban centers) in modes of agricultural land transfer. While the method certainly fits a knowledge deficit model, it puts the burden of training on the landowner rather than the small farmer.

This analysis of the BFRDP funded grants suggests the dominant approach to addressing beginning farmer programs is through a knowledge deficit model. It is clear that these programs acknowledge individual beginning farmer problems like the complexity of farm business management and the expertise required for small scale horticulture. But these results invite the question: does this type of programming meet the challenges that beginning farmers face? Is the knowledge deficit logic sound for beginning farmers? As the evidence from farmer narratives show, barriers like access to land and racialized exclusion have little to do with individual capacity.

DISCUSSION AND CONCLUSION

Experiences of beginning farmers in the California Central Coast show how some key barriers to success are structural in nature. These barriers like land access, the challenges of being a tenant farmer, and racial exclusion are embedded in social relations like landlord tenant interactions, regulations like immigration policy, and historical private property regimes. In the Central Coast, these barriers act unequally on different ethnic groups. For some aspiring Latino farmers in California and across the U.S., the feat of acquiring land title is shown to be difficult or perhaps impossible for transnational farmers (Minkoff-Zern 2017). This work demonstrates that these barriers based on ethnic identity ultimately constrain the shape of agriculture these farmers can take on. Going further, I would argue that these barriers also constrain the utility of beginning farmer interventions that act from a knowledge deficit approach.

My analysis of the BFRDP reveals the dominant effort to motivate the next generation of beginning farmers is largely through individualistic and market-based means. The results show a program aimed at rectifying a knowledge deficit mainly through agronomic and entrepreneurial training programs. These strategies aim to increase supply of new farmers and their capacity to transition new acreage into restorative farm enterprises. Yet the farmer narratives represented in this paper reveal how the deficit approach falls short of addressing the structural nature of several central beginning farmer challenges. The limit of the knowledge deficit approach is a flawed logic that suggests the injection of cognitive resources will help farmers overcome structural barriers such as ethnocentric preference of supports or landowner-tenant dynamics. For institutions working on supporting beginning farmers in their regions, it is worth considering the extent to which providing new knowledge remedies the specific challenges their constituents face. Without doing so, the result may be creating a new resource pool that is essentially inaccessible to the farmers that face barriers structural in nature.

The review of BFRDP proposals suggests how knowledge deficit logics embedded in the call for proposals has the effect of replicating those logics across the entire BFRDP program. The parameterized grant making program *a priori* establishes a logic of self-improvement for supporting beginning farmers and is embodied by the grant receiving institutions and in turn, beginning farmer communities. This may explain why most funded projects frame their target problems as knowledge gaps among their farmer constituents and propose programs to improve technical capacity, thus reinforcing the dominant logic. In a review of a pioneering food philanthropy venture called Vivid Picture, Guthman (2008b) similarly identified how the narrow logics within the original request for proposals had the effect of constraining the generated strategies for change. As the granting process developed, Guthman noted how more political strategies like de-regulating pesticides and re-orienting public research priorities fell to the wayside to solutions like consumer education and green business models. Embedded priorities, like win-win solutions, incentive-based programs, entrepreneurism, and quantitative evaluation were embraced by the grant receiving organizations, deepening the spread of these strategies. Of course, grant proposals may not be indicative of actual grant activities, but inserting alternative logics of agricultural interventions into grant proposals could mean not receiving funding.

One potential consequence of farm support programs that overlook structural barriers is to exacerbate inequity in the food system (Holt-Gimenez and Shattuck 2011; Minkoff-Zern and Carney 2015). Farmers without structural barriers receive the benefits of public individualistic supports while others, based on their social location, fall behind (Ayazi and Elsheikh 2015; Minkoff-Zern 2014). Without a focus on the structural aspects of beginning farming, new farmers will certainly be produced, but that success will likely favor particular classes of new farmers (e.g., those who are highly educated, well-resourced, and white). Those, like Alejandra, who overcome their individual knowledge deficits through training programs, nevertheless confront a system of barriers that exist outside the realm of technical training or entrepreneurial tactics. One outcome is a major discrepancy between the food justice and food sovereignty objectives that many beginning farmer institutions hold and their implementation of training programs that deepen divides in the food system.

Faced with the limits of a knowledge deficit approach, science scholars suggest a more democratized epistemology is needed to address complex systems (Miller 2001; Funtowicz and Ravetz 2003). Cortassa (2014), writing on alternatives to the knowledge deficit, suggests a model that redefines expertise, where:

> Specialized knowledge is not the only knowledge nor in principle the most valuable at play. Instead of being regarded as passive recipients, people should be seen as fully competent agents who assume an active role in the relationship relying on their own expertise, skills, values, and criteria.

Much theory in participatory agricultural extension and farmer-to-farmer knowledge production supports this adjustment in epistemology. Numerous experiences show how a de-emphasis on expertise and support for local knowledge can lead to greater understanding of complex agricultural systems (i.e., McGreevy 2015; Roling and Wagemakers 1998). However, while a commitment to these democratized epistemologies address some shortcomings of the knowledge deficit model, it is unclear how much leeway individual actors have to enact these types of programs, given the guidelines set in the BFRDP.

Given this limitation, I offer a parallel example found in the field of public health intervention where grant parameters were redefined to open the boundaries of change strategies. Federal health interventions that relied solely on individualistic behavior change models have faced withering criticism from scholars who investigate the social determinants of health (Marmot et al. 2008). A focus on health services was seen as insufficient and reactionary, rather than working towards upstream investigation into the drivers of health inequity (Jones et al. 2009). One response at the federal grant-making level has been the Centers for Disease Control's call for policy engagement to address individual health outcomes (Bunnell et al. 2012). The agency has set up a funding mechanism called the Policy, Systems, and Environmental (PSE) improvement strategies in order to motivate healthcare practitioners to address individual health via structural solutions. These include financing the placement of community members on health planning boards and the creation of tools for community representation within bureaucratic organizations (Honeycutt et al. 2015). This framework carries an implicit understanding that well-intentioned individualized health interventions may exacerbate health inequity, and interventions should focus on changing the broader policies and norms around health instead of seeking to make behavior change. This paradigm shift could be imagined in a beginning farmer/agricultural policy landscape.

Following this concept, a policy engagement oriented BFRDP could preferentially support projects that contribute to resolving the structural barriers that farmers face. While technical training is certainly a crucial part of agriculture, solely relying on individualistic training to hurdle structural barriers is an engine of disparity. Following the model of the systems-oriented PSE programs, the BFRDP would spend less time providing horticultural advice to farmers like Alejandra and more time supporting her participation in the governance and making of her regional food system.

In this hypothetical shift, grant recipients who previously focused on creating new capacities amongst beginning farmers work to create a system where those same farmers have improved chances at success. Instead of educating farmers about how to negotiate a fair lease, programs would work towards appointing a farmer representative like Alejandra to county housing boards in the pursuit of novel ordinances to protect tenant farmers. Farmer support institutions could test these ordinances, like a provision that compensates tenant farmers for capital improvements and share the results in other new farmer communities. Instead of solely teaching farmers business management, programs would lobby to reduce ethnocentrism in the existing agriculture loan products available. A beginning farmer support program that looks upstream to structural barriers would not just teach marketing strategies, but rather challenge

buyers and shippers to innovate on contracts that meet the needs of low-resource farmers. Alternatively, farmer advocates could challenge the monopolizations of shippers.

A BFRDP in this vision unbound by the limits of the knowledge deficit model would acknowledge how power influences winners in the food system instead of reifying singular pathways to change. In a food system with significant structural barriers to entry, making better farmers does not necessarily mean making new farmers. Beginning farmer experiences are diverse, and in many cases, improving cognitive resources may be central in their success. But this assumption needs to be examined before implementing such programs while attempting to support all beginning farmers in a just manner.

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CHAPTER 4 –
LAND ACCESS MAPPING IN A RENTER'S WORLD: A participatory mapping framework to facilitate farmland access

Beginning farmers face an entrenched land access barrier, threatening to dead-end an aspirational agricultural transition strategy (Ackoff, Bahrenburg, and Shute 2017; Plotkin and Hassanein 2017). Problematically, the structural and spatial aspects of this challenge have been largely overlooked by dominant beginning farmer interventions. Mainstream interventions emphasize entrepreneurism, horticultural training, and farm business education (i.e. Williamson and Katchova 2013; Mishra, Wilson, and Williams 2007; Mishra, Wilson, and Williams 2009), expressing a logic of individual capacity building. However, the challenge of access to farmland for small-scale and beginning farmers is best characterized by the informal social interactions that mediate access, of which individual capital is only part (Calo and De Master 2016). These dynamics are especially salient in tenant farming operations that have come to dominate the farming experience for new entrants seeking small parcels of land in high value peri-urban regions (Hachmyer 2017; Calo 2016). In this setting, access is not just about gaining the singular right to lease a property, but rather manifesting the social power to continuously negotiate secure and beneficial tenure to the land. Researchers observing the entrenched social and political economic drivers of the land access barrier warn that without structural efforts to facilitate access, the beginning farmer movement will be relegated to a niche phenomenon (Calo 2018; Horst and Gwin 2017; Wittman, Dennis, and Pritchard 2017).

This understanding of access demands that beginning farmer interventions expand beyond economic supports and work towards creating the social power needed to secure tenure on the land. In this paper, I explore how emerging Geographic Information Systems (GIS) and participatory mapping tools have the potential to augment a farmer's ability to make improved land access claims—the strategies, rhetoric, and processes employed in pursuit of access to a resource. The extent of which these access claims are granted legitimacy by nodes of authority is a central feature of determining access. Targeting interventions at the site of access claims is a key step to engage in the overlooked structural dimensions of the land access dilemma. I contend that the spatial aspects of the beginning farmer land access dilemma have a special relationship to the technologies of mapping, registration, the making of territories, and GIS. I propose that creating and using spatial tools can attend to some of the ongoing forces that mediate access, thus providing greater legitimacy for beginning farmers and beginning farmer support organizations.

To explore the implications of participatory mapping interventions for beginning farmer challenges, I first review the problems of land access, highlighting spatial and social aspects of the issue. Then, I review contributions from the field of critical GIS that show how spatial interventions are thought to provide legitimacy for making access claims. Based on this review, I trace how GIS tools are increasingly being used to promote a variety of large scale and industrial agricultural visions, often overlooking or even entrenching the land access dilemma. Finally, I present a functional example of a geospatial land access intervention framework—a web-based participatory GIS framework for monitoring, analyzing, and interrogating patterns of agricultural land ownership for beginning farmers in the California Central Coast. The framework, embodied in a novel GIS tool called the Farmland Monitoring Project (FMP), proposes to use participatory mapping tools to support farmers and farm support organizations in their access claims. The tool

proposes to do this in three ways: 1) crowdsource the identification of available farmland parcels rendered invisible amongst existing sources; 2) aggregate land ownership information for ongoing monitoring of consolidation trends; 3) produce "story maps" that interrogate spatial delimitations of land ownership and management regimes. These three features aim to contest entrenched understanding of "available land" and provide new social power to farmer groups who struggle with land access.

Using the FMP as a case, I discuss the ways emerging GIS tools engage with the structural aspects of land access for beginning farmers. Thinking about the access dilemma from the perspective of the social relations that govern the ability to benefit from farmland, I contend that GIS tools oriented towards land access have a key role to legitimate appeals made by farmers seeking farmland. Despite this optimism, the FMP still carries embedded assumptions about land use and land transfer, an inevitable consequence of spatial representations of social systems. Within a landscape of rapidly emerging GIS interventions for agriculture, I bring the reflexive and power-aware spirit of the critical GIS literature to examine the future of GIS use for the land access challenge. As this scholarship suggests, GIS interventions can both provide new social power to its users and reinforce the status quo.

LITERATURE REVIEW

BEGINNING FARMER LAND ACCESS: TOWARDS INTERROGATIONS OF POWER ACROSS SPACE

As the aging US farmer population retires, it is predicted that 10% of all US farmland will change hands before 2020 (91 million acres) (USDA NASS 2014, Jablonski et al. 2017). Anxiety over the future shape of the agricultural sector motivates the creation of new farmer incubator programs, federal funding to train new entrants, and policy campaigns aimed at easing beginning farmer transitions. For some farmer advocacy groups, beginning farmers are seen as a force of agricultural transformation, where a new generation of farmers will replace retiring farm operations with novel direct marketing arrangements and environmental sustainability (Ruhf 2013). At the federal level the depreciating farm sector is seen as a risk for rural livelihoods and food security. In the 2014 Farm Bill, Congress legislated support for the US Department of Agriculture (USDA) Beginning Farmer and Rancher Development Program (BFRDP), the flagship funding source for beginning farmer training programs. The Farm Bill also directed the Farm Credit System to investigate the unique loan requirements of beginning farmers (USDA 2016). Congress is expected to continue to fund these programs as well as consider a variety of beginning farmer specific provisions in the Farm Bill re-authorization process now underway.

Despite these policy goals, beginning farmers face an entrenched barrier in gaining access to quality, suitable, and affordable farmland (Horst and Gwin 2017; Shute 2011). In some areas, the high value of agricultural land is often prohibitive for many new entrants (Ackoff, Bahrenburg, and Shute 2017). Regional variation in agricultural land prices plays an outsize role, as some prices are inflated due to proximity of high-value residential markets. Other areas may be less expensive, but may lack connection to elite consumption hubs often found in urban coastal cities. Beyond the initial price point of agricultural land, beginning farmers face challenges in finding land that is suitable towards their farming operation—land available could be too large for a new, small operator, or have a lack of nearby affordable housing (Parsons et al. 2010). If beginning farmers do arrange new operations on high-value land, as was found in a case in the California Central Coast, rental rate and debt burdens combine to restrict farmer autonomy (Calo and De Master 2016). While access to high-value food markets is plateauing

(Low et al. 2015), farmers seeking premium prices require proximity to high-value urban markets. Thus, beginning farming is largely happening within the context of tenant farming arrangements, a dynamic that both explains and dominates the land access dilemma. Nationally, 40% of all farmland is rented out to others and in areas where demand is high like California, 47% of all agriculture is practiced on rented land (Bigelow, Borchers, and Hubbs 2016)[14].

In this renter's world, exemplified by a region like the California Central Coast, landlord-tenant dynamics exert a powerful force on beginning farmer livelihoods. Beyond the initial entry barrier—gaining a use right to farm in the first place—many tenant farmers continue to be pressured by land access challenges, as rent payments and lack of autonomy restrict their agricultural decision-making (Katchova and Ahearn 2016; Beckett and Galt 2014). Land tenure, or lack thereof, is key constraint that may prevent farmers from making land use decisions that align with diversified farming systems (Kremen, Iles, and Bacon 2012). New farmers can be overlooked by other tenants with established credibility and verbal lease agreements can offer little long-term security (Calo and De Master 2016)[15]. The quality of farmland can be exaggerated by eager landlords, resulting in poor yields, or infrastructure failure. Increasingly, these new farmers face competition from farmland investors, whose activities further financialize the land value in search of secure returns (Fairbairn 2014). Additionally, farmers excluded from the large floodplain farm parcels who have secured leases on properties with residential value are always in danger of eviction (Johnson 2008), especially when their farm operation improves the amenity value of the property (Calo 2018).

Although these structural aspects of tenant farming dynamics characterize land access, the problem is often approached from a standpoint of the economic problems of small-scale agriculture. Work from the microeconomic approach investigates the determinants of farm profitability by analyzing national farm finance statistics (Mishra, Wilson, and Williams 2007) or through survey responses about beginning farmer incomes (Jablonski et al. 2017). In this way, land access for beginning farmers is understood as a problem of supply and demand, where improving farmer incomes facilitates land acquisition (Katchova and Ahearn 2016; D'Antoni et al. 2009). This microeconomic narrative translates to the broad approaches to beginning farmer interventions. An analysis of the USDA's BFRDP revealed that the dominant form of grant-funded programs proposed to train farmers in entrepreneurism, niche product marketing, and horticultural techniques even while recognizing the structural nature of land access issues (Calo 2018). Some farmland conservation groups raise funds to purchase development rights on farmland, ostensibly reducing the land value (Johnson 2008). While these interventions view land access as a problem of expensive land and cash-poor farmers, property theorists have long understood access as a structural issue of power, authority, and informal social relations.

Access is more appropriately considered as the ability to benefit from a natural resource stream (in this case, arable land) (Ribot and Peluso 2003). This ability is mediated by a series of informal interactions—"access mechanisms" such as technology, capital, markets, identities, knowledge, and social relations. Sanctioned rights, like a lease agreement or a land title, are indeed key discrete moments in the broader theme of access. However, continuous access negotiations are seen to also mediate a farmer's ability to draw value from the land (Peluso and Lund 2011; Hall, Hirsch, and Li 2012). These negotiations, in the US farmland access example, include the ongoing impacts of terms of the lease, the debt accrued in financing the farm, the

[14] When grazing lands are excluded from tenure analysis, the amount of farmland rented out increases to 61%.
[15] Farmland ownership is racially skewed. Based on data from the last USDA census of 2012, 97% of all agricultural land is owned by someone who identifies as white.

discretion of the landlord to direct farming practices, and the zoning of the farm parcel. Where improved capital resources may grant one the right to enter in a new agricultural lease, like in peri-urban California, researchers showed how factors like landlord discretion, problems of cultural credibility, and the unequal distribution of policy supports influence the ability of a farmer to benefit from the land (Calo and De Master 2016).

Addressing the land access problem for beginning farmers with this theoretical framework of access is more difficult, or at least less distilled than with a microeconomic framework. Interventions within an access framework would thus intend to bestow new power on tenant farmers presently unable to contest the social forces that modify their land tenure. In other words, if questions of access are central to the fate of beginning farmers, interventions would focus on generating what Sikor and Lund (2009) call "legitimizing practices", or the techniques that groups use to make successful claims for increased access. Of these practices, this paper focuses on the techniques that achieve spatial ordering, or the socially determined sorting of people across space.

> Institutions undertake a wide variety of activities to legitimize their authority. However, since we are concerned here with property regarding land and other natural resources, the notion of territoriality deserves particular attention. The control of spatial ordering and the control of people in space combine different techniques and policies of classification, registration and mapping. (Sikor and Lund 2009, 15)

An example of the control of spatial ordering in the land access case is the representation, registration, and management of private property boundaries. Control over this feature, its presentation and disclosure, implies the social relationships of land use, indicating who has legitimate claims to carry out activities on the land. In modern, Westernized property systems such as those of the US, private property boundaries, represented through spatial representations, tend to grant landowners or permitted land users (e.g. tenants) with the power to exclude (Guldi 2012; Wood and Fels 1992). Spatial ordering is also achieved through municipal government determinations of what lands will be permitted to be used as agricultural zones, and in public planning documents that depict approved visions of future land use.

Despite their centrality in arranging people across space, the spatial dynamics of the land access dilemma are often under appreciated. Jablonski et al. (2017), in a review of best practices that modify beginning farmer incomes, chose not to include farm location as a variable that influenced farmer incomes. This exclusion, the researchers noted, may confound their results. Through anecdotal evidence, however, the authors suggest that location of the farm parcel likely had a strong effect on farm success. The authors lament, "Unfortunately, in many cases there is not much one can do about the location of his/her farm or ranch." On the contrary, for beginning farmers seeking land, this "choice" of location, and the constraints on this choice, is fundamental to their ability to gain access to the benefits of agricultural production.

CRITICAL GIS: MAPS AWARE OF SOCIAL POWER

Critical GIS scholarship informs how maps, geospatial analysis, and mapping technologies exist as both expressions of values and analytical processes (see O Sullivan 2006; Harris and Weiner 1998). Early work in this domain shifted understanding of mapping as a value-neutral inventory of the earth towards a process of representation modified by assumptions and value systems (Pickles 1995). Historical analysis describes early mapping as a tool for

making dominant positivistic visions of the world, notably imbricated with periods of colonization, imperialism, and militarism (Wood and Fels 1992). Modern critiques continue to demonstrate how GIS tools express ideas of "what is" without explicitly revealing the embedded values and assumptions behind these analyses (Haklay 2013; Kwan 2002; Warf and Sui 2010). Scholars show how GIS embodies privileged and often positivistic ways of knowing (Kwan 2002; Elwood 2008). For example, researchers have showed how an "official" map can serve to illegitimate competing claims to resources, criminalizing visions of land use by the traditionally oppressed (Peluso 1995). Dwyer (2013), showed how a map produced by Laotian state technicians (at the behest of a Chinese rubber company) laid the foundation for formalizing land ownership, bisecting all land into the categories of "forest" and "agriculture," thus making visible the ideal targets for contract farming. These interrogations of how social forces shape GIS remain important as the technical capabilities of GIS tools increase, diversify, and become much more complex, further obscuring the methodological steps underlying their analyses and their predictable implications for society. On the other hand, these broadsides against an entire discipline have tended to prevent GIS practitioners from constructive development. Instead, the field seems to diverge into silos, where "uncritical" development of new powerful tools continues unabated and critics shy away from helping build emerging methodologies (Thatcher et al. 2016).

Schuurman and Pratt (2002), embracing a feminist aversion to "antagonistic dualisms," provide a crucial intervention towards a more constructive approach to GIS practice. They ask, "What would criticisms of GIS look like if the attitude of the critic shifted from one of exposing error to a careful study of the production of truth?" Following the lead of the reflexive scholarship of Elwood's (2000) inquiry into how GIS projects shaped the politics of urban interest groups, Schuurman and Pratt argue that interrogating the GIS design implications and outcomes from a practitioner perspective has the potential to shape a powerful new force in society. They suggest that critiques of GIS as a whole fail to contest or construct the discipline in a meaningful way. They write "the stakes in constructing GIS are too high to choose the position of external critic when being on the inside is more effective epistemologically—and ontologically." (Schuurman and Pratt 2002). They liken this approach to Haraway's "looking for the cracks" framework for resisting the colonial and positivistic forces of society from within the logics of the dominant system (Harvey and Haraway 1995). The goal of political inquiry, they argue, is not to propose anti-GIS alternatives, but to operate from the position of those with no choice but to engage with the oppressive system pressed upon them. This form of feminist GIS practice and research opens up space for practitioners to practice GIS work that is aware of the forms of knowledge represented and excluded from mapping technologies and their associated narratives (Elwood 2008).

One approach for GIS scholars to satisfy these objectives has been to increase community or user participation in the stages of GIS development, problem generation, and data collection. The field of public participation GIS (PGIS) has engendered a suite of collaborative mapping efforts to analyze and reflect on spatial information (Elwood 2006; Dunn 2007). Alternatively, some suggest that if mapping possesses unique powers of authority, alternative maps can be made to counter existing power relations (Peluso 1995; Hazen and Harris 2006; Taylor and Hall 2013). Here, socially-aware GIS tools are used to counter-represent appeals to authority from official sources, either showing the visions of land use that under-represented groups hold or mapping variables overlooked by powerful actors. These approaches coalesce into the current form of critical GIS, in which geographers suggest an ongoing reflexive practice that prioritizes

1) exploring the political economy of GIS tools, and 2) an assessment of how GIS interventions might precipitate social and environmental justice (Thatcher et al. 2016, 201).

In this morass of GIS approaches and ballooning use, Wright (2009) provides a particularly clear-headed view of how GIS tools may be used for natural resource decision-making. Wright's position rests on how the dialogue between expert knowledge and natural resources users reflects and grants social power.

> GIS maps provide a potential portal to the collaborative development of stories about landscapes. When an impersonal database can be queried and the results seen by stakeholders of many stripes […] something important happens to an adversarial dynamic.

The invitation of multiple, diverse actors to contribute to, and to analyze, spatial data central to their livelihoods is a constantly public expression of values and assumptions about the existing and potential land use. It is this expression, made in a new way, that provides the transformative potential of a critical GIS process:

> GIS technology is not going to improve communications unaided, but the process it initiates, of communicating over a multilayered map, even in a conflict-ridden setting, can become itself a tool of change. (Wright 2009, 265)

GIS tools are thus not to be considered as a true or better representation of the world, but as a *means* of generating new, democratized dialogues concerning areas of uncertainty and conflict. While Wright and others do not explicitly comment on the property and access literature, their observation of how GIS tools can generate new social powers or democratize land use decision-making resonates with property theory. The linking strand is legitimacy formation and spatial ordering. Sikor and Lund (2009) view practices like official mapping and spatial registration tools as part of the techniques that groups use to legitimize their access claims. The optimistic critical GIS scholars show how the design of such mapping tools may be organized around re-distributing the power of legitimacy formation. This theoretical alignment provokes a continued exploration of critical GIS and land access interventions.

RISING GIS APPLICATIONS FOR AGRICULTURE

Given the critical GIS frameworks for understanding how spatial technologies interact with representation, social power, and the formation of legitimacy, it is worth considering the current moment of GIS applications for agriculture. There are now many spatial tools that propose to improve, adjust, or "better" agricultural systems (Bronson and Knezevic 2016; Hogan et al. 2017). GIS tools have long been applied to agriculture, but few explicitly describe their visions of agricultural land tenure. Nevertheless, the embedded assumptions within these powerful tools continuously express articulations of land tenure and land use arrangements. A complete review of values embedded in agricultural GIS technologies is outside the scope of this paper, but a partial review of notable contributions and the values they reproduce is worthwhile.

AcreValue, acquired by the farm business management software company Granular in 2015, uses the tagline "prospect for land like a pro" (Acre Value 2018). The tool, via an interactive spatial interface, supports real estate investment in agriculture. AcreValue proposes to accomplish this goal by providing land ownership information and predicting sale prices. A

subscription fee grants users access to advanced analytics and expanded geographical detail. Currently, AcreValue operates in select Midwestern states, with plans to expand nationally. Another private software company offering a suite of spatial tools is the Climate Corporation, bought by Monsanto for $930 million in 2013 (Upbin 2013). Climate Corp, found at the domain climate.com, uses predictive analytics and personalized data representations to support corn and soy farmers in maximizing their yields. Their software, called Fieldview™, uses satellite imagery to alert farmers of potential crop disease and water stress, and then suggests how the application of certain inputs can remedy identified problems (Climate 2018). The tool offers the ability to diagnose crop disease via satellite predictive analytics and machine learning.

Beyond for-profit mapping tools, non-profit and conservation groups also employ spatial tools for agricultural decision-making. One such group is the Bay Area Greenprint, a collaborative project between the American Farmland Trust and The Nature Conservancy. This project provides an interactive map database of "multiple benefits of natural and agricultural land" for eight Bay Area counties. Represented as layers on a map, the Bay Area Greenprint shows datasets of food production, water yield, carbon storage, water quality, outdoor recreation, prioritized habitats, and habitat connectivity. Users can query certain areas of interest and the platform will summarize the relative contributions of their measured attributes. Their stated goal is to inform city planners and other stakeholders of how their land management decisions might influence their measured attributes (BAGP 2018).

Bringing the critical GIS literature to bear on these emerging spatial platforms suggests each of these GIS interventions implicitly supports a vision of agricultural tenure. For example, if a mapping technology offers proscriptions of some agricultural management, its audience must be a single, autonomous decision maker. If an algorithm predicts value based on previous crop sale, the designers of the algorithm envision farmland as a liquid financial asset. When a GIS represents farmland value as "tons of crops produced," it is implicitly valuing the production aspect of the land over the cultural. The Bay Area Greenprint provides a detailed description of how they calculate the various values of food production. Their methods section is an impressive display of transparency. Yet, they do not divulge how or why they chose these values to represent. Visions of land tenure regimes in maps and mapping tools are rarely explored explicitly, reinforcing the need for critical examination and a reflexive approach towards spatial tools for agriculture.

METHODS

To explore how participatory GIS tools and the spatial characteristics of land respectively influence the land access barrier, I led the development of the Farmland Monitoring Project (FMP) over a four-year period, from the project's inception in 2014 through 2018. In my early research in the region, I saw how powerful actors used GIS tools to achieve their land access goals, like identifying land for large-scale real estate investment or farmland consolidation. Following Schuurman and Pratt's (2002) call, I wondered if a participatory GIS could invoke the same powerful results. Here, I describe a participatory research and development process through semi-structured interviews and participant observation of early design meetings. Once an early version of the tool was put into production, I observed the use of the FMP with individual farmers, through online communications, and through a series of four workshops that engaged beginning farmers in working through the land access dilemma, using the FMP. In some cases, semi-structured interviews of FMP users were conducted. Finally, the data that beginning

farmers submitted to the FMP provide insight into how farmers use the tool in search of land access.

Hands-on workshops were designed to conduct outreach of the FMP and gather a broader set of farmer inputs to inform design. Workshops consisted of a brief presentation about land access challenges and facilitated a dialogue about participants' experiences in finding land. Then, the FMP was described, noting an iterative design process, and soliciting verbal feedback. After an initial round of input, participants were offered the chance to engage with the FMP website, being prompted to complete a variety of potential tasks and queries. After the hands-on portion of the workshop, participants were asked to submit verbal or written feedback. These workshops were audio-recorded when possible; the recordings were transcribed and analyzed for key themes. Because the critical GIS literature underscores the importance of values and assumptions embedded within technological interventions, reflection by participants on design throughout the stages of development of the FMP are a crucial source of data (Jonson 2005). In this regard, reflections-in-practice of the designer, myself, are used to understand the often-invisible assumptions undergirding the FMP technology (Schön 1983).

Beyond the assessment of the FMP, I sought to understand how the spatial aspects of farmland influence the land access barriers. I observed beginning farmers in the Central Coast as they aimed to scale up their farming operations in everyday practice. I went with farmers as they visited potential new parcels, spoke with realtors, consulted with NGO staff, and attended farmland access mixers. Through these observations I noted how spatial aspects of farmland influenced a farmer's assessment of "availability."

FINDINGS

FARMLAND SUITABILITY: BEYOND AGRONOMIC FACTORS

The location of parcels can drive land suitability assessments for prospective farmers. Even in cases where beginning farmers have the appropriate skill, capital, and willingness to enter into a new land use agreement, the land's location and its associated implications can alter the suitability of a parcel. A farm parcel's distance to markets or distribution centers may increase the financial burden on farmers by increasing commute time and opportunity costs. Farmer's often expressed how long drives to market also meant having to stop to eat meals on the road, further reducing the benefits of a lucrative, yet distant market. Farm microclimates may allow some crops to excel and others to underperform. Microclimates also interact with irrigation infrastructure and a parcel's water governance. A parcel may be on "county water," subject to rate changes and volume reductions. On the other hand, a site with an existing well, could mean a higher rental price for the farmer. A farmer's personal spatial environment is further overlooked. The commuting distance from a farmer's home or apartment can cut into farmer incomes. In fact, there is a perverse dynamic where the peri-urban parcels that represent the most ideal location to serve urban niche markets are associated with the highest housing costs. Farmland in these area takes on residential value. Farm parcels with an attached or adjacent homesite can be particularly desirable but rare in high-value rental markets. A farm family's proximity to school or child care is also embedded in the spatiality of potential farmland.

Maps and mapping technologies express claims about boundaries, recognized territories and therefore, allowable use. Spatial ordering practices like registration and mapping processes of municipal zoning, prime farmland designations, and property ownership information play an

under-recognized role in shaping the land access dilemma. Zoning, a municipal government classification system that expresses what land can be legally used for, dictates the types of activity that can be carried out on the land. As the priorities of a local government authority shift, these zones are amended and altered to favor or restrict land use activities like agriculture, new development, environmental protection, and commercial activity. Existing farmland designations identify areas of land with historically productive soils and extant farm properties. These designations legitimize the maintenance of certain forms of agricultural production and protect farmland from encroaching development as well as "lock in" certain forms of land use (Smith, Voß, and Grin 2010). Finally, ownership parcels identify the individuals or entities that maintain recognized property rights over a given area. The information is in the public domain, but a variety of bottlenecks prevent the broad disclosure of ownership information. First, each county maintains its tax assessor information in different ways and in different formats. Therefore, it requires knowledge of multiple registration systems to understand ownership across the counties of the Central Coast. Second, citing an aversion to revealing the address of acting public officials, some counties choose to hide *all* information from parcel maps. The intended use pathway is to individually request ownership information. Finally, many landowners, valuing privacy, may ask or petition the manager of a mapping service to hide the land ownership information. Sometimes, landowners may even petition to remove the shape of their otherwise identified parcel.

Importantly, the set of "available land" for new leases is a dynamic knowledge object, dictated by landowners who decide when to make their land "visible" to potential tenants or buyers. Because there is no publicly accessible database of land available for farmland use, landowners can determine the timing of making their listing public. Landowners can also selectively disclose information about their land, either searching out particular tenants, or releasing partial information about the land quality. In this same way, the landlord controls the initial ability of farmers to assess quality when making a land listing available.
Given the inherent spatial dynamics of the land access dilemma, and the power of spatial ordering practices to mediate access, participatory GIS interventions may support a more structural land access approach.

THE FARMLAND MONITORING PROJECT: ORIGINS, TECHNICAL DESCRIPTION, AND IMPLICATIONS

What is the problem? Participatory problem definition

The genesis of the Farmland Monitoring Project began with a series of open-ended workshops at the Agricultural and Land Based Training Association (ALBA) near Salinas California. ALBA is a farm incubator program that offers training in small-scale organic food production, a food hub for cooling and distribution, and subsidized leases of their 150-acre farm property to graduates of their training program. ALBA's recruitment process focuses on providing career pathways in agriculture to farmworkers and aspiring farmers in the region. The workshops were held amongst UC Berkeley researchers and beginning farmers, and ALBA staff facilitated a conversation about the key barriers to success for their constituency. These workshops were supplemented by field visits with ALBA farmers, participant observation of beginning farmer operations, and semi-structured interviews with farmers and ALBA staff. Our goal was to work towards a farmer-led research agenda. During this exploratory research phase, researchers learned about the informal social relations that create and complicate land access

barriers (Calo and De Master 2016). After identifying these land access challenges as an entrenched problem deserving of additional research and intervention, I worked with other UC Berkeley researchers to form a partnership with the non-profit California FarmLink, a rural development organization focused on direct services for farmers seeking land. The role of this group was to guide the creation of an applied resource for farmers facing land access barriers. These consultations provoked conversations about using mapping tools to engage with the land access dilemma. As one resource provider noted:

> These are growers who are selling to local markets and businesses and at a certain point it becomes a regional land use planning issue. There is no one stop shop for this information […] Farmers want to be able to look at a map. Because farmers have requirements of where they want to farm. Where do they live? How far away is it from their markets? We've seen some cash flow models where the majority of their expenses are from gas. I think the need [for a mapping tool] is definitely there. But a lot of the land is privately owned. Someone may have 50 acres, but how do you translate that to two, 20-acre parcels for new farmers?

A land's location in relative space thus constrains the resource providers' ability to support the search of beginning farmers for suitable parcels of land. The spatial attributes of a parcel may serve to increase the suitability for some farmers while making the prospect of operating there untenable for others. These forces operate outside of other attributes that determine suitability, like price or rental agreement. In many cases, the spatial attributes of a parcel, like proximity to child care or to regional produce distributor, ruled out otherwise desirable parcels with quality soils, lease rates, or landlord relationships. It became clear that the spatial aspects of a parcel needed to be made much more transparent to prospective farmers, and that farmers needed a way to determine how the spatial characteristics of a parcel matched their own agricultural vision and social/cultural needs. This farmer-driven assessment stands in contrast to interventions that attempt to "score" the quality of location, based on a variety of predetermined variables[16].

As the spatial dynamics of the land access barrier became more pronounced, we proposed the original concept of the FMP. Originally, the FMP was designed to represent land access in three Central Coast Counties (Santa Cruz, Monterey, and San Benito). These three counties represent one of California FarmLink and ALBA's key operating areas. As interest in the project grew, the FMP expanded to San Diego and Sonoma Counties.

Through focus groups, design meetings and participant observation, farmers, FarmLink staff, and I observed how different forms of information about land interacted to form a picture of availability. This first type of information was knowledge about land that is up for rent. Both ALBA and FarmLink staff expressed frustration that there was a dearth of farmland rental listings that they could tap into. Occasionally, ALBA and FarmLink staff reported that landowners, familiar with their programs, would call and give a few details about some land that could potentially be arable. Both ALBA and FarmLink would then aggregate these listings and present them to their participants and clients. Farmers expressed frustration that there was no place to find out if a piece of land was available. "It's not like they put up 'for rent' signs," one farmer commented. The comment indicated that land was indeed changing hands from one tenant to the next, but the process of identifying and securing these leases was informal and

[16] See walkscore.com, for example. Much of "Suitability Analysis" is a GIS tool aimed at assigning scores to an area based on a set of quantitative attributes.

highly uncertain. Knowledge of availability came from individual farmers probing around, asking friends and their current landlord about a piece of land they had seen. Farmers also identified that sometimes, these inquiries could *make land available* by bringing a proposal to the right decision makers, whether it was a ranch manager or a landlord. In the Central Coast, farmers were often aware of large parcels of agricultural land that had many desirable spatial attributes. However, as a beginning farmer, they only had the capital or desire to farm smaller parcels of land. Landlords, farmers commented, were hesitant to break up the leases of their parcels, preferring to arrange a single lease agreement to a larger farmer than risk the management of many smaller tenant farmer arrangements.

Focus groups also revealed the importance of the legal and environmental aspects of a parcel. ALBA and FarmLink staff noted the importance of zoning, as they shared anecdotes of farmers entering leases, only to find that the zoning rules prohibited certain forms of land use or development. A false start for farmers could be devastating to their business plan. Also, farmers wanted to able to assess how the land may shape their growing practices. In particular, farmers wanted to know about soil characteristics, neighboring resources, and the variety of rental prices.

We proposed that the FMP could be used to collect, organize and represent two types of knowledge crucial to the land access problem. The first can be thought of as official knowledge, formed by existing classification datasets that describe farmland quality and availability. The second is farmer knowledge, formed by individual interpretations of farmland suitability. Through our period of learning, we posited that neither type of information alone was sufficient to support farmers in gaining access to farmland. The ultimate goal of the FMP is to facilitate the *joining* of these two types of information with spatial representations and customizable search. In the following section, I describe the major components of the official and farmer knowledge supported by the FMP and review how the web-based GIS organizes their representations.

Official knowledge

County and state-wide datasets regarding ownership, zoning, remotely sensed farmland polygons, and soil type form the basis of the official knowledge represented in the FMP. These datasets, obtained through public offices and databases (Table 5) are processed to represent potential farmland.

Table 5 Data sources used in the FMP

Dataset	*Description*	*Source*
Tax Assessor Parcels	Ownership parcel shapes limited by county boundary. Associated Assessor Parcel Number (APN)	County Assessors, Third Party aggregator
Tax Assessee (Owner) information	APN and owner information including name, site address, and assessee address. The assessee address is the mailing address used for tax purposes.	County Assessor, Boundary Solutions
Zoning	County and municipal zoning ordinances described the rules and regulations governing land use on any particular parcel.	County Assessor, Municipalities
California farmland	USGS remotely sensed details of farmland. Raster 30 -50m resolution	NASS CDL 'Cropscape'
California soil survey	Broad characteristics of soil and farmland in California. Large polygons	CAFMMP

These data types, and the processing decisions are described in detail.

Tax assessor parcels

The core of the FMP is the tax assessor parcel data layer. These data are retrieved from the county assessor's office, which maintains land ownership records for the purpose of tax assessment. These data show the geometric shape of land ownership parcel and assessor parcel number (APN), which provides a unique ID for each parcel in a given county. At a minimum, the tax assessor parcel data will include the shape and APN, but in many cases, the county will affix other attributes to the shape and APN such as area, previous land valuation and site address. For the FMP, the key to making this information meaningful for the purposes of land acquisition is to link the parcel location with the name of the landowner associated with each APN. While this information is held in the public domain, some counties do not facilitate bulk acquisition of such datasets. In some cases, state law prevents counties from releasing the address of any public official. To ensure downloadable parcel datasets do not breach such codes, some counties remove all name and address information from parcel datasets. The address information must be then queried piecemeal from the county website, or from a third-party parcel data service organization. Because the research with farmers demonstrated the power of renter-landlord dynamics on farmland access the unit of analysis is not farmland, but assessor parcel. Negotiation with a landlord will inevitably form a central piece of the beginning farmer

experience. This data representation decision alone focuses the GIS intervention on the social relations that mediate access.

Zoning

Zoning codes and regulations are an underrepresented feature of land accessibility for agriculture. Zoning can facilitate or restrict the construction of buildings, the types of commercial activities, and the types of agriculture. Some zones represent intentions to incentivize agricultural production, by restricting some types of residential development, or indicating affirmative agricultural use. However, much agriculture for beginning farmers takes place on land not zoned primarily for agriculture, relying on rural residential properties that allow for both types of land use. Understanding the zoning types and their specifications of any prospective farmland is vitally important for beginning farmers. In addition, zoning regulations provide a window into potential regulatory changes that may incentivize and or protect beginning farming as a land use type.

On average, zoning polygons align with parcel boundaries. However, some zoning regions enclose multiple ownership parcels and some boundaries otherwise do not align. In order to "assign" a zoning code to an ownership parcel, we used a tabulate intersection function to calculate the percent of coverage for each assessor parcel. Parcels with over 95% of any one zone coverage were assigned that zone classification. All zone percentages are preserved for a complete analysis if desired.

Soil and water information

There are many soil classification databases and their availability and granularity vary by region. To provide near complete coverage of relevant soil information, we chose to use the most broad and complete soil data layer available in California—the CA FMMP soil database. The CA FMMP classifications, like prime farmland and important farmland are also often used in planning decisions. We applied the same tabulate intersection to assign dominant soil values to ownership parcels. All parcels with more than one soil type were assigned a dominant soil type and the complete percent coverage information was retained. Information about water was more difficult to represent. In some areas, like the Pajaro Valley, water governance appears to strongly influence the water availability for a given parcel. These data can be represented by boundaries that determine the overseeing water district. In other areas, the water availability interacts with a farmer's agricultural vision and thus remains highly situated. Thus, water information is a key site of local knowledge. The FMP provides pathways for water details to be submitted by farmers and landowners.

Representing potential agricultural land

The FMP takes a very conservative view of potential agricultural land, with the intent to include many types of land as potential farmland. After consulting with farmer constituencies of the region we learned many seek non-traditional parcels for their first operations. These farms rarely take place on legacy agricultural soils in flat flood plain areas. Instead, they occur in back yards of rural residential parcels, on vacant land owned by the municipality, or on other creative land tenure arrangements. Therefore, when representing potential farmland, it was important to take a very broad view of land that *could* be used for agricultural purposes. This is why a simple

overlay of satellite assessment of California farmland with ownership parcels is insufficient for the purpose of a GIS that considers the land access question. That being said, members of the oversight group agreed to rule out some land that has little or no potential for farmland. These include built-up industrial areas, dense residential or commercial lots, freeways, railways, bodies of water, and ports. Urban agriculturalists would reject even this decision, as dense urban parcels with lots of concrete are the ideal site for building new gardens. However, for the sake of the specific constituency of farmers we consulted with, their minimum size requirements demand land in at least peri-urban parcels of at least .2 acres of arable land. Parcels that did not meet these requirements have been excised from the database (Figure 5).

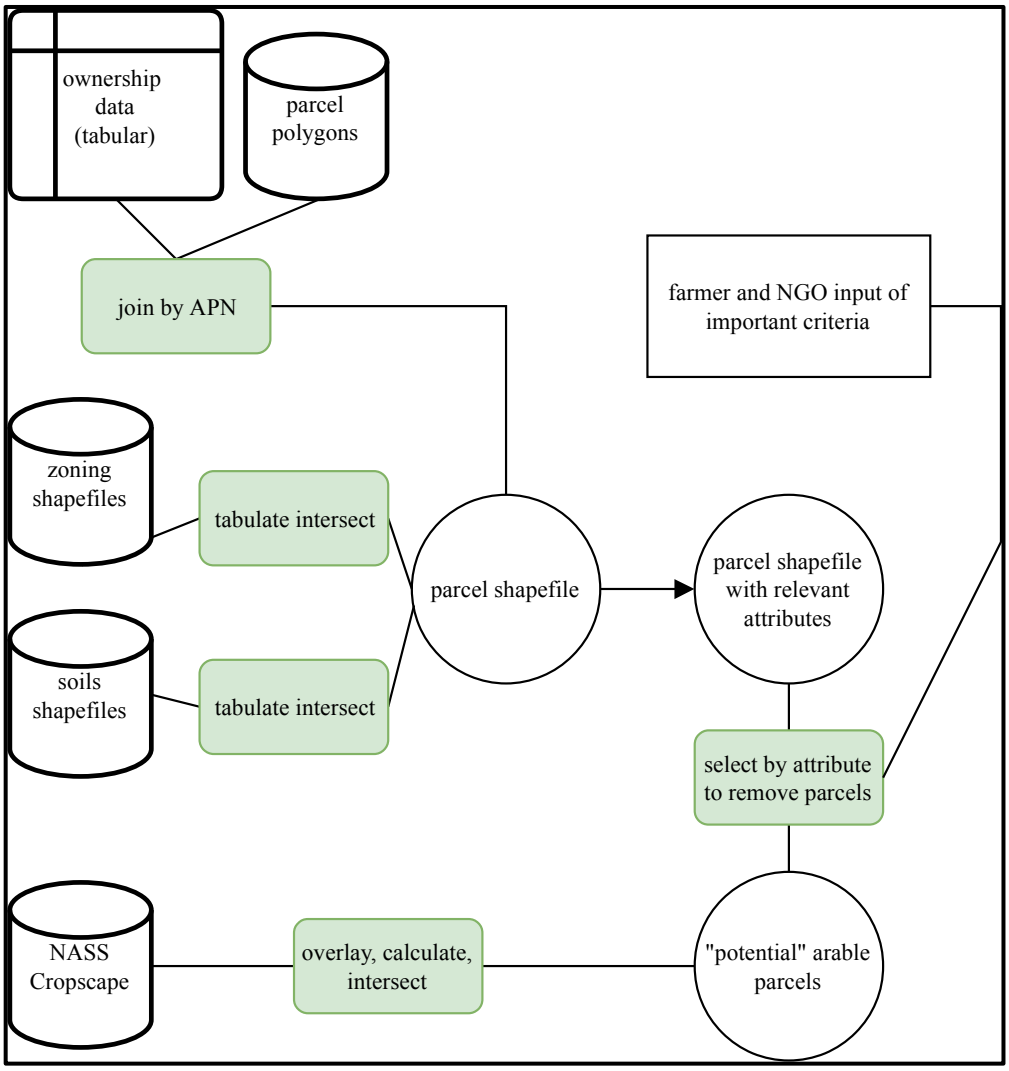

Figure 5 - Geoprocessing step performed in ArcGIS.

Once the data have been processed as in Figure 5, the resulting information is uploaded to an online GIS (CARTO). This service allows for custom visualization, sharing of datasets, and, importantly, a flexible and open Application Programming Interface (API). The FMP uses the CARTO API to display user-generated queries of the potential farmland parcels.

Data submission and aggregation: Facilitating local knowledge

The FMP takes the approach that land characteristics of quality and availability have not been properly represented in a majority of GIS applications. Quality, in most GIS applications, is often defined as some computational outcome based on yield productivity or utility function. For example, in an effort to determine which lands most suitable for farmland zoning protections, Liu et al. (2011) calculate suitability based on soil characteristics, irrigation status, and slope. These estimates are important, but do not include the social or structural aspects that define farmland quality. For example, a parcel may have high quality soil, but may have low quality water pressure. A parcel might be high quality for vegetable production but not for berries and so on. The variety of possible interpretations calls for a local and individualized assessment of quality. A more meaningful assessment of quality would combine some quantifiable classifications alongside a local interpretation. Quality is thus a dialogue between the ecological characteristics and the local interpretation by farmers. The FMP seeks to support such dialogue through aggregating georeferenced farmer interpretations of quality.

Land availability is often similarly constrained. Land "for rent" may be available in some real estate database or listing, but its location, cost, and landowner preferences may exclude it from the total pool of possible parcels. For example, a landowner may only rent to a tenant who will carry out a particular form of agriculture. In one site visit of a potential farm parcel, a farmer noted that the water pressure would not be enough to maximize the use of the full rental property. The farmer offered the possibility of joint construction of a new pump, and the landlord suggested the farmer could change their cropping plan to meet the sites existing irrigation potential.

The FMP takes advantage of an organic sampling pathway: the farmland site visit. These visits occur when an agent with local knowledge—a beginning farmer, a member of a farm service organization, or a land owner—visits a site of potential agricultural development. The visit may be formal or informal.

A formal visit consists of a targeted reconnaissance with the goal of future agriculture lease formation. In this visit, the prospective farmer or farm service staff evaluate the features of the site to understand the potential for a new agricultural operation. There is no official set of assessment criteria. Yet, many farm service organizations and experienced farmers share resources on elements of farmland that should be known prior to pursuing a tenure arrangement (California FarmLink 2018, CASFS 2018). The criteria of assessment can be organized into three main categories: agroecological potential, tenure, and unique farmer attributes. Agroecological potential concerns matters of horticulture. The variables are existing infrastructure, climate variability, irrigation potential, soil type and quality, weed stress, and production history. Regarding tenure, the mechanism of access for any given parcel is evaluated. Individuals seek to know the rent, the frequency of payment, the conditions of a lease, the number of farmable acres, and the level of involvedness with the landlord on agricultural decisions. Finally, each beginning farmer has a unique set of criteria that relates with the parcel in question. The farmer may have a specific business plan or experience that favors some parcels over others. Here is often where the spatial attributes of a parcel are most influential. Thus, some parcels may be high quality in any of the other category of attributes, but because of unique particularities of any beginning farmer, it may be inaccessible.

Informal visits occur when a farmer or farm service agent—because of their embeddedness in agriculture communities—learns of a parcel with agricultural potential. This

can occur when a farmer notices a piece of vacant land on their commute or by viewing an adjacent parcel to their place of work. With prospective farmers who also work as farm laborers, they sometimes may come to know about underutilized land managed by their employer (Calo and De Master 2016). While informal visits can occur physically, they can also occur virtually. In this scenario, a person with local knowledge can view a spatial representation of their neighborhood and identify various parcels with agricultural potential and are able to provide much of the formal assessment criteria from memory.

Finally, beginning farmers with an established farm operation are also invited to submit data to the FMP. These data reveal the characteristics of a current new farm operation. Although the land is not "available for lease," the FMP shows these operations as means of representing beginning farmer activity in nearby areas.

To facilitate the aggregation and representation of land availability from a local knowledge perspective, the FMP used a variety of mobile-based data collection and aggregation techniques. With ALBA and FarmLink's guidance, the FMP employs a mobile-based survey of the assessment criteria. This process is intended to allow farmers, landowners, and farm service personnel to provide specific and contextual knowledge about any piece of farmland (Figure 6).

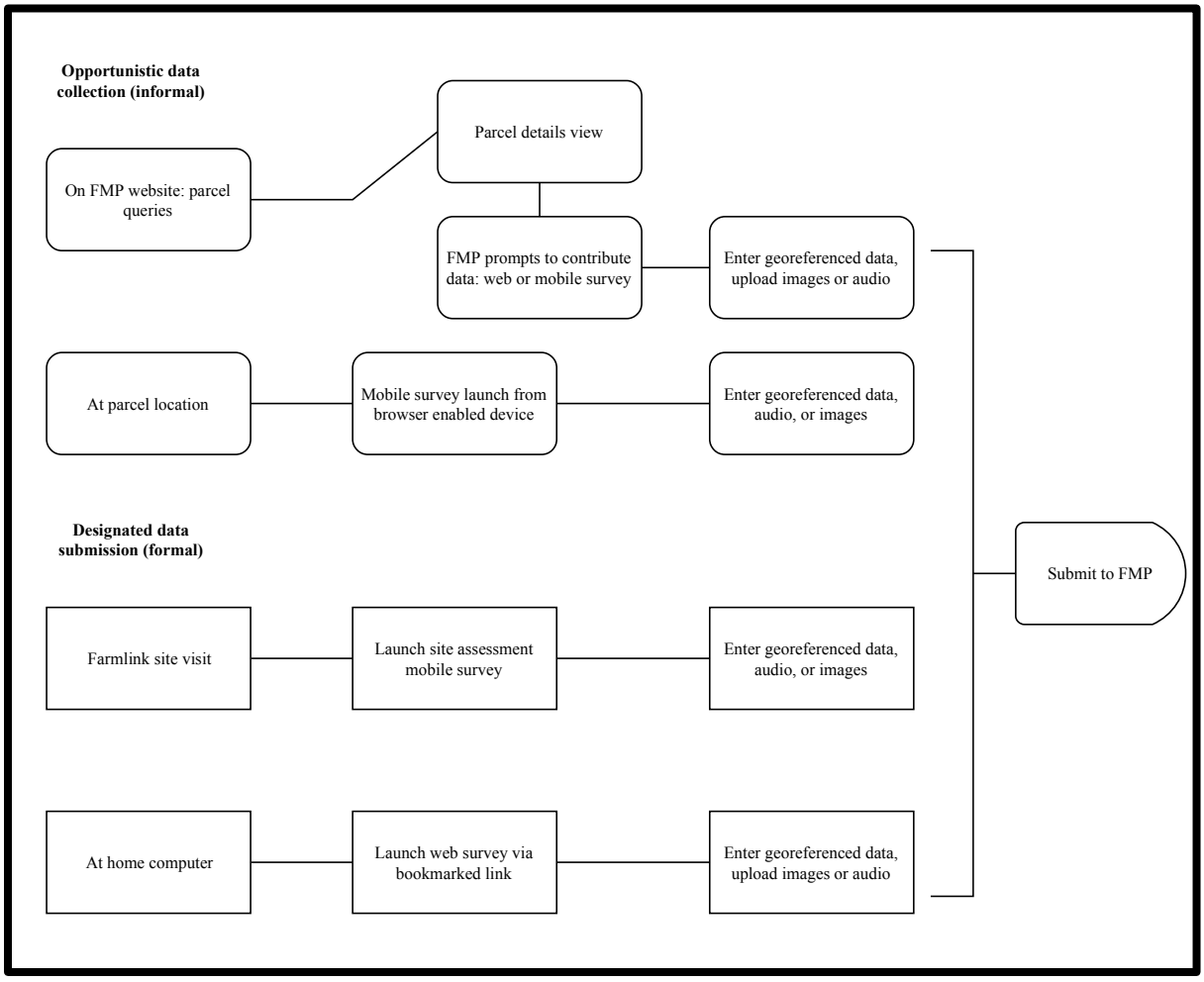

Figure 6 - Process of mobile and web-based data collection supported by the FMP.

To surface and share local knowledge of farmers, the FMP uses software that facilitates georeferenced digital survey creation and management (Ona.io)[17]. The survey can be created in Excel and are rendered on a web browser—on or offline—allowing for multi-platform support. The digital surveys support a variety of media types like audio and GPS coordinates and then are deployed via a browser link to enable repeat observations (Figure 7). The surveys employ skip logic, a process to create custom survey schemas depending on previous responses. For example, if a respondent identifies that there is a well on the property, a series of follow-up questions are displayed. The survey questions were determined through consultations with ALBA farmers, ALBA staff, and FarmLink staff through an iterative process. The survey tool allows for multiple language representations and audio completion of the survey.

When the questions have been submitted, the data can be quickly visualized (in a table or by individual record), edited, and downloaded in a variety of data formats. At this moment, the data can only be viewed by whomever has access to the software account. For a small agricultural land access campaign, or even an individual farmer, this may be sufficient. To facilitate access to a broader agricultural community, these results need to be prepared for geospatial representation and published to the web.

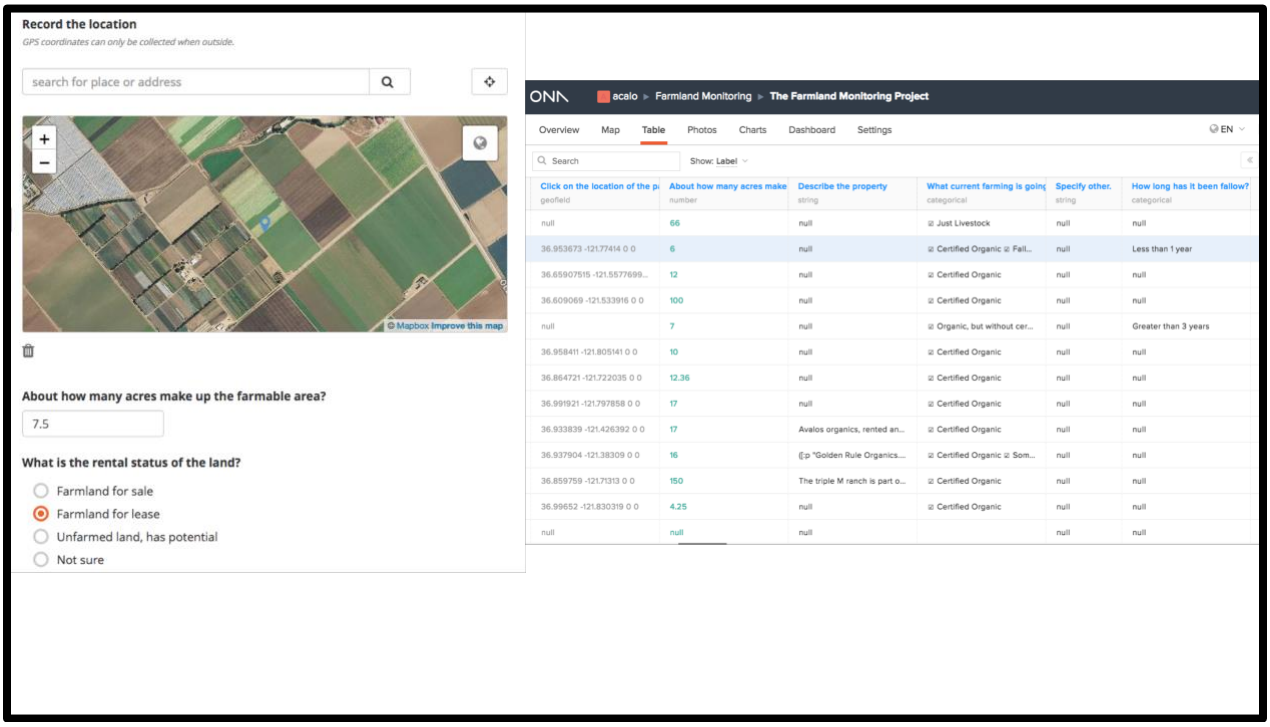

Figure 7 – An image of the mobile data collection survey. The survey uses skip logic to present different questions contingent on previous answers. This figure also shows the volunteered geographic information dashboard, aggregating submissions from farmers into the database.

Through these mechanisms, the FMP can support the crucial local farmer knowledge necessary to understand land access and suitability. The concept of "available land" is best described as the complex interaction between ecological, agronomic, social and spatial factors.

[17] There are now many customizable mobile data collection support tools. These range from fully open-source to full service software packages like Enketo, ODK, Formhub, and GeoODK. Each tool approaches geodata in different ways.

These factors are assessed from the perspective of an individual embedded in the food system. A farmer may possess a unique understanding of the agricultural potential of a nearby parcel of land, and only they can place this potential in proper context. This manifests in the FMP through a spatial dialogue between data submissions of a variety of users. For example, a landowner working with FarmLink may decide to indicate that a parcel of land is "available to rent." The landowner may provide a series of details about the parcel, including how many acres are for rent and an asking price. Physically visiting the site, a farmer may observe features important to them and their agricultural production vision including existing infrastructure, access roads, and slope. They can record their observations and opinions and submit them to the FMP. They can then ask around to learn about historical use of the land including past cropping systems and interaction with the landlord. These data can also be submitted. Finally, viewing the FMP website they can place these data in spatial context, learning about the rental prices of nearby farms, zoning boundaries, and calculate distances from their markets and home. Viewed in this context, the land may remain "available" or it may be excluded from their ongoing search.

Web-based GIS framework

Once the official data have been processed and a pathway for farmer-driven data submission established, the FMP employs an open GIS to store, analyze and service these data (Figure 8).

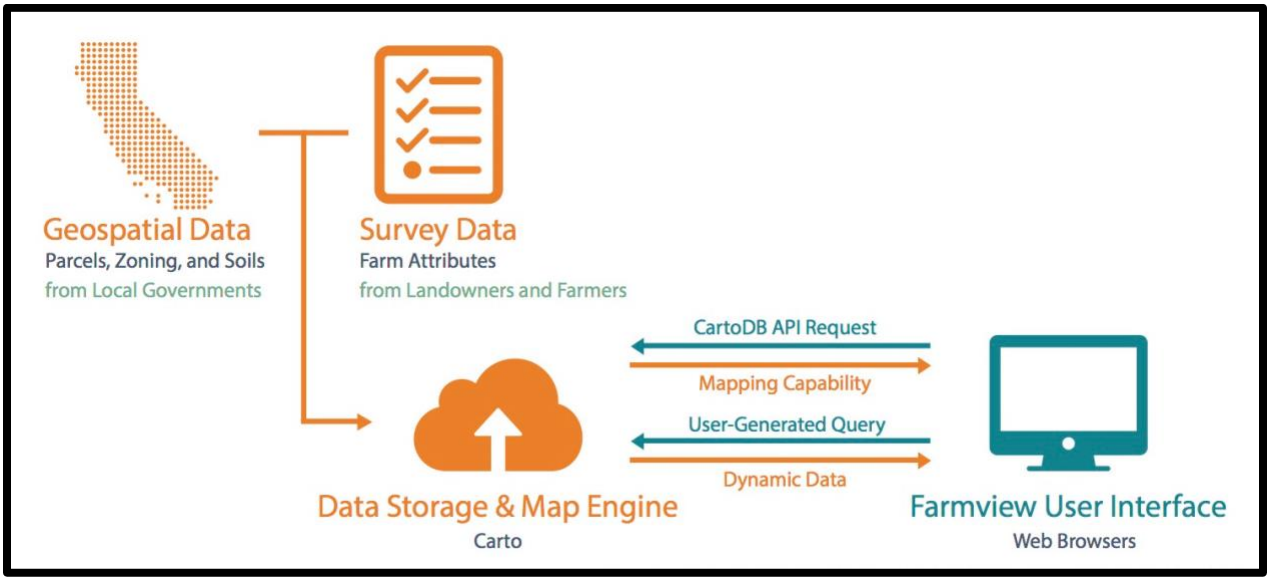

Figure 8 – The data workflow and user interaction of the Farmland Monitoring Project.

The FMP is first a web application that communicates between the spatial data and the farmer-submitted data. A user can deliver individual search queries and the FMP returns the results. From there, the FMP prompts the user to view full records of any parcel and invites users to submit information about any given parcel of land. Through an administrator portal, predetermined queries, generated from all possible attributes related to parcels, can be dynamically presented to users. This allows users to create complex queries about land, without requiring mastery of any database search techniques.

The FMP is also a website that delivers other information related to farmland access in California. It includes resources provided by California FarmLink, a blog about land access issues and events, and a series of map narratives described in the next section.

Distributed land access analysis platform

The affordances of a web GIS platform provide dynamic analysis and mapping features. The FMP continuously manages a growing dataset of two dynamic tables, land ownership parcels with associated attributes, and georeferenced submitted data. With this structure established, the data can be represented in a myriad of ways instead of attempting a singular visualization of key themes. Based on farmer and California FarmLink input, we developed a series of thematic map analyses regarding farmland ownership. These include an interactive map of all farmland characterized by ownership category, a map of conservation easements overlaid with farmland, and maps of the top 20 farmland owners in each county. These map narratives can change based on feedback from constituents, and the geospatial data behind each map can be downloaded or even re-embedded in another location.

OBSERVATIONS OF THE FMP IN PRACTICE

Early observations of the FMP in practice are useful to understand how a spatial approach to land access may engage with the structural aspects of the land access dilemma. I observed the use of the FMP with individual farmers, through online communications, and through a series of four workshops that engaged beginning farmers in the land access dilemma and presented the FMP soliciting feedback. This section describes some initial observations of how the FMP engages with the land access dilemma, key design pitfalls, and opportunities to attend to the challenges presented. Overall, farmer participation in the design of the tool greatly shaped its values, assumptions, and goals, often challenging the researcher's implicit assumptions. Farmers, acting as agents in solving the barriers they face, oriented the FMP towards the problem of land access, issues of land ownership and consolidation, and the sharing of local knowledge.

Making visible land ownership parcels and "new farmers"

Perhaps the key finding of the FMP experience is the utility of aggregating private property information associated with potential farmland. Farmers used the map application to query land ownership information about a piece of land they knew about. They identified such parcels through noticing vacant land in their daily commute, or in some cases neighboring parcels that they might want to inquire about expanding their operations. One FMP user at a Latino farmer land access event introduced their experience using the FMP to the room of beginning farmers. The facilitator asked farmers to share resources that had helped them in their search for farmland. When they noticed I was present in the conference room they said:

> [This researcher] created an online tool to help farmers who are searching for land. It's really good and has helped me to find land. For example, if you see fallow land or land that's not in use, the tool helps you to find the owners of the land and then make contact with them. Seriously, it helps a lot. You can see lots of information about the land like the soils, what types of land use is allowed … so you click for example on the map, and all of the information is going to appear, including who is the owner.

These individuals would obtain the ownership information and then move their further inquiry off the FMP website, using Google to search a variety of other property databases to find out more information. In some cases, farmers would bring this information to a farmland access service provider. Individuals contacted the researchers seeking additional information about a private property owner. "Would you be able to send me the link to your GIS tool for accessing land? I am trying to look up a landowner with no luck on internet." Conversely, users would have already identified the unique APN number of a parcel they were interested in through the FMP and would contact the researchers seeking all the information the FMP could provide about the parcel.

The FMP also makes visible the experience of land seekers. Farmers reveal their unique requirements for land and the factors they think define land quality. Farmers who reveal details about their operation show what areas, including municipal zones, soil characteristics, rent burdens, and regions farmers are operating.

Farmer contestation of land quality and availability: Sharing or competition

A common response to the FMP that emerged from the NGO and farm advocate perspective was the concerns about farmer contribution to the FMP. A concern emerged that farmers would not share information to a public database, citing the competition of beginning farmers for ideal parcels. As one NGO member suggested, "If I am a farmer, and I do know about a piece of land, I wouldn't share it to the map for others to see." This concern prompted design feedback that the FMP could be converted into a private tool for individual users. Competition for land certainly exists, but alternative perspectives contested this notion for beginning farmers.

Some farmers interviewed about the FMP provided an important alternative. Some suggested that the many particularities of a farmland "match" are so unique that many farmers could share information to those they know are better suited to a parcel, rather than change their production plan or budget to make an available parcel work. When asked if sharing information about available farmland would be feasible, one farmer suggested that "that's not competition—it's sharing." This view of land access did not match the NGO perspective. To the NGO member, the beginning farmers work against each other to compete for a dearth of suitable farmland. To the respondent above, the challenge is finding the right match, and farmers could work together to place the best possible stewards onto the best-suited parcels.

This disconnect between farmer knowledge and NGO knowledge also emerged in conversation about data quality. Some NGO members expressed frustration that the FMP supports farmer assessments of quality without any form of expert "vetting." They expressed a desire for an intermediary step, where staff or researchers would validate submissions made by farmers before being presented to "to the map." In contrast, farmers expressed the desire to see the unfiltered comments about a parcel of land from their peers.

Seeking map narratives for argumentation

The introduction of the flexible mapping platform (the "mapbook") provoked many individuals to request digital maps that told certain narratives. Farmers wanted to see spatial representations of individual search criteria – for example, a map of all parcels within Monterey County that were under 20 acres and above 5 acres. While the FMP's main application is to

facilitate these types of searches, beginning farmers desired highly specialized information regarding their potential search, including data that the FMP failed to provide. For example, in a workshop feedback response, one farmer wanted to see potential farmland with certain water resources, a dataset the FMP does not yet represent.

Some individuals requested maps that they could use for planning or argumentation purposes. For example, members of California FarmLink wanted to know the location of any conservation easements in their operating counties in relation to farmland parcels. A farmer active in Sonoma County wanted a map geared towards identifying ownership patterns of viticulture in the region: "If Sonoma County is done I really look forward to identifying the corporate ownership of winelands. I think it will be a reality check for the community and perhaps a policy lever." Given these inputs from beginning farmers and small farm advocates, the FMP researchers built these maps and represented them on the mapbook site (Figure 9).

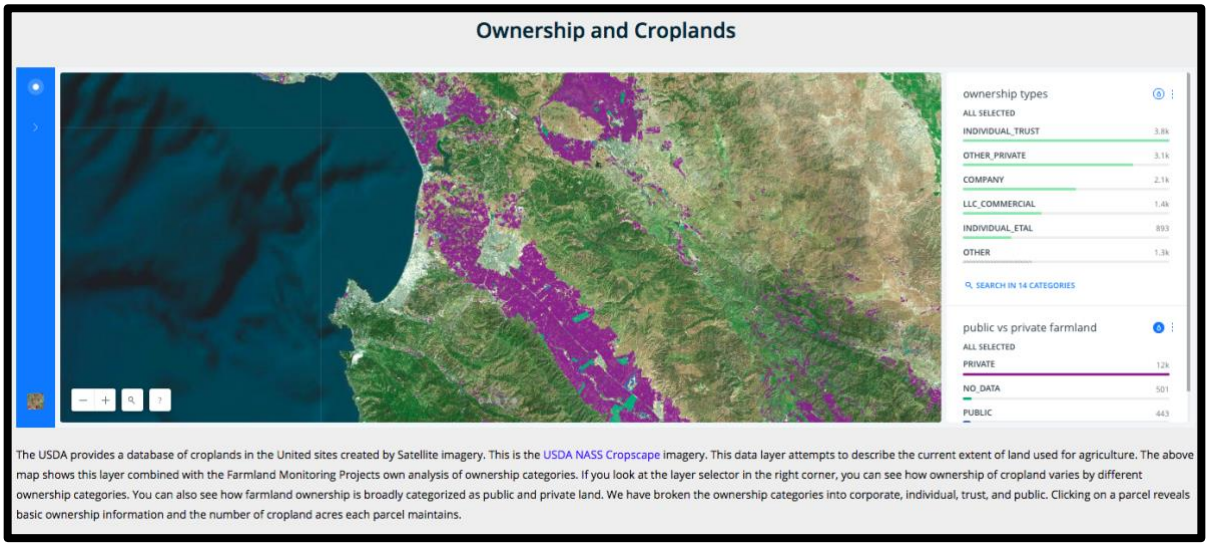

Figure 9 - A sample custom interactive map on the FMP website. This map shows farmland organized by ownership classification.

Localization

The FMP is designed to facilitate the unique land access requirements of beginning farmers by providing flexible and individual land search tools. However, more specificity and more localization were always requested at workshops and through individual use cases. Could the FMP add a new region? Could the tool show sun saturation? Climatic zones or water attributes? Some of these suggestions of localization prompted the design of new features. For example, the addition of Sonoma and San Diego counties to the FMP came from interactions with members of the Farmer's Guild, a state-wide beginning farmer advocacy group. The FMP team is also investigating ways to represent water attributes. However, these localization requests lead to important questions about the systems that promote the involvement and use of such VGI GIS tools. While California FarmLink and ALBA served as the two hubs of interest to link the tool with beginning farmer constituents, other groups might have different goals with similar data representations.

Perils of private property representations

Observing the use of the Farmland Monitoring Project and constituent reactions at conference presentations and oversight meetings at ALBA and FarmLink, I observed how embedded values and assumptions in the project's representation of farmland access produced immediate and unresolved tensions. This corroborates critical GIS scholarship which argues how the intended use of a given GIS representation is not guaranteed to align with norms that are reproduced through the tools design. The most prominent assumption I observed that the FMP reproduces is the logic of private property rights. By representing potential agricultural land as a map defined by private property boundaries, the FMP reinforces such an approach to farmland access. In particular, the FMP reinforced the idea that land access was really about land ownership.

The tension regarding private property often came to the fore in conversations about the potential misuse of an open source farmland database. There was a common fear that as the FMP gets "better" at representing land quality and availability, those with power in the food system could use it to accomplish their land access goals. For beginning farmers in the region, there was a feeling of being outcompeted by large-scale agribusiness or real estate investors. On multiple occasions, I was questioned to whether I was planning on "selling" the FMP to a larger company, furthering the goals of farmland financial investment or agribusiness consolidation. Even though farmer values influenced the FMP's design and intention, it begs the question if the embedded features of mapping technologies ultimately lean towards certain visions of land use, just like developing agriculture-GIS tools. This sentiment, querying who will benefit most from knowledge of land ownership, was one of the most common responses to FMP presentations at farmer workshops.

DISCUSSION AND CONCLUSION

A beginning farmer movement narrative claims a new generation of young agrarians will access transitioning farmlands, releasing a new agricultural management regime across the land. However, I argue that without progress in addressing the land access challenge, the beginning farmer movement will continue to exist as an educational phenomenon, relegated to university gardens and incubator farms (Wittman 2017, Horst 2017). To address this issue, proponents of sustainable agriculture transformation must address the social and political forces that shape land access in order to shape new interventions. These forces are the legitimizing practices that facilitate access to the benefits of arable land by certain groups and certain types of users. In this paper, I argue that mapping and categorization of landowner parcels, zoning boundaries, and prime farmland classification plays a central role in sorting farmers across space and onto different parcels. These representations frequently relegate beginning farmers into tenant farming relationships that at best split benefits between the farmer and the landlord. If zoning maps, private property boundaries, and farmland designations tend to territorialize, the critical GIS literature suggests they can also be contested with frameworks for collaborative assessment and representation by farmers. The Farmland Monitoring Project tests a framework for this intervention.

This optimism for critical GIS intervention exists within a moment of deepening trust in, and growing private resources for, spatial technologies to achieve agricultural improvement (Coble et al. 2018; Graham and Shelton 2013). These technologies, and their assumptions of land access and tenure specifically, are largely hidden and unchallenged. AcreValue, by representing

parcel boundaries as tradeable units, thus enshrines private property rights and supports farmland as a financial investment. The Bay Area Greenprint is designed to show regional planners the areas of greatest ecological value, but strategically elides ownership parcels. They do this to avoid complaint from their potential users, namely large powerful landowners or city planners beholden to landowners. Climate Corporation's powerful analytics are only relevant to monocrop growers at a large scale. They also do not share information of farming decisions between their clients, entrenching a siloed vision of agricultural management. The tool clearly promotes a narrative of efficiency and productivism. Given these visions of land tenure and agriculture land use, I find Schuurman and Pratt's (2002) invitation to contest these spaces with alternative visions compelling. Emerging GIS tools could play a role in engaging with the structural aspects of the land access issue by making visible previously underrepresented claims to arable land. While AcreValue leverages GIS to encourage corporate investment in farmland, a GIS tool like the FMP could be used to monitor these investments more critically.

The promising and worrying experience of the FMP reinforces the need to reflexively interrogate the values, assumptions, and "production of truth" in GIS interventions (Schuurman and Pratt 2002). Regarding the beginning farmer land access dilemma, the following questions appear especially important: Who is granted new social power through agricultural GIS projects? Do GIS interventions form new legitimizing practices for farmers seeking land access? What visions of agricultural land use do GIS representations authorize?

It is important that spatial tools for farmland access tread with attention to the social power they grant, both in design and application (Wright, Duncan, and Lach 2009). Some critics of GIS would say that by simply placing parcel boundaries on a map, the project thus validates this form of social relation. Some of the features of the FMP appear to ossify certain understandings of agricultural land tenure in the peri-urban setting. As one workshop respondent noted: "I have deep concerns over private property and the colonization of this land and from a farming perspective I think this focus is creating an unstable foundation for a new food system." This individual suggests how the FMP, by claiming to support farmers in engaging with the land access dilemma presents a certain logic of land access. The logic, here, is one based in tenant farming and private property ownership. Without facilitating a truly alternative vision of land use, one unbound by tenant farming relationships, the FMP could be seen as supporting the status quo. In a sense, the FMP sets the boundary on what farmland access is, by representing farmland as a landscape made up of private individual land owners and land-owning entities.

By beginning the map design with a view of tax assessor parcels, the map grants legitimacy to the concept of private property ownership of agricultural land. Yet, the FMP responds to the realities of beginning farmer land tenure, understanding that land access is only granted through a successful landlord negotiation. Knowing who controls a piece of land with a private property right is foundational. Private property relations and their effects on agriculture are sometimes regarded as the root problem of struggling to promote agroecological land use arrangements within prohibitive real estate regimes (Ikerd 2013). By offering an intervention of improving the equity of lease negotiations, the FMP tends to legitimize the tenant farming dynamic, the key problematic element of the land access dilemma. However, through this new ability of access to information of ownership, tenant farmers appeared to have more power in land access negotiations.

In a similar way, the FMP at once individualizes and collectivizes the land access dilemma. The GIS supports individual search for parcels, a feature that farmers described using frequently. Unfortunately, this effect reinforces some neoliberal narratives of beginning farmer

success, wherein farmers succeed because of individual capacity to beat the odds (Calo 2018). At the same time, the FMP supports connection towards land access resources, both virtual and real, such that the collective burden of the land access challenge is made visible.

Despite these pitfalls of the FMP's approach to representing the land access dilemma, it can be argued that the pervasive impact of private property regimes and individualized search must be made visible before they can be imagined in alternative and more redistributive ways. Because the primary use of the tool was to identify information about private landowners, it suggests that there is social power embedded in this feature. A potential design opportunity is to facilitate the next steps after identifying a parcel of interest and the landowner information. This could support mechanisms of landlord contacts, refer farmers to regionally appropriate lawyers with experience in agricultural tenant negotiations, or use the APN number to provide any other land use information such as history of sale and value assessments. This use type also suggests that the land access search is not linear and requires more case by case research to understand the different access pathways. Thus, GIS tools that both recognize existing private property regimes, but strive to facilitate questioning of this land use pattern serve to "look for the cracks."

The value of information disclosure of private property regimes is evidenced by the reluctance of many agencies to present this public information in accessible ways. A plethora of maps and mapping platforms designed to support agricultural land use decision-making present large datasets of biophysical information (see the Bay Area Greenprint, Climate Corp, Pajaro Compass among others), but refrain from presenting land ownership information. On multiple occasions, NGO staff recounted how revealing land ownership information may run counter to their objectives, for representing value associated with an individual landowner may remove the landowner from the pool of potential collaborators. For example, the California Protected Area Database provides this disclaimer about their release of geographic boundaries of conservation easements.

> While this data is from public records, your use of the data should make every effort to respect the privacy concerns and sensitivities of land owners and those agencies and organizations who work with them. (CPAD 2018)

There exists an inherent tension between fostering a positive relationship with landowners in order to achieve the land use goals of a variety of actors and using public information to achieve land access reforms. But asking who is rewarded by various levels of information disclosure helps answer questions about the recipients of social power of a GIS.

Regardless of what learning self-awareness can achieve, many sectors of society express a willingness to accept the data-rich map as a useful mechanism to express problems, analyze data, and present solutions to social problems (Kwan 2010). This was indicated when many different actors sought individualized map narratives to be used as evidence for argumentation. Perhaps this feature of the FMP provides the clearest connection to new forms of legitimizing practices. By using data-rich map visualizations, actors envision their arguments being heard by experts and decisions makers to more effect. A farmer part of a young farmer organization San Diego, for example, wanted a map of all of the lands zoned for agriculture so they could bring this information to their policy committee. Additionally, FarmLink intends to use specific queries of landowners to target outreach campaigns in which they implore owners of suitable agricultural land to host their client farmers. Indeed, the interactive map is increasingly seen as a powerful decision-making tool in agricultural settings.

Another way of remaining optimistic about the potential of emerging GIS tools to engage in the land access barrier is to focus again on the emergent properties of citizen engagement that are afforded through participatory approaches. These forms of citizen science and participatory data collection have the potential to generate new agency, knowledge-making capacity, and understanding, unbounded by any one mapping event (Wright, Duncan, and Lach 2009). Within the FMP, the workshops and mapping events spurred debate and discussion about the challenges of land access unique to the Central Coast Region. NGOs and farmers seeking land debated their intervention strategies together. These outcomes are more difficult to identify, but could be the focus of future research.

Researchers studying the beginning farmer land access dilemma within peri-urban areas appear to arrive at a similar conclusion; broad, landscape-level policy reform is needed to meet the access demands of beginning farmers (Calo 2018). Beckett and Galt (2014), in their study of the effectiveness of land trusts to provide secure and tenure for beginning farmers suggest the land conservation approach is not enough to support tenure and call for policy support. Wittman, Dennis, and Pritchard (2017), in a study of cooperative farming initiatives amongst the "young agrarians" in British Columbia, notes how the innovation of collaborative land management arrangements was pitted against the ongoing trend of high value land purchases.

> To increase the scope and impact of community-led farmland access initiatives as a driver of a new agrarian transition spurred by new forms of economic cooperation, leveraging broad public support (beyond the farming sector), a cultural shift towards alternative social and public valuation of farmland and food, and policy changes addressing the root problems of farmland financialization and speculation are required. (Wittman, Dennis, and Pritchard 2017)

The author, having documented the incredible efforts of community-led land acquisition projects in a high-value peri urban area like British Columbia, nevertheless see involvement of the state as the most demanding need for the broader goals of the beginning farmer movement.

The primacy of these calls for broader political intervention into the land access barrier puts the FMP in its appropriate context. Considering Ribot and Peluso's (2004) "access mechanisms" (technology, capital, markets, identities, knowledge and social relations), the FMP certainly alters a beginning farmer's relation towards new technologies and knowledge that can support access claims. The FMP has shown promise in forging, or at least making visible, the social relations involved in negotiating access. More work studying this intervention needs to be done to understand how the FMP succeeds or fails in creating new legitimacies for farmers and for FarmLink in their land access claims. Yet, without regard towards the political changes needed to facilitate access, the FMP could remain a neoliberal tool, further isolating farmers in their land access appeals to distinct sites of authority. Individualized interventions do not meet the scale or scope of "agrarian capitalism" that produces the challenges of land access. Thus, the FMP must be connected to broader policy-level reforms in order to address the structural nature of the land access dilemma.

Take, for example, the Scottish Land Commission, formed through an act of parliament, tasked with redistributing land for public benefit (Shields 2018). There, the state is deeply involved in cataloguing existing land ownership trends, identifying land best suited for transfer, and disclosing the information through spatial representations. It is possible to imagine a tool like the FMP as a regular, fully-funded function of government, rather than a project of non-

profits, university researchers, and activist farmers. In the California context, future iterations of the tool could expand the scope of participation to include policy-making and planning institutions.

Despite my misgivings, I do believe that spatial analysis and map representations of some form will be required to engage the land access dilemma at meaningful scales. Amidst a backdrop of ballooning GIS tools for agriculture, it is worth presenting flawed GIS tools that can represent alternative visions of land tenure. Without presenting alternative visions, the hidden assumptions of large-scale privately-owned farms carry on unabated.

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CHAPTER 5 – CONCLUSION

> [God] is pressing me to ask for this one thing. Please, gentlemen, make it possible for my people to buy their own land and to care for it with hands that are full of love for the soil. As a simple man I do not know how this can be done. But if it is, we will be able to build a better life for ourselves that will make this country more fruitful and more aware that, unlike others, we have never resorted to violence to bring about change.
>
> — Manuel Leon, testimony in the Senate Subcommittee on Migratory Labor, January 12, 1972

WHY "NEW" FARMERS?

Is the beginning farmer movement a useful construct for food systems transformation? The stated goal of creating new farmers, which is what motivates this dissertation, is paradoxical. What does it really mean when a call emerges, urging the need for a new class of something? The concept of newness invokes something without prior existence. Newness, is thus about absence. In the case of asserting a need for new technology—GM drought resistant crops for example—the call is specifically for something novel to emerge where *previously there was none*. This certainly isn't the case with farmers. Farming cannot have existed for over 10,000 years without young people or people new to doing agriculture joining in. There is certainly a long history of many generations of new farmers within the United States alone.

Rather, the new farmer story is actually about multiple losses taking place in the past 40 years. Beginning farmers are "needed" because of the powerful forces that have emaciated the farm sector, creating a wholesale departure of farms, farmers, and farm livelihoods from rural areas (Brown 2018). These forces include the broad structural moves that encourage rural to urban migration, consolidation of farmland, the turn towards productivism, and the infiltration of neoliberal logics into agriculture. The result is a missing generation (or two) of farmers, such that the creation of more farmers is now uncritically seen as "needed."

Well aware of these contradictions, shellfish farmer Bren Smith urges, "Don't Let Your Children Grow Up to Be a Farmer*"* in a *New York Times* opinion piece. He writes,

> Especially in urban areas, supporting your local farmer may actually mean buying produce from former hedge fund managers or tax lawyers who have quit the rat race to get some dirt under their fingernails. We call it hobby farming, where recreational "farms" are allowed to sell their products at the same farmers' markets as commercial farms. (Smith 2014)

Smith warns that an uncritical embrace of new farm enterprises may not restore the hallowed institution of farming. Instead, it may allow for a co-optation of niche markets, creating an elite-to-elite production consumption pathway. The concern for newness in farming therefore masks the need to the question of the forms of farming being used and the different classes of farmers able to benefit from the production system.

The next time a prominent policy maker or food systems reform advocate, such as Mark Bittman, launches into a call for new farmers, it is worth asking "What happened to the old

ones?" In other words, in order to "create" new farmers who will not quickly vanish or merely meet elite demand for organic foods, the forces that provoke loss of dignified and durable farming livelihoods must be identified and addressed.

THE SOCIAL DETERMINANTS OF FARMING LIVELIHOODS

These "forces" are the social determinants of farming livelihoods. They are the policies, markets, politics, technologies, epistemologies, and cultural values that shape prevailing societal visions of agriculture. It requires much untangling to understand how each of these social determinants operate and interact. One thing is clear; an observed effect of the social determinants is the threatening of dignity, productivity, diversity, and sustainability of farming life. Encouraging new farmer entrants into this dynamic makes no sense at all—it is akin to sending lemmings over a cliff.

In debates over the approach to delivering public health services, the "cliff analogy" encourages researchers, policy-makers, and non-profits promoting healthcare interventions to think critically about how they impact the social determinants of health and illness (Jones et al. 2009). In this analogy, the cliff represents the negative health aspects of disease from which large swaths of society continuously are falling. Health services, described as an ambulance at the bottom of the cliff, react to the problems of disease. Addressing the social determinants of heath, the authors argue, would mean intervening on the "structures, policies, practices, norms, and values" that determine one's likelihood to fall (Figure 10).

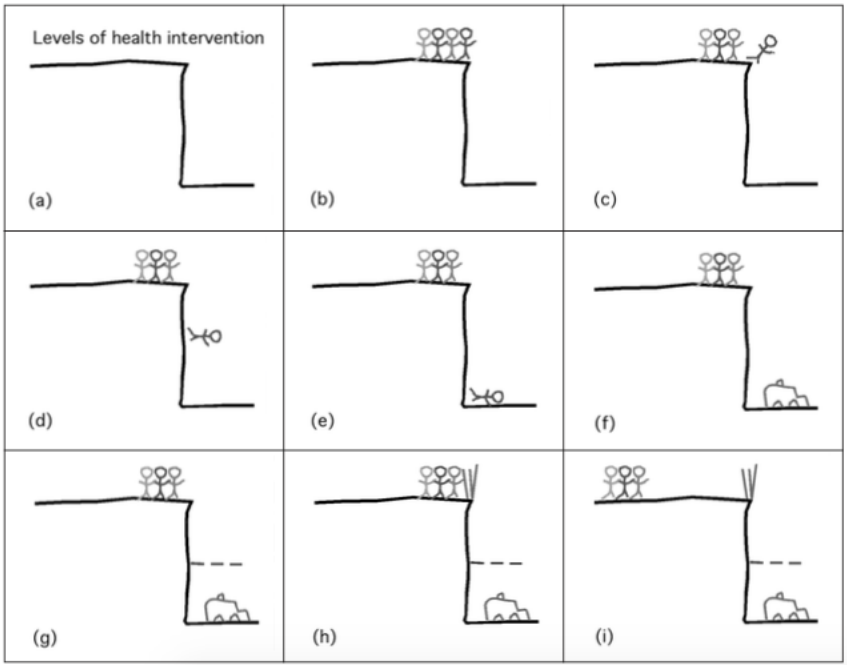

Figure 10 – Social determinants of health, a cliff analogy representing the different approaches to intervention from Jones, Camara Phyllis, Clara Yvonne Jones, Geraldine S. Perry, Gillian Barclay, and Camille Arnel Jones. 2009. Journal of Health Care for the Poor and Underserved 20 (4A): 1–12. In (f), the ambulance represents acute, reactionary care, (g) demonstrates a secondary prevention intervention, (h) represents a primary prevention intervention with a fence at the top of the cliff, and (i) suggests a social intervention to move a certain population away from the edge.

If social determinants of farming lead to a similar cliff scenario, the dominant beginning farmer logic merely serves to create more individual farmers, who are destined for descent. The incubators, marketing workshops, and training sessions that beginning farmer programs are built upon are, at best, a parachute of sorts (scenario (g) and (h) in the cliff analogy concept), easing new entrants in their descent to the bottom. It is quite a perverse feature of the current beginning farmer construct that it implores the creation of new farmers without seeking to reform the very structures that force farmers out of the sector. It seems like a poor bargain.

Newness also makes invisible the moments of struggle, resistance, and oppression that discourage the establishment of agrarian livelihoods amongst farmers of color. The focus on new farmers and the focus on technical improvement silences manifold power imbalances across the food system. By describing the challenges of farming as a purely technical matter—as a knowledge deficit issue—the beginning farmer paradigm suggests the structural racism at play is not important. By focusing on newness, technical experts and beginning farmer movements act as if decades of struggle for entry of farmers of color into the food system, including against the concerted efforts by industry, landed white farmers, extension agents, and federal policy to constrain benefits, is not ongoing.

I do think that beginning farmers have transformative potential in the food system. But it is *because* their challenges intersect with large, policy-driven challenges such as access to land, historical and present-day racial discrimination, and tenant's rights that beginning farmer success, adequately conceptualized, could mean system change. On the other hand, viewing beginning farming as it is currently understood risks obscuring the deeper, embedded challenges in our food system. For in that vision, beginning farming is a lifestyle choice for the privileged, which elite consumers will support. Given this dissertation's work to show how the social determinants of farming limits the beginning farmer movement's prospects for achieving meaningful change, there are three logical points of progression.

LAND ACCESS *SHOULD* FRAME THE BEGINNING FARMER MOVEMENT

In Chapter 1, the case of new entrant farmers near Salinas demonstrates how landlord tenant dynamics and pervading structural racism mediate the standard beginning farmer pathway. In particular, an incubator program like ALBA may temporarily insulate new entrants from the structural forces that tend to challenge small farm livelihoods, by giving them land on which to learn their profession and markets for their produce. But once the farmers graduate, the land access barrier is often insurmountable. The experience of the graduates provokes questions about how incubators can engage with the structural forces that make it difficult to attain farming success. Should incubators move away from technical training towards political engagement? Could incubators intervene not just at the beginning of the farming pipeline but far into a new entrant's career? What policy and planning interventions can support these newly minted graduates who may be growing high quality organic produce with little resources on marginal lands? The incubator model and its implications for farmer livelihoods are a crucial area of future research.

In addition to interrogating the incubator model, the experiences of ALBA farmers highlight the forces mediating the land access barrier. Chief among those, are landlord tenant dynamics. In "high stakes" peri-urban farming landscapes, new entrants are perhaps better understood as vulnerable tenants. While horticulture is certainly practiced on the land, issues of

tenure security, autonomy, and mobility influence a farmer's ability to derive benefits from their labor (Hachmyer 2017; Calo and De Master 2016). Instigating, deriving, acquiring, and maintaining a lease arrangement for farmland is an informal and socially mediated process. Undergirding this process are existing cultural, social, and economic relationships that make up the "rules of game" for access to land. The legacy of private property regimes that historically preference white male landownership creates a racialized access dynamic. In this setting, the cultural and social capital required to negotiate a lease informally excludes socially disadvantaged farmers and ranchers. More affluent, white beginning farmers can more easily negotiate these social-cultural access mechanisms, leading to the elite entrenchment of good food movement.

The dominance of tenant farming as a mode in US agriculture immediately forces a reconsideration of the yeoman ideal. The lack of attention to the root causes of the land access dilemma amongst beginning farmer interventions provides a way forward for research, innovation, and action. What forms of policies would chip away at the structural injustices embedded land access challenges? Could a reinvigorated Williamson Act leverage tax incentives to promote below-market rate productive lands? What mechanisms can housing boards implement to protect tenant farmers? Can planning departments implement progressive zoning laws to support beginning farmers? If new entrant farmers as are viewed as vulnerable tenants first, and farmers second, what novel interventions become possible?

Urban sociologists have long been concerned about the forces that produce uneven distributions of individuals into neighborhoods with chronic poverty. Recently, a key figure has emerged as a powerful yet overlooked sorting mechanism: the landlord (Rosen 2015). Landlords, with their power to make autonomous decisions over their private property, use considerable discretion when selecting tenants. If the concern is understanding how individuals arrive in certain spatial living arrangements, these scholars suggest that interrogating the landlord tenant relationship will help us understand origins of poverty in cities (Rosen 2014, Desmond 2017). Applied to the farmland access context, one might say that landlords most determine what type of agriculture is happening on the land—not farmers, land suitability, or farmer decision making. While there is much concern (and scholarly output) about the forces that influence farmer decision making, this attention could be combined with research about the forces that influence the landlord.

What is particularly useful about the analogy between urban housing crises and new farmer land access challenges is exploring how interventions differ across domains. In the urban housing context, the uneven power of landlords and the lack of adequate low-cost housing necessitates political intervention in the market. In *Evicted: Poverty and profit in the American city*, Harvard sociologist Matthew Desmond depicts the lives of chronically evicted tenants in Milwaukee as they struggle to establish a semblance of permanent homes. After clearly laying out the widespread and structural origins of widespread, chronic evictions, Desmond's strategies for reform are similarly broad and bold. The policy reforms offered include universal housing vouchers, New Deal-esque affordable housing commitments, and a strengthening of tenants' rights (Desmond 2016, 2012). What is notably absent in those urban housing reform strategies is a call for increased technical capacity aimed at enabling individual tenants to obtain housing. On the contrary, it would be amoral and illogical to suggest that the way to solve the housing crisis would be through providing piecemeal skills-improvement strategies. Imagine a program that taught vulnerable tenants how to perform self-repair on their dilapidated lodging, or a capacity building workshop on "how to speak to landlords." Here, it seems, the knowledge deficit

approach is appropriately absurd. But for some reason, this type of logic persists across beginning farmer programs.

ALTERNATIVES TO THE KNOWLEDGE DEFICIT MODEL

In Chapter 2, I demonstrated how the knowledge deficit model, expressed through the flagship federal program, namely BFRDP, entrenches a vision of beginning farmers as squarely technical and entrepreneurial. The consequences of such an approach to expert-driven problem solving is shown to be an increase in disparity amongst the different forms of new entrants trying to start a farming enterprise. As all participants in these programs may gain some technical skill, socially disadvantaged farmers still face access barriers that are structural in nature. Meanwhile, privileged farmers, with the cultural capital to navigate structural barriers, reach higher levels of farming success, increasing disparity that is based on social location rather than merit. All the while, the notion of begging farmer success as a narrative of individual self-improvement is reproduced.

An immediate reaction to the critiques of the knowledge deficit model is to defend the merits of technical training. Young students need to learn, young families need to be taught how to eat well, and farmers need to learn how to fill out a business plan, correct? As an academic researcher who often presents learnings outward in a unidirectional fashion, it is hypocritical to warn of the deleterious effects of such a tactic. But rethinking the logics of this approach to social intervention forces one to re-consider the foundations of technical expertise and the limits of scientific reason. This reflection alone can be quite powerful in re-orienting perspectives on who can be agents in beginning farming. A career agricultural technical extension specialist, on reading about the knowledge deficit model in Chapter 2 wrote to me:

> I spent a decade as a consultant focused on developing education opportunities for farmers and ranchers almost always funded by some government agency. Your article really articulates why in my long work life focused on "Helping farmers and ranchers, (mostly small), who want to keep farming to make a living" I have so few specific examples of success. I knew perfectly well that simply training farmers in business management, or marketing, or risk management, or food safety, or soil management was not the real problem they face. But I too had to make a living and knew what was likely to get funded. I was one of those people offering workshops in Salinas. Your article, and some of the other work of yours that I could find on the web, is the most cogent discussion of the problem with a top down education alone approach to helping farmers succeed that I have ever read. I'm still doing it; I just returned from Malawi where I taught management and marketing to a farmer cooperative.

The hubris often found in the sciences is the unshakeable faith that through adequate delivery of observed truths, the world will change for the better. But even a cursory glance at the projects of intervention in the beginning farmer case shows how entrenched values and visions of agriculture and society are embedded into the knowledge deficit model. In fact, the individual improvement character of the model aligns ever so neatly with the yeoman farmer myth.

Future work needs to be done to imagine how to escape the trappings of the knowledge deficit model. What would a beginning farmer grant program look like, if it were attuned to the weaknesses of the model? What would a "knowledge surplus" model be? The first place to look

is through radically alternative pedagogy. Horizontal and bottom-up knowledge transfer mechanisms are well-established as transformational in the food system, especially when associated with peasant movements (Rosset et al. 2011; Holt-Giménez 2006). Built on the foundations of Freirean ideal, bottom-up learning approaches are transformational precisely because they provide power to "lay-people", experts of their own experience, to determine the themes of inquiry (Freire 1970). What would new farmers want to investigate and learn about if given autonomy to do so? My hunch is that "how to market kale to urban consumers" would not be prioritized. In fact, the motivation of this research comes from participating in some collaborative problem generation workshops held with ALBA farmers and staff. In these workshops, the problems and nuance of land access barriers came to the fore. In many ways, I allowed the ALBA farmers and their peers in agriculture to define my research agenda based on their lived experiences and own interrogations. And it wasn't just that they wanted to know about how to gain access to land (technical), but why (structural). Bottom-up problem generation is an important step in an emancipatory research paradigm (Borda 1979). However, taking the ALBA case as a warning, even amidst an incubator program purposefully built on the sharing of knowledge, subsidized resources and land, and some forms of alternative pedagogy, I still observe how structural challenges exert forces once outside such a learning environment.

Perhaps changing the BFRDP programs from technical assistance to political education could be enough to escape the trappings of the deficit model. This would be a transition from teaching new farmers what they don't know to working together to understand leverage points within municipal and regional governments. This work would change the primary duties of beginning farmer organizations from technical assistance and training towards the traditional work of political and movement organizing. In some ways, I see this transition occur in a variety of beginning farmer organizations, perhaps internally aware of the limits of a pure technical assistance and training operation.

For example, the University of California Cooperative Extension, a storied knowledge deficit program, recently created a few positions for "public policy specialists." These positions, novel to the program's history, reflect an awareness that the upstream challenges of the agricultural constituencies Cooperative Extension is meant to serve are predicated on structural, policy change. I find this reflexive shift encouraging. However, I am forced to ask, is political education not a knowledge deficit approach with a slight shift in content? It is unclear how the weaknesses of the knowledge deficit model are avoided in a political education or rights awareness program.

In the overall environment of beginning farmer organizations, there is a surprising disconnect between the politics of the groups versus their activities of intervention. On the whole, beginning farmer organizations put forth a vision of a radically different form of agriculture, one built on a network of mostly self-sufficient and small-scale producers. They envision agriculture production without the reliance on the synthetic inputs of agribusiness. Holt Giménez and Shattuck (2011), setting a framework for food system reform strategies, call these politics of change "progressive" amidst a typology of reform strategies (Figure 11). However, after analyzing beginning farmer interventions and their narratives, I see the activities of the movement as neoliberal or "reformist". The theory of change for beginning farmer challenges rests squarely through market-based mechanisms and individual capacity building packages.

	Corporate food regime		Food movements	
POLITICS	NEOLIBERAL	REFORMIST	PROGRESSIVE	RADICAL
Approach to the food crisis	Increased industrial production; unregulated corporate monopolies; land grabs; expansion of GMOs; public-private partnerships; liberal markets; microenterprise; international sourced food aid; GAFSPF – The Global Agriculture and Food Security Program	Same as neoliberal but with increased middle peasant production & some locally-sourced food aid; microcredit; more agricultural aid, but tied to GMOs & 'bio-fortified/ climate-resistant' crops; *Comprehensive Framework for Action* (CFA)	Right to food; better safety nets; sustainably produced, locally sourced food; agroecologically-based agricultural development; Committee on World Food Security (CFS)	Human right to food; locally sourced, sustainably produced, culturally appropriate, democratically controlled; focus on UN/FAO negotiations

Figure 11 – An excerpt of Table 1 in Holt Giménez and Shattuck 2011. The authors create a typology of food systems change politics, discourse and approaches. On the one hand, a neoliberal politics encourages a doubling down of industrial production and consolidation to meet global food demands and secure the agricultural industry. Alternatively, a radical politics promotes food sovereignty, a rights-based framework for re-orienting the food system.

While this disconnect is alarming, showing the deep penetration of neoliberal logics into progressive spaces, it also suggests that a broader shift towards the progressive and radical approaches would align the activities of the beginning farmer movement with its politics.

The limitations of the knowledge deficit model in resolving structural barriers for beginning farmers underlines the perpetual tensions between technical and political agricultural change strategies. Putzel (1992), after engaging in a detailed study of approaches to land use change in the Philippines, presciently notes this tension:

> While every national debate over 'agrarian' or 'land' reform policy must be understood in its own historical context, there has been a common thread running through most debates. Debates everywhere have seen a confrontation between those who believe that agrarian reform must be centered on the redistribution of property rights and effective control over productive agricultural land and those opposed to extensive redistribution who wish to focus on measures to raise agricultural productivity (Putzel 1992, xxiii).

Attending to how power influences land tenure arrangements forces us to consider the deep questions of historical dispossession of land, the sanctity of private property rights, ongoing racial discrimination, and tenant rights. These themes are made largely invisible when farming is represented as a purely technical endeavor. Engaging these questions, however, is crucial to addressing the social determinants of a dignified agrarian life.

PARTICIPATORY GIS AS NOVEL ACCESS

In Chapter 3, I described an attempt to leverage the power of participatory spatial tools to influence claims by socially disadvantaged farmers to land access. Spatial representations of private property boundaries and their use in political and land-use planning decisions are shown to be a crucial site of intervention. Private property owners possess the power of selective disclosure in determining when to make their land "available" for farmland lease. Even though information about ownership is public, it is highly guarded by groups who want to maintain their relationships with landlords. The county assessor's office may obscure the release of records, or a farmland conservation group may produce a map of priority farmland conservation based on ecological attributes, without disclosing who owns the decision-making power over those lands. Yet, when powerful actors, like planners or farmland realtors make decisions about land-use,

they deal at the level of the landowner. They use satellite imagery combined with legal boundaries of title to understand who has legal rights to transfer ownership, contest a proposed change, or accept a new tenant.

Simultaneously, as web GIS tools for agriculture proliferate, it is crucial to investigate the underlying values of agriculture embedded in these tools. In particular, it appears that the more powerful and well-funded web GIS tools align with a large scale, individualized, and industrialized farming vision. Here too, the yeoman myth prevails. While there is some question to whether any spatial representation of agriculture can escape the pitfalls of a "technical gaze", I find the leverage of power that technical tools can offer too useful to ignore. Instead, the Farmland Monitoring Project is an example of a self-reflective experiment in reinventing the mechanisms through which land access claims are negotiated, and in giving greater power and participatory knowledge to socially disadvantaged farmers of color in this realm. By combining processes of information disclosure, knowledge commons, participatory data collection, and citizen science, perhaps enlightened web GIS tools can provide new institutionalized platforms for citizen to decision making.

UNCOILING THE YEOMAN MYTH

This dissertation presents an argument for challenging the prevalence of the yeoman myth across beginning farmer narratives. To answer the question I posed at the outset: is the concept of beginning farmers useful? I argue that it is not, but it could be. A decidedly political and process-oriented reframing of the question is required. As long as the yeoman myth pervades the federal, university, and non-profit approach to beginning farming interventions, it will continue to make power in the agricultural system invisible across many spatial and social scales. When this power is elided, socially disadvantaged farmers will be left behind their more privileged, often white peers, ultimately weakening the chance for building a truly broad coalition of new agrarians. The good food movement has long been challenged by activists of color and critical sociologists and geographers for its articulation with elite cultures and elite eating cultures and elite consumers. In the past 10 years, making a political narrative out of the yeoman myth has been seen as necessary to meet the goals of the beginning farmer movement-building. By contrast, I argue that making a new narrative around land rights is a much more compelling way to draw together the many disparate beginning farmers (and aging farmers) around a political agenda for changing the agricultural system. A food system focused on secure land tenure and land rights builds the structures for long term survival and endurance of beginning farmers.

This call is not terribly novel. Late in the writing of this dissertation, I had the lamentable experience of finding a body of work that succinctly encapsulates my own argumentation towards the need for public policy intervention to resolve land access dilemmas. *The People's Land*, published in 1975 is a collection of essays on the impending disappearance of smallholder agriculture in the United States (Barnes 1975). The editors, calling themselves the National Coalition for Land Reform, present a broad coalition of contributions from historians, migrant labor activists, farmers, politicians, and rural sociologists like Dolores Huerta, Jim Hightower, Robert Rodale, and Ralph Nader. Their solution to what they see as a crisis across all regions of rural America is emblazoned on the back cover: "A new phrase has entered the American vocabulary: Land Reform."

The arguments of the book are an inspiring call to public action in order to resolve the root causes of rural depreciation. The work overall makes it clear that the site of action is through *public policy* to change the structural forces that were already seen as pushing agriculture to a profound breaking point. The authors freely write about new taxation of absentee landholders, land seizure for smallholders, and the nationalization of industry that profits from large scale land use—all seemingly taboo topics today. Today, it seems, similar enthusiasm for reform is much more divided, and perhaps more resolved to embrace market-based strategies for incremental reform or "compassionate" capitalism. Nearly 50 years after this book's publication, I am forced to consider how distant the contemporary food systems reform movement appears from the more radical approach of *The People's Land*. I am also concerned about being caught up myself in a cyclical repeating process of thought in agrarian studies. The cycle goes like this: Actors in the food system work doggedly to make the economics of agriculture work for small scale and sustainable livelihoods for individual landowners. The slow realization of this relative impossibility for all points towards the need for structural reform. Momentum builds towards a structural reform package but is dead-ended by the entrenched cultural political values of private ownership and liquidity of land. Actors eventually regroup with market-based innovation aimed at "farmer entrepreneurs" as a way to work with these dominant values. Neoliberal logics entrench.

Faced with this potential futility, I offer a suggestion to begin breaking the loop: In any renewed call for land rights and land reform in the United States, first uncoil the foundational yeoman myth. The first contribution in *The People's Land* is indeed Thomas Jefferson's adoration of the yeoman: "The small land holders are the most precious part of the state." Looking back on the work of this dissertation and out towards global land rights movements, I am keen to suggest that the yeoman myth is not the surest pillar to launch a land reform campaign. That leads to a hopeful ponderance of alternative vision of land use arrangements could form a revitalized conversation around land reform. I see the articulation of this vision as a crucial priority for the beginning farmer movement.

Who will be central in articulating this alternative land use vision depends on much future work. I don't see why the current visionaries of beginning farmer movement couldn't also leverage their privileged position in society to argue for innovative land re-distribution policies and programs. It would be encouraging for celebrity chefs, for example, to work towards supporting the creation of secure land base for which their innovative farmers can feel secure. Supporting the secure tenure of producers would indeed be a brand-new mechanism for food buyers, distributors, and grocery conglomerates, to take more responsibility in the good food movement.

Yet, an elite call for land reform still fails to address central questions of democratized decision making. Thus far, the beginning farmer movement has not included the voices of the historically and currently dispossessed. As I've argued the proposed "solutions" to beginning farmer challenges, rooted in a neoliberal yeoman mythology, appears to maintain the status quo. The challenges of elite problem-solving reproducing elite spaces demand an urgent search for new modes of ally-ship, representative scholarship, and equity-based movement building.

Searching for models, it is useful to explore cases of alternative visions of land use that have won concessions from local and national governments to legitimize their access claims. In parts of Brazil, a movement of land redistribution is driven by landless workers who use occupation to demonstrate lands that fail to deliver public good (Wolford 2010). In Scotland, a logic of land transfer from absentee landlords—who acquired land from mid 18th century forced

evictions—to commons use has helped form the Scottish Land Commission, a body devoted to a national land reform act (Shields 2018). The protests against the Dakota Access Pipeline is bolstered by Standing Rock Sioux appeals to indigenous rights to land use (Whyte 2017). La Via Campesina, a global movement of agriculturalists, demands the global political structure support peasant livelihoods (Patel 2009; Wittman 2011).

In each of these political movements, historically underrepresented voices, whether a landless worker, a Scottish crofter, or an indigenous activist, are fundamental in production of alternative land-use narratives. They form a critical mass in movement membership and are present at tables of power. As long as the mythology of beginning farmers silences these voices, the chance for uncoiling the yeoman myth will remain out of reach.

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