

NAVIGATING COMPLEX DYNAMICS: POWER, STRUCTURES,  
INSTITUTIONS, AND ACCESS IN CALIFORNIA  
CLIMATE-SMART AGRICULTURE PROGRAMS

By

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DEDICATION

To my late grandparents' former family farm in New Hampshire that served as my introduction to agriculture before I could walk.

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## ABSTRACT

The United States agriculture sector needs to adapt to and mitigate its contributions to climate change, especially with adverse impacts such as intense and frequent drought, flooding, wildfire, and extreme heat that affect crop yields, livestock health, farm infrastructure, and farmer incomes. Recently, federal and state governments have introduced new ‘climate-smart agriculture’ (CSA) policies and programs to help farmers mitigate greenhouse gas (GHG) emissions from farming operations. However, farmers face persistent barriers to accessing government resources, which necessitates an understanding of power dynamics among CSA program actors and existing institutions and structures in the agricultural sector. I used the California Department of Food and Agriculture (CDFA) CSA incentive programs to investigate these dynamics. I examined how farmer access to CSA programs and the broader program goal of GHG mitigation are enabled or constrained by program actors involved in program implementation and decision-making, and external institutional and structural ‘conditions.’ I explored if and what foci should be incorporated into the California CSA approach to further achieve GHG mitigation and broader climate change adaptation. To assess these objectives in the context of the CSA programs’ implementation and agenda-setting policy process stages, I employed qualitative methods. Drawing from conservation social sciences, political sciences, and human geography, I used a research approach based in concepts of power – the mechanisms of power and the enabling and constraining outcomes – and theories of institutions and structures. The findings demonstrate persisting challenges within the implementation process that ultimately constrain farmers’ access to the CSA programs. External policies, market dynamics, farmland and labor access, structural discrimination, and asymmetrical power dynamics in program agenda-setting further constrain farmer access to programs and the programs’ ability to mitigate GHG emissions. My findings highlight potential foci to address structural constraints for GHG mitigation and adaptation at the farm level for the CSA approach utilized in California. I recommend considering a more holistic, multi-policy approach to address climate change mitigation and adaptation in agriculture and I argue for future participatory action research with farmers, farm workers, and rural communities to determine mitigation and adaptation needs.

## CHAPTER ONE

## INTRODUCTION

Problem Overview

Climate change remains a current and future problem for the California agriculture sector in the United States (US), with farming operations facing more risk from climate change impacts like extreme heat, flooding, drought, and wildfire (Fernandez-Bou et al., 2021; Pathak et al., 2018). Although farming operations face these risks, they also contribute to climate change by emitting greenhouse gasses (GHGs) into the atmosphere through farming activities (California Air Resources Board, 2021; Thao et al., 2019). It is thus necessary for the agriculture sector to adapt to and mitigate its own contributions to climate change, with needed changes from every actor – farmers, farm workers, technical assistance, retailers, processors, agricultural agencies, and consumers – within the sector (Davis et al., 2022). Within the past few decades there has been an increasing emergence of climate change policies – often described as climate-smart agriculture (CSA) policies – at the federal and state levels of government to address agricultural adaptation and mitigation of climate change. These policies include government incentive programs for implementing GHG-mitigating practices and technologies on farms, the creation of markets for CSA commodities, regulations around the management of food waste and compost, and other adjacent policies touting nature-based solutions to on-farm natural resource management (Berkeley Law, 2019; USDA-FSA, 2023).

The state of California has been a leader in championing CSA policies and connecting GHG mitigation to agricultural conservation practices, inputs, and technologies, with the early

establishment of CSA incentive programs for farmers in the 2010s (Lewis and Rudnick, 2019). The California Department of Food and Agriculture (CDFA) administers the suite of CSA programs to eligible farmers, who must apply to receive financial compensation for implementing CSA practices on their farming operations. The suite of programs includes the Advanced Manure Management Program, Dairy Digester Research and Development Program, Healthy Soils Program, and Sustainable Water Efficiency Enhancement Program. The programs aim to mitigate GHG emissions from farming operations by implementing CSA practices that sequester carbon in the soil and plants, capture methane from livestock, replace fertilizers with other inputs, and replace fossil-fuel-based technologies with renewable-energy-based technologies. Alongside the suite of programs, CDFA administers an incentive program to support technical assistance providers in helping farmers complete program applications and then implement the CSA practices (CalCAN California Climate & Agriculture Network, 2020).

The relative newness of these CDFA CSA programs necessitates an evaluation of the intended and unintended outcomes of these policies and programs to ensure they are functioning as intended. Additionally, an evaluation of these policies and programs should consider beneficiaries and non-beneficiaries of these policies and programs (Flyvbjerg, 2004), or more broadly who is accessing CSA programs and who is not. Who participates in these programs and receives benefits versus who does not participate have equity implications, such that participating in CSA programs may enable some farmers' abilities to address climate change while non-participating farmers would not be enabled to address climate change. These dynamics imply the potential for CSA programs to not achieve intended goals of mitigating GHG from farming operations. Identifying the factors and elements tied into the different stages of policy

processes (in particular, the agenda-setting and implementation phases of the process) that ultimately shape the design of policies and programs and how they are administered to public actors can aid in understanding how different actors benefit from these policies and programs (Hilgartner & Bosk, 1988). Likewise, considering factors and elements beyond the design and implementation of these policies and programs (e.g., federal policy, economic processes, farmer access to land and labor, etc.) will contribute to this understanding (Giddens, 1999; Jacobs et al., 2013). Together, these findings can further feed into adapting the CSA approach utilized by the state of California to more holistically address climate change mitigation and adaptation on farming operations (Azadi et al., 2021).

This introductory chapter of my dissertation examines research needs related to the CSA framework and contextualizes the broader governance, policy process, and economic conditions of US agricultural policy and problems. This chapter also establishes the dissertation research approach for assessing how different social, political, economic, and environmental conditions can create enabling or constraining dynamics among agricultural actors. Following the research approach, I review concepts of power, structures, and institutions that are utilized in this dissertation research.

## Literature Review

### Climate-Smart Agriculture

CSA in the research field describes a strategic framework that aims to ensure future food security under climate change. CSA prioritizes mitigating GHG emissions from the agricultural sector, adapting agricultural activities to enhance resilience throughout the agriculture sector, and enhancing agricultural productivity to equitably support livelihoods, rural communities, and food

security (Lipper et al., 2014). The framework was originally developed through work in Global South communities, with the goal of transforming agriculture away from unsustainable conventional agriculture systems and practices (e.g., monoculture crop/livestock systems and intensification of inputs into systems [Lipper et al. 2014; FAO 2010]). CSA, as a strategy, recommends achieving its priorities through four broad activities meant to build on existing sustainable agriculture experience and knowledge. First, CSA requires more research activities to build evidence and assessment tools in the face of climate change uncertainty, with a specified focus on examining barriers to transformation. Second, CSA requires enhancing support to national and local institutions to support their adaptive capacity in light of climate change uncertainty. Third, CSA requires increasing the coordination of agricultural, climate change, environmental, and broad food systems policies (e.g., trade and economics) to address climate change. Finally, CSA requires improving and increasing financial resources targeted to different agricultural and broader food system actors to support CSA (FAO, 2010).

While CSA as a strategic framework holds enough generalization in terms of foci and activities to be applicable to a broad variety of geographic contexts, a lack of specificity may constrain the CSA framework's intended outcomes (Chandra et al., 2018). The framework does not include information about performance guidance of CSA practices and models, nor does it acknowledge the role of different geopolitical contexts in the development and application of CSA strategies. Furthermore, while the foci of the CSA framework are critical for addressing climate change mitigation and adaptation in agriculture, the focus of mitigating GHG emissions can exclude small-scale farmers from CSA efforts due to their small contributions to GHG emissions relative to larger farming operations. In these cases, CSA foci may need to be

expanded to incorporate different agricultural needs for all actors in the sector (Azadi et al., 2021). Research at regional and local levels can also provide more insight into needed foci, along with CSA policy solutions that consider performance measures relevant to different geopolitical regions (Chandra et al., 2017). Thus, more research is needed to focus on barriers to the CSA transformation at regional and local levels (which aligns with the types of necessary CSA activities called for by researchers).

Given the powerful roles of policymakers and those who can gain their attention in shaping the agendas of public policy (Avelino, 2021; Birkland, 2019b), the gap in the CSA framework around the role of geopolitics in applying CSA to the agriculture sector and the broader food system thus requires research of its own to inform CSA solutions in the US. Furthermore, research related to policy processes, or the life cycle of public policies, can help inform our understanding of the types of conditions that exist on the agricultural and policy landscapes that constrain the broader priorities of the CSA framework. To inform the governance, policy process, and economic conditions under which CDFA CSA programs exist, this research aims to contextualize the broader system of governance, the policy process, and the economic approach of the US in relation to Farm Bill policy.

### Agenda Setting for US Agricultural Policy

In the US, the landscape of agriculture is highly influenced by the broader governance of states and the country and economic structures, such that who ultimately makes decisions in policymaking and what values are inserted into policy agendas shape how policy solutions are designed and if and how they affect agricultural problems (Leland, 2003). The form of governance for the US is a federal democratic republic, where individuals elect officials to

represent them in public policy decisions (Onuf, 2010). The policy process or lifecycle of public policy under this form of governance includes multiple stages: 1) issue emergence, when a problem emerges to policymakers; 2) the agenda-setting stage, where individuals and groups compete to get their agendas incorporated into the broader policy agenda; 3) alternative selection, where policymakers and bureaucrats choose the policy tool for addressing the problem; 4) enactment, where the policy solution gets authorized; 5) implementation, the process of implementing policy tools, including how agencies administer the policy tool to the target recipients of the policy; and 5) evaluation, where the policy outcomes are evaluated (Birkland, 2019a). The policy process then feeds back into itself when policies are adapted.

In regard to decision-making at the policy level, the process is inherently top-down. Policymakers – including Congress, the President, and the Supreme Court – hold power over decision-making as the only decision-makers who get to vote on public policy decisions made through the typical policy process or court cases. These decisions then affect a select number to the entire nation of people in the US, regardless of whether or not people support these policy decisions (Bachrach & Baratz, 1962). The outcomes of these decisions enable and constrain individuals, such that some individuals may benefit from the decisions and others may not (Avelino, 2021). For example, policymakers historically took a neoliberal approach to agricultural policymaking addressing the decline in farm viability as a result of market crashes throughout the 20<sup>th</sup> and 21<sup>st</sup> centuries. Neoliberalism is an approach to structuring economies, associated governance of economies, and general management of society, and emphasizes free-market capitalism. In regard to agricultural policy in the early to mid-20<sup>th</sup> century, market-based policy approaches, such as incentive programs, subsidized loans, and supply management

programs, were utilized to address the historic decline in the number of farms in the US. The supply management programs, which were part of the federal Farm Bill, helped regulate some aspects of agricultural markets, such as farmgate prices (i.e., the cost of agricultural products directly from farmers to buyers), to help correct negative impacts of market dynamics on farmer profits. However, despite explicitly linking declines in farm viability to harmful market dynamics in public hearing sessions in the 1980s, policymakers began removing supply management aspects from the Farm Bill, citing favoritism toward maintaining the presence of the US agriculture sector in global markets as lobbied for by agribusinesses, retailers, and processors. This decision was also made with the explicit assertion that the loss of agricultural livelihoods would be a sacrifice for the economy (Leland, 2003).

This example of policymaker influence over the approach to Farm Bill policymaking highlights how decision-making in the agenda-setting stage of the policy process can enable or constrain different agricultural actors depending on both the values and interests of the policymakers and the interests of lobbying organizations. In addition to individual voting, participating in public commentary periods, and legalized forms of protesting, individuals can affect agenda-setting decision-making through organized lobbying. Regarding agricultural lobbying, these organizations include the aforementioned groups in the Farm Bill example: agribusinesses, retailers, and processors, who often represent more corporate and large-scale agriculture interests as well as the majority of agricultural production, profits, laborers, and farmland acres (Gawande & Hoekman, 2006; Grant, 2024). Other farmer advocacy groups, such as groups with farmer memberships or groups representing farm workers, also play a significant role in representing general farmer interests in policy agenda-setting (Pahnke, 2024).

The intersection of decision-making in the policy process and the economic approach to the US in shaping agricultural policy necessitates a need for research on how newer policy solutions to agricultural problems, such as the CDFR CSA programs, interact with policy processes and economic conditions (Leland, 2003). In particular, focusing on the administration stage of the policy process associated with these programs may highlight some of the policy, economic, and other agricultural conditions that farmers face to accessing the programs. Program access is one condition that influences the outcomes of government incentive programs, such that those who can and do access the programs are able to contribute to the desired outcomes of the programs, and those who cannot and do not access the programs do not contribute to the desired outcomes. Given the role of neoliberal agendas in determining historic policy solutions authorized through the Farm Bill (Czarnecki & Fiedler, 2016; Graddy-Lovelace & Diamond, 2017), insight into the decision-making involved in the administration stage and earlier agenda-setting stages of the policy process can also help identify and contextualize the influences over the programs and broader agricultural conditions that constrain farmer access to the programs.

#### Farmer Access to Government Resources

Farmer access to government resources is a critical component to ensuring agricultural policy solutions achieve their desired outcomes. However, pertaining to federal-level resources such as Farm Bill programs, research generally suggests that a majority of agricultural policy resources are concentrated among larger farming operations and agribusinesses while farmers with smaller farms do not receive government resources (Ayazi & Elsheikh, 2015; Belasco & Smith, 2022; McFadden & Hoppe, 2017). Research on Farm Bill conservation programs (comparable to CDFR CSA programs), crop insurance, commodity subsidy loans, and farmland

ownership loans highlights a variety of critical barriers that constrain farmer access to government resources. Many farmers are not eligible for these types of programs administered through the Farm Bill, with research citing inadequate financial resources and credit scores as key barriers to eligibility for programs (Asare-Baah et al., 2018; Fagundes et al., 2020; Nickerson & Hand, 2009). Likewise, programs may not be compatible with farming operation systems. For example, federal crop insurance through the Farm Bill is not designed to support diversified operations (O'Donoghue et al., 2005), and thus excludes farmers with diversified operations from participation.

For many farmers, a lack of time, labor, farmland, and financial resources are key barriers to even apply for the programs (Ayazi & Elsheikh, 2015; Ranjan, Wardropper, et al., 2019; A. P. Reimer & Prokopy, 2014a). Farmers who rent farmland can also be constrained from accessing government resources due to not being the head decision-maker of the land they are renting for farming (Palm-Forster et al., 2023; A. P. Reimer & Prokopy, 2014a). Although both the institutional and structural barriers for farmers are relevant for the average US farmer, under-resourced farmers are particularly affected by these barriers. For example, Black farmers, who have historically been excluded from accessing farmland and associated financial resources provided by governments and banks due to both institutional and interpersonal racism, now, on average, own significantly smaller farms than white farmers (Gilbert et al., 2002; USDA, 1997; USDA-NASS, 2019). As a result of owning less farmland, Black farmers make lower profits, have less financial resources, and have lower credit scores than white farmers (Ayazi & Elsheikh, 2015; Fagundes et al., 2020; Saffeir, 2020). Research in Oklahoma demonstrates that due to having less financial resources and lower credit scores, Black farmers have had applications

rejected from some Farm Bill conservation programs at higher rates than white farmers despite Black farmers applying at higher rates than white farmers to the programs (Fagundes et al., 2020). Given the critical role of farmer access to government resources in helping address the intended outcomes of agricultural policy solutions, the constraints farmers face in accessing government resources are critical to consider in the evaluation of new policy solutions for agricultural problems, including the CDFA CSA programs.

### Research Approach and Framework

With the relative newness of CDFA CSA programs in the complex and challenging agricultural landscape in the broader US, there should be an examination of how CSA programs fit into the agricultural landscape to address climate change and identification of needed changes for the programs, including new foci for the California CSA approach, all of which my research accomplishes. This dissertation specifically uses concepts of power and theories of structures and institutions to examine how farmers are enabled and constrained in accessing CDFA CSA programs, with a primary focus on the implementation stage of the policy process and a secondary focus on policy agenda-setting in agricultural policymaking. Within this examination, 1) I explore how the CSA programs directly enable or constrain farmers' abilities to address climate change, with a focus on program access based on research demonstrating an increasing lack of access among under-resourced farmers to Farm Bill conservation programs and other government resources; 2) I assess how the structural and institutional conditions external to the CSA programs interact with the programs enable or constrain their ability to address climate change mitigation; and 3) I examine potential priorities to incorporate into the state of California's CSA approach. Chapters 3-4 utilize concepts of power to understand the conditions

that enable or constrain the CDFA CSA programs from addressing climate change mitigation but diverge on which conditions they focus. Chapter 3 primarily examines the role of power dynamics between actors involved in the administration process in enabling or constraining farmers' access to the programs. Chapter 4 examines the interactions between the CDFA CSA programs and broader structural and institutional conditions on the agricultural landscape that directly or indirectly enable climate change mitigation.

### Research Questions and Methods

The current dissertation research uses the case study of CDFA CSA programs in California to examine how access to CSA programs and, more implicitly, the programs' ability to address climate change mitigation is influenced by power dynamics between actors involved in the administration of the programs, and broader structural and institutional conditions on the agricultural landscape. Before the research chapters, this dissertation has a chapter drawing on the literature to examine historical agricultural policy decision-making and the role of policymakers' values and desired neoliberal approach to policymaking in shaping how agricultural problems are addressed through Farm Bill policy. Chapter 3 of the dissertation uses 53 semi-structured interviews with CDFA staff and their program advisory board, technical assistance providers, advocacy group staff, state and federal agency staff, and farmers (i.e., grant recipients) who participated in the programs to primarily understand the underlying power dynamics between CSA program actors involved in program administration. This chapter focuses on the role of institutional conditions related to the CSA programs such as program design, administration process, CDFA capacity, and technical assistance providers in enabling and constraining program access among farmers in California. I ask the following research questions:

1. Who is enabled and constrained, and by what mechanisms of power?
2. What are the social outcomes of these enabling and constraining dynamics?

Chapter 4 then uses 16 semi-structured interviews with state agency staff, technical assistance providers, advocacy group staff, and university researchers who all engage with CDFA CSA programs in California to examine how the programs interact with other structural and institutional conditions that directly or indirectly enable climate change. This chapter specifically focuses on understanding how the CSA programs enable or constrain change to these structural and institutional conditions that drive climate change and how these conditions then enable or constrain farmer access to CSA programs and the programs' ability to address climate change mitigation. I ask the following questions:

1. How do CSA programs interact with structural and institutional conditions to enable GHG mitigation?
  - a. How do CSA programs enable or constrain structural and institutional conditions to mitigate GHGs through program participation?
  - b. How do these structural and institutional conditions enable or constrain farmers' access to CSA programs and the programs' ability to mitigate GHGs?

The final research chapter of the dissertation, Chapter 5, utilizes the same methods and dataset as Chapter 4 to then explore how foci under the CSA policy approach in California could be expanded to include addressing other critical problems in agriculture that directly or indirectly affect the ability of farmers to mitigate GHGs and adapt under climate change. I ask the following research question in this chapter:

1. Should additional priorities be included in California's CSA policy approach beyond the foci of GHG mitigation, adaptation, and agricultural productivity; if so, what should be (more) prioritized?

### Concepts of Power

Power dynamics are critical to consider in this research, as they shape the outcomes of policy solutions. I use political ecology as a lens to look at my research, as it emphasizes using power as an analytical lens to assess environmental problems like climate change. As an approach that originates from critical geography research, political ecology combines power dynamics, aspects of poststructuralism theory (i.e., theory related to the fluid and dynamic nature of meaning depending on context, power dynamics, and culture [Heiskala 2001; Foucault 1980]), and political economy theory (i.e., theory related to how economic structures, political structures, and social relationships interact to distribute and control resources and power in society (Martin et al., 2019)) to understand environmental degradation. The consideration of power dynamics in political ecology originally responded to neo-Malthusian theories of environmental issues, which tend to ignore implicit power relations, wider structural and institutional contexts, and their role in shaping environmental issues (Jones, 2008). For example, in the 1968 essay *Tragedy of the Commons*, Garrett Hardin used neo-Malthusian theory to shortsightedly and rather discriminately attribute natural resource degradation to the overpopulation of poor people and argue for the privatization of natural resources (Brinkley, 2020; Hardin, 1968). In the context of agriculture, this argument ignores the fact that the majority of family farmers do not participate in Farm Bill conservation programs (McFadden & Hoppe, 2017), and many lack the adequate financial, land, and labor resources to even adopt conservation practices (Prokopy et al., 2019a; Ranjan, Church,

et al., 2019; A. P. Reimer & Prokopy, 2014a). Hardin's argument likewise ignores the powerful roles of organizations and others like policymakers, the USDA, agribusinesses, and large food retailers in deciding the agendas of agricultural policies meant to address the lack of resources among farmers (Czarnezki & Fiedler, 2016; Glenna, 1999; Graddy-Lovelace & Diamond, 2017).

As a result of ignoring power dynamics that overarch environmental issues, the application of neo-Malthusian theory in research may provide myopic perspectives of environmental issues that exacerbate societal and natural issues (Jones, 2008). For example, traditional neo-Malthusian analysis might attribute farmland degradation to the siloed problem of farmers not properly managing resources. Based on this conclusion, a neo-Malthusian analysis might recommend stricter regulations for farmland management, which does not address the myriads of institutional and structural barriers that farmers face in preventing farmland degradation. Political ecology asserts that an analysis considering power relations would attribute farmland degradation to inadequate land management policies, institutions, economic structures, decision-making processes, governance values and beliefs, and other key factors that hold power over how public actors can manage land rather than attributing farmland degradation solely to farmers (Blaikie & Brookfield, 2015; Chandra et al., 2017; Jones, 2008).

By considering the role of power relations, policy evaluations can avoid inaccurate conclusions about how problems come to exist, and research can avoid contributing to unjust policies that further exacerbate existing inequities (Calo, 2020). For this research, power abstractly describes an actor's ability to pursue a desired agenda and the resources that aid this pursuit (Avelino, 2021; Birkland, 2019b; Heiskala, 2001). Power dynamics, therefore, describes the interactions between actors involving power and the outcomes of other actors' power to act

resulting from these interactions. Agreed upon concepts of power described by political scientists, philosophers, human geographers, and other social scientists contextualize these power dynamics. These concepts, which are derived from various theories of power (e.g., elite and pluralist theory) include mechanisms and outcomes of power. Mechanisms of power as a theory describe how power is used by actors. These mechanisms include *power to*, *power over*, and *power with*. *Power to* signifies an individual actor's ability to act (e.g., farmers' abilities to access CSA programs). *Power over* describes situations where one actor or actor group holds power over another actor or actor group and makes decisions for them regardless of the benefits to the latter actors or actor group (e.g., policymakers ultimately vote on and decide CSA program agendas regardless of whether or not those agendas serve all farmers). *Power with* describes situations where multiple actors or actor groups collaborate to pursue shared agendas (e.g., advocacy groups with shared goals might collaboratively lobby to affect the agenda of CSA programs) (Dahl, 2005; Pansardi & Bindi, 2021). The outcomes of the mechanisms of power (or how power is used) between actors result in enabling or constraining effects on other actors' power to act as desired (Avelino, 2021; Giddens & Giddens, 1982).

### Interactions of Structural and Institutional Conditions

Social-ecological conditions (with an emphasis on the social conditions) can be framed as structural or institutional conditions, drawing from anti-oppression and discrimination, structuralism, poststructuralism, and Marxian literature (Giddens & Giddens, 1982; Shiao & Woody, 2021; Stör, 2017). I specifically choose the word 'conditions' to neutrally describe institutions and structures and account for their ability to change over time. Likewise, structural and institutional conditions can enable and constrain each other and individual actors (Avelino,

2021; Giddens & Giddens, 1982; Jacobs et al., 2013), and thus act as both opportunities and barriers depending on the enabling/constraining dynamics over other conditions/actors.

Structural conditions describe broad and abstract conditions on a landscape (e.g., poverty, drought, market and economic dynamics, etc.) as the result of interacting institutions (policies, their processes, and formal and informal organizations that influence the policies), social relationships, and culture. The latter two categories include the nature of social connections, beliefs, attitudes, knowledge, norms, and perceptions. Structural conditions or ‘structures’ are critical for consideration in social-ecological change due to how they hold meaning over individual human actors (Giddens & Giddens, 1982) and institutions (Jacobs et al., 2013).

Although the term ‘structural’ may imply that structural conditions are fixed over time, conditions do change over time through social processes and the overarching power dynamics that shape social processes (Heiskala, 2001; Stör, 2017). Moreover, the consideration of structural conditions within the context of other social processes at the internal and interpersonal levels of the framework (e.g., production of knowledge, beliefs, attitudes, norms; relationship building, collaboration, etc.) can help identify enabling and constraining forces within that change (Avelino, 2021; Giddens & Giddens, 1982; Heiskala, 2001; Jacobs et al., 2013).

Institutional conditions describe the processes, policies, and actors that are part of individual formal and informal organizations that influence institutional processes and policies, with institutions being defined as a shared system of rules within a community (Crawford & Ostrom, 1995; Knight, 1992; Ostrom, 1990). In the context of under-resourced farmer, or farmers that lack critical agricultural resources as compared to the average farmer in the US (i.e., Black or African American, Indigenous, Asian, Hispanic or Latin American, Middle Eastern, women,

beginner, small-scale, and veteran farmers [Guynn, Player, and Burns 2024; USDA 2022; Carter 2019; Effland 2021]) land tenure patterns, institutional conditions that affect these patterns include stringent eligibility requirements for farmers to gain access to government-provided land ownership resources, such as credit score and financial asset requirements, that many under-resourced farmers do not meet. Structural and institutional conditions have the potential to impact each other (Giddens & Giddens, 1982; Jacobs et al., 2013; Marx & Engels, 1973). Within these interactions, conditions can be assessed for their enabling and constraining dynamics related to social-ecological outcomes, opportunities, solutions, or broad change.

Viewing the process of administering CDFR CSA programs as a set of interactions between the programs, structural conditions (e.g., limited access to financial resources, land, and labor among farmers; market dynamics), and other institutional conditions (e.g., federal agriculture policy) on the landscape can lend to assessing the efficacy of the CDFR CSA programs in addressing climate change mitigation. The CSA programs themselves are an institutional condition that can enable and constrain other actors involved in the programs and ultimately shape the outcomes of the programs. Farm Bill resources research demonstrates that many farmers face structural constraints to accessing these resources (Asare-Baah et al., 2018; Nickerson & Hand, 2009; A. P. Reimer & Prokopy, 2014a), so it is thus likely that structural conditions exist on the agricultural landscape that constrain farmer access to CSA programs. Given that institutional conditions, especially agricultural policies, also shape the structural conditions of the agricultural landscape for farmers (Glenna, 1999), it is likely that other institutional conditions outside of the CSA programs feed into structural conditions that constrain or enable the programs' ability to address climate change.

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## CHAPTER TWO

## POLICY PROCESSES, NEOLIBERALISM, AND FARM BILL

## POLITICS IN THE US

Introduction

In response to the increasing impacts of climate change on the agriculture sector, United States (US) federal and state government policy agendas have increasingly been incorporating climate change mitigation and adaptation in agriculture as a problem to be addressed by public policy. The emerging policy solutions to climate change mitigation and adaptation, which are dubbed climate-smart agriculture (CSA) policies, include market-based approaches to managing greenhouse gas (GHG) emissions from farming operations. These market-based approaches take the form of incentive programs that support eligible farmers in adopting CSA practices and technologies that mitigate GHG emissions from farming operations (Daniels, 2022; Lewis & Rudnick, 2019) and the development of CSA commodity markets to encourage farmers to produce crops or livestock associated with lower GHG emissions or GHG mitigation (USDA-FSA, 2022).

Although these approaches to addressing climate change mitigation are promising, given the historic denial of climate change among federal and state policymakers throughout the first few decades of the 21<sup>st</sup> century (Kousser & Tranter, 2018), the use of market-based policy approaches to addressing agricultural problems from the mid-1930s to today have had limited outcomes. For example, market-based approaches used in the Farm Bill – a significant agricultural policy that established a variety of programs providing financial resources to farmers

(McGranahan et al., 2013) – to address the decline in number of farms on the agricultural landscape have done little to stop this phenomenon, with the trend of decreasing numbers of farms persisting into the 2020s today (Bigelow et al., 2016; Callahan & Hellerstein, 2022; Morath, 2014; USDA-NASS, 2019). This trend juxtaposes the consolidation of farmland into increasingly larger farms (Fairbairn, 2013).

Furthermore, outcomes of market-based policy approaches to agricultural problems are likely in-part stymied by trends of limited access to government resources among family farmers who work small to medium sized farming operations and make up the majority of farmers in the US (Effland, 2021; USDA-NASS, 2019). Research examining the flow of Farm Bill funding to farmers finds that the majority of these funds and associated resources are concentrated among increasingly larger farming operations over time, despite their minority presence on the agricultural landscape (Ayazi & Elsheikh, 2015; Belasco & Smith, 2022; McFadden & Hoppe, 2017). For farmers who are not accessing government resources, constraints to accessing these resources include institutional incompatibilities between government resources requirements, funding structures, and agency administration processes and farmer abilities, operations, and timelines (Fagundes et al., 2020; M. K. Johnson et al., 2018; Nickerson & Hand, 2009). Structural conditions (i.e., conditions resulting from interacting policies, their processes, their decision-making organizations, social relationships, and culture), such as economic, labor, and land access limitations that generally plague family farmers' vitality and ability to continue farming in the future, interact with these institutional incompatibilities to further constrain farmer access to government resources (Ayazi & Elsheikh, 2015; Guynn et al., 2024; Maher et al., 2023; Prokopy et al., 2019b; A. P. Reimer & Prokopy, 2014a). These persisting trends both in declining

numbers of farms and general limited access to government resources among family farmers imply an inadequacy of the Farm Bill's market-based approach to managing agricultural problems and beg a further examination of the conditions under which this approach was established (Leland, 2003).

Limited outcomes of market-based policy approaches to addressing agricultural problems, the broader issue of limited farmer access to programs, and the continued emphasis on these approaches by federal and state policymakers to address climate change mitigation in agriculture, point to a need to question these approaches and catalog how and why these approaches are chosen to address agricultural problems. In particular, considering how policy decisions are made, including who influences and makes policy decisions and what values are thus embedded into these decisions, can highlight areas of agricultural policymaking that contribute to the current market-based policy approach and its failures (Birkland, 2019b; Hilgartner & Bosk, 1988; Leland, 2003; Maronie Bendaoud et al., 2020). This review examines the case of Farm Bill programs geared towards farmers and the neoliberal approach to the political decision-making that created and adapted the Farm Bill throughout the 20<sup>th</sup> and early 21<sup>st</sup> centuries. Drawing on research documenting the creation and adaptation of the Farm Bill and associated decision-making by policymakers, this review examines a variety of Farm Bill resources for farmers that exist or have existed throughout the Farm Bill's history. In this review, I include supply management programs, risk management programs, commodity subsidy loan programs, conservation programs, federal crop insurance programs, and farmland ownership loan programs. This review is structured as follows: 1) an overview of US governance, the policy process, and the neoliberal political-economic approach of policymakers, 2) an examination of

the influence of the neoliberal political-economic approach on decision-making related to the adaptation of the agricultural policy using the Farm Bill as a case, 3) an exploration of continued neoliberal political-economic approaches to addressing agricultural problems in light of the Coronavirus Pandemic in 2020, and 3) implications of the Farm Bill case.

### Contextualizing Policy Processes in Agriculture

In the US, the agriculture sector is highly influenced by the broader governance of states and the country and economic structures. The form of governance for the US is a federal democratic republic, where individuals elect officials to represent them in public policymaking and federal decisions (Onuf, 2010). The lifecycle of policy, also known as the policy process, in the US is composed of various stages that feed into each other to create a cycle: 1) *issue emergence*, when a problem emerges to policymakers; 2) the *agenda-setting stage*, where individuals and groups compete to get their agendas incorporated into the broader policy agenda; 3) *alternative selection*, where policymakers and bureaucrats choose the policy tool for addressing the problem; 4) *enactment*, where the policy solution gets authorized; 5) *implementation*, where policy solutions are implemented, generally by government agencies; and 5) *evaluation*, where the policy outcomes are evaluated (Birkland, 2019a).

Within this form of governance in the US, individuals have opportunities to contribute to governance decisions through voting for elected officials and referendums in elections, certain forms of public commentary on public policies and decisions (part of the agenda-setting and evaluation stages of the policy process), and certain forms of public protest in opposition to or agreement with public policies and decisions (Keeler, 1993; Kochan, 2017; Sato & Haselswerdt, 2022). Organizations can participate in public policymaking and other decisions via lobbying

activities during the agenda-setting stage of the policy process, which requires ample resources to participate (Choi et al., 2015; Esteban & Ray, 2006; McCauliff, 2009). Otherwise, this form of governance and public policymaking is inherently a top-down process, such that the government holds power over the process and non-governmental decision-makers must adhere to the decision regardless of their perspectives about the decisions (Bachrach & Baratz, 1962). In agriculture, the agenda-setting stage for agricultural policies has historically been influenced by powerful agricultural lobbies that represent agribusiness interests, including large agribusinesses, retailers, and processors (Glenna, 1999; Grant, 2024). Farm advocacy groups that include farmers and farm workers as key members or leaders also participate in the agenda-setting stage through lobbying efforts and sometimes organized protests (Browne & Dinse, 1985; Pahnke, 2024). In addition to these lobbying and protest efforts from different agricultural interest groups, policymakers make decisions based on electoral pressures and conditions related to their ability to stay in office (Bellemare & Carnes, 2015).

### Political-Economic Values: Neoliberalism

Before discussing historic policy processes in the context of the Farm Bill, the approach to the US economy must be contextualized, as economic factors such as market dynamics drive agricultural conditions that contribute to climate change and natural resource degradation, such as monoculture crop and livestock farming operations combined with input intensification (Berka et al., 2001; M. Lin & Huang, 2019; Rojas-Downing et al., 2017). In the context of this research, markets refer to the complex system of supply, demand, pricing, and other economic structures that embody the sale and purchase of agricultural commodities and key resources, with market dynamics referring to changes in market supply, demand, pricing, etc. (e.g., inflation and

deflation of pricing). In addition to this form of governance, US policymakers' general approach to economic and societal management is based on neoliberalism, an approach and value-laden ideology to political-economic structuring that arose post-World War II as an attempt to re-build US society post-war and embed liberalism into global governance (Conrad & Zuckerman, 2020; Harvey, 2007). As a political-economic approach, neoliberalism emphasizes the deregulation of markets and business in favor of free-market capitalism as a means to manage resources and people for human well-being and vitality (i.e., neoliberalism is a conceptual rationale for a free-market capitalist economy, which predates neoliberalism and originates from colonial European economics [Comminel, 2000]). The US does not have a fully free-market capitalist economy, as some aspects of markets are regulated under public policy (Simmons, 2001). Neoliberalism also emphasizes private property rights and protections, and land is a highly valuable financial asset within this idealized political economy. To address needs within this approach – needs such as accessible and affordable housing, healthcare, education, etc. – markets must exist or be created. Neoliberalism views corporations as individuals, and this perspective, combined with deregulating business affairs and markets, allocates autonomous power to corporations (Harvey, 2007).

Contrary to the neoliberal goal to uphold human well-being, the current neoliberal approach to the economy is associated with processes that inequitably shape the societal landscape. First, this current approach is associated with the withdrawal of government services from the public, including key services and resources related to healthcare, education, unemployment, welfare, and other critical services (Hendrickson et al., 2006; Mullens et al., 2024; Schupp, 2019). Losses in these services are especially adversely impactful on the well-

being and health of marginalized groups of people (Allen, 2010; Davis et al., 2022). Second, the application of neoliberalism to US development policy historically resulted in uneven development between rural and urban communities, with rural communities receiving less public policy attention and thus, critical resources, leading to exacerbated social and environmental issues on those landscapes. As a result of these exacerbated issues, rural communities are less empowered to navigate environmental and social challenges, such as climate change or the COVID-19 pandemic (Fernandez-Bou et al., 2021; Mueller et al., 2021; Peters, 2020). As an activity that occurs in and around rural communities by members of those communities, agriculture and farmers are similarly impacted by the neoliberal agenda embedded within decision-making and public policies (Graddy-Lovelace, 2017).

#### Case: Farm Bill Approach to Addressing Agricultural Problems

In the context of US agriculture, policy processes embedded with neoliberal agendas have played a significant role in shaping agricultural public policy. One critical suite of policies is the federal Farm Bill (currently the Agricultural Act of 2018). The Farm Bill is a suite of public policies that provide essential resources for farmers to manage agricultural issues, including resources related to food security, credit, crop insurance, commodities, conservation, energy, forestry, rural communities, and more (Congressional Research Service, 2019; Economic Research Service, 2020, 2023). Under the US governance system, the Farm Bill is renewed approximately every five years by Congress, giving continued opportunities for the Farm Bill to be adapted to changing needs and conditions related to agriculture and food.

The Farm Bill arose in response to collapsing economic, societal, and environmental conditions in the 1920s and 30s, during which many farmers went bankrupt and were unable to

stay in business and thus unable to provide food for local communities during the Great Depression (McGranahan et al., 2013; Morath, 2014). The Great Depression followed a period of mass overproduction among farmers, which led to intense soil erosion that caused the Dust Bowl. With the onset of the Great Depression, agricultural product prices decreased due to a lack of consumer demand and many family farmers went bankrupt (Graddy-Lovelace & Diamond, 2017). In response to these conditions, the federal government established the first Farm Bill (Agricultural Act of 1933) to ultimately ensure that farmgate prices (i.e., the price of agricultural products sold directly from farmers) would cover production costs. In doing so, theoretically, farmers would be able to stay in business and help overcome national food shortages (Czarnecki & Fiedler, 2016; Graddy-Lovelace & Diamond, 2017).

#### Market Influence in Farm Bill Approach

In their paper examining the historical contexts leading to the creation and adaptation of historic Farm Bills, Graddy-Lovelace and Diamond (2017) describe the Farm Bill as a reactionary set of policies that the federal government had to create in response to the ill effects of free-market dynamics on farmers. One category of policies they observe in the first Bill includes ‘protectionism’-based strategies, including subsidies and incentive programs (Czarnecki & Fiedler, 2016). The example they describe is commodity crop subsidies that provide direct payments to farmers for producing commodity crops such as corn, soybeans, wheat, cotton, etc. These subsidies are highly criticized across the political spectrum (Edwards, 2023), highlighting issues such as the adverse impacts of export subsidies to domestic markets and farmers abroad, contributions of direct payment programs to the exacerbation of monoculture systems, and direct payment programs largely serving farmers with the largest farming operations (Weis, 2007).

Graddy-Lovelace and Diamond describe these perspectives as “legitimate and important, but they often still fall into the trap of assuming subsidies are distorting what would otherwise be a smoothly operating free market” (Graddy-Lovelace & Diamond, 2017, p. 73). Rather, the authors contend that subsidies are government strategies based on ‘protectionism,’ or strategies that serve to protect farmers from the negative effects of semi-free-market capitalism, which thereby allows the semi-free-market to remain in place (Polanyi, 2002). The authors posit that subsidies help uphold the “political-economic and ideological dominance of the ‘free-market’ over society even as it serves to minimize societal damage from market dysfunction” (Graddy-Lovelace and Diamond 2017, p. 75). An additional outcome of subsidies on the agricultural landscape is the prevalence of monoculture crop systems (particularly in the Midwest) and the intensification of agricultural inputs to support higher yields and more income for farmers (M. Lin & Huang, 2019; Traldi et al., 2024), both of which contribute to natural resource degradation (Berka et al., 2001; Hatfield et al., 2013).

Although Graddy-Lovelace and Diamond (2017) do not discuss farm ownership loans provided through the Credit Title of the Farm Bill, farm ownership loans demonstrate another type of ‘protectionism’ strategy to protect farmers against the negative effects of free-market capitalism. Farm ownership loans enable farmers to purchase and own farmland, which is a highly valued asset for autonomy and privacy under a neoliberal economy. Although the Farm Bill continues to authorize and fund efforts supporting farm ownership loans, a significant amount of farmland (~40%) is still rented among farmers (Bigelow et al., 2016; Horst & Marion, 2019). In contrast, over 80% of all farmland is owned by only 4% of all farmers (USDA-NASS,

2019) – a pattern of consolidation for economies of size that is encouraged under neoliberalism (Fairbairn, 2013).

The other category of policies embedded in the Farm Bill that Graddy-Lovelace and Diamond (2017) observe are management strategies, such as establishing price floors (i.e., minimum prices), restricting imports, and controlling the means of production for some commodity crops, to stabilize market fluctuations and bring balance to consumer and farmer interests. Research on earlier Farm Bills (1985, 1990, and 1996) finds that these Farm Bills reversed these supply management strategies in favor of developing international trade activities and economic profits (Glenna, 1999; Graddy-Lovelace & Diamond, 2017). The time period in the 1980s leading up to these Farm Bills marked an explicit shift among policymakers into neoliberal approaches for addressing agricultural problems (Czarnezki & Fiedler, 2016). This approach fed into Farm Bill decision-making, such that policymakers recognized the negative impacts of fluctuating market dynamics on farm viability and still chose to remove supply management aspects from the Farm Bill, as desired by agribusinesses, food retailers, and processors, who heavily lobbied for these removals at the time. Congress's rationale for removing supply management from the Farm Bill despite the negative impacts of market dynamics on farmers was that maintaining the agricultural system in the global economy was most important, and this maintenance would necessitate a sacrifice in livelihoods among farmers (Leland, 2003). For example, in a 1983 congressional hearing, Secretary of Agriculture John Rusling Block stated in support of continuing a market-based approach to managing the agriculture sector,

“There will be some come and some go. Some would prosper and some would not – depending on where we would put the support level and put the safety net. But

that's part of the American system. The American system provides the opportunity to take a risk and the opportunity to profit if successful... We must all rise about the pressures of constituencies that place demands on us [policymakers] on a daily basis. We must do the right thing for agriculture... To preserve the most efficient agriculture in the world is our challenge.” (*Toward the Next Generation of Farm Policy*, 1983 in: Leland, 2003)

Replacing supply management aspects of the Farm Bill were direct payment mechanisms and risk management programs, including the Price Loss Coverage and Agricultural Risk Coverage programs (Ferrell et al., 2023; McGranahan et al., 2013). Although these programs help farmers navigate increasing uncertainty, and thus, risk in light of economic and ecological shocks, Graddy-Lovelace and Diamond (2017) describe the risk management programs as a ‘non-response response’ to the ill effects of free-market capitalism and note that the programs likewise encourage overproduction and monoculture systems on the agricultural landscape. Furthermore, the authors note that while these programs are increasingly being favored and relied upon by US agricultural policy, the programs are not designed to combat systemic or chronic problems (Graddy-Lovelace & Diamond, 2017).

Graddy-Lovelace and Diamond (2017) illustrate how conservation goals under Farm Bills in the 1930s-1950s emphasized land conservation, but largely in favor of economic benefits from conservation. The Soil Bank program that was established in the 1956 Farm Bill functioned as a supply management strategy that encouraged land to sit idle with the goal of disincentivizing production to prevent overproduction and surpluses in crops (Graddy-Lovelace & Diamond, 2017; Lichtenberg, 2014). The 1985 Farm Bill established the first programs aimed at natural resource protection outside of the control management measures of the Soil Bank Program (Cain & Lovejoy, 2004). Other research notes how modern conservation programs, which are structured as mark-based incentive programs, operate similarly to subsidies by providing some

form of payment to make up for lost farmer income from implementing conservation practices (Czarnecki & Fiedler, 2016; A. Reimer, 2015). In this regard, Farm Bill conservation programs also function as a strategy based in ‘protectionism’ against the adverse impacts of free-market capitalism (Polanyi, 2002). Moreover, although these program practices have visible and quantifiable positive impacts on natural resources, and can reduce the use of unsustainable inputs such as fertilizers and pesticides, conservation practices do not address critical aspects of agriculture that contribute to adverse impacts on natural resources, such as monoculture crop/livestock systems or growing crops in climates/landscapes that are inherently incompatible with each other (Kelley & Lodoen, 1995; Oberle, 1994). Conservation practices authorized by the Farm Bill are meant to be implemented alongside agricultural systems that produce commodity crops sold to international markets, and thus are not designed to disrupt growing commodity crops (Kelley & Lodoen, 1995).

The current policy strategies used in the Farm Bill seemingly feed into validating current economic neoliberalism policies and increasing exports to international markets. This is done generally, using federal funds (i.e., taxpayer dollars) to minimize the adverse impacts of these structures and activities (Graddy-Lovelace and Diamond 2017). Ironically, the trend of incentivizing agricultural production for products that would be sold and transported to international markets juxtaposes the persistent or growing food insecurities in the very same rural regions where these products are produced (Allen, 2010). Despite the Farm Bill’s intent to protect farmer incomes and ensure farmers can continue farming in the future, research has shown that a majority of income for farming households came from other activities besides farming (Hoppe, 2014). Furthermore, the number of farming operations and acres of land in

farmland have continued to decrease throughout the 20<sup>th</sup> and first few decades of the 21<sup>st</sup> centuries (Graddy-Lovelace & Diamond, 2017; Leland, 2003; USDA-NASS, 2019).

### Farm Bill Access Among Farmers

The makeup of farm household income and declining number of farms may in part be due to trends in *which* farmers receive Farm Bill resources. Many farmers, especially under-resourced farmers (i.e., Black or African American, Indigenous, Asian, Hispanic or Latin American, Middle Eastern, women, beginner, small-scale, and veteran farmers), do not receive Farm Bill resources (Asare-Baah et al., 2018; Ayazi & Elsheikh, 2015; Fagundes et al., 2020; Gilbert et al., 2002; Young, 2023). In fact, Farm Bill resources have been increasingly flowing towards farmers with higher incomes and likely with larger farming operations or industrialized farms, both of which make up a minority of farmers in the US (Belasco & Smith, 2022; McFadden & Hoppe, 2017; USDA-NASS, 2019). For example, with Farm Bill conservation working lands programs, over 55% of program funds in 2006 went to family farmers who made gross cash farm incomes of \$150,000 or more, with a majority of those funds going to family farmers who make over \$1,000,000 in gross cash farm income. A minority of funding (15.2%) went to farmers who made less than \$150,000, and in 2015, that percentage decreased to 11.2% of funding. However, the percentage of funding that went to family farmers who made gross cash farm incomes of \$150,000 or more increased to 84.7% (McFadden & Hoppe, 2017).

This trend is logical considering neoliberalism and its free-market approach favors economies of size. However, this trend also shows that the Farm Bill's neoliberal approach to stabilizing agriculture is not serving the vast majority of farmers who operate farms smaller than 100 acres (Ayazi & Elsheikh, 2015; Graddy-Lovelace & Diamond, 2017). These trends around

who receives Farm Bill resources, the decline in the numbers of farms and acres of land in farmland, and the growing food insecurity in rural regions in the US, all contradict the original intent of the Farm Bill to address domestic food security and support farmer incomes (Morath, 2014). These trends also demonstrate short-comings of current agricultural policy to adequately support farmers and their rural communities under the guise of liberating markets and economies (Graddy-Lovelace, 2017).

#### Case: US Response to COVID-19 Impacts on Agriculture

Despite research documenting continued declines in the number of farms on the agricultural landscape and trends of limited access among family and under-resourced farmers to Farm Bill resources, policymakers in the 21<sup>st</sup> century continue to rely on market-based approaches to addressing agricultural problems with no market intervention. A relevant and more modern example of this problematic policy approach relates to the COVID-19 pandemic. The COVID-19 pandemic caused a decrease in domestic economic activity in the US and disrupted agricultural supply chains (i.e., the path that agricultural commodities take from farms to consumers via food processing and distribution networks [Schnepf & Monke, 2020]). The price of commodity crops and products dropped significantly, exacerbating already financially constraining conditions for farmers. In particular, the supply chain was disrupted due to the shutdown of all non-essential businesses and the increasing uncertainty about the availability of labor. At that time, labor availability was constrained because of workers contracting COVID-19, worry about contracting COVID-19, and immigration status. Regarding immigration status, travel restrictions into and out of the US were implemented, disrupting the flow of migrant labor into the country that makes up a large body of farm workers (Farnsworth, 2020). Estimated

losses from the agriculture sector due to COVID-19 approached \$40 billion or around 10% of annual cash receipts in May of 2020 (Schnepf & Monke, 2020). Researchers compared the economic ‘shock’ on agriculture to that of the Dust Bowl on Midwest agriculture (Hart et al., 2020).

In response to these challenging conditions for farmers at the beginning of the COVID-19 pandemic, Congress and the Trump administration collaborated to pass the Coronavirus Food Assistance Program (CFAP). CFAP provided financial relief for farmers experiencing drops in commodity prices and general disruption to the food supply chain (i.e., the program served to correct the negative effects of market dynamics on farmers). Payments were assigned to eligible farmers based on either the amount of crop/livestock production or the number of acres on which crops/livestock are produced (Schnepf & Monke, 2020). Emerging results on farmer access to CFAP demonstrate that much like Farm Bill programs, payments from this program were heavily concentrated toward larger, more productive, and implicitly wealthier farming operations as a result of how payments were assigned to eligible farmers (Belasco & Smith, 2022). Small and midsize farming operations received a minority of resources from the program.

Prior to the COVID-19 pandemic, the USDA Economic Research Service noted that while the average net cash income for farmers in the US was \$43,053, the median income from farming activities was -\$1,400 in 2017 (i.e., a net loss [USDA-ERS, 2024]). Additionally, the median farm size was approximately 45 acres in the US in 2017, while the average farm size was 445 acres (USDA-NASS, 2019), skewing towards a minority of large farms and agribusinesses. These descriptive statistics describing wealth and farming operation size illustrate that a large proportion of the farming population is relatively financially challenged (with the caveat that

many farmers garnered household income from other sources beyond farming) and small scale prior to the COVID-19 pandemic. These conditions also imply that by the time impacts were hitting agriculture during the early COVID-19 pandemic in 2020, over half of farmers in the US likely would not have received substantial benefits from CFAP due to not showing high levels of agricultural productivity in terms of how many crops or products they produced and how many acres were used to produce these crops/products. These outcomes are contrary to the overarching objective of CFAP, which was to limit negative impacts such as farm foreclosures to agriculture from market dynamics (Belasco & Smith, 2022). The outcomes also demonstrate the continued reliance of policymakers on market-based approaches to managing agricultural problems that arise from market dynamics, further implying the resonating value of neoliberalism in the policy process.

## Conclusion

### Summary

This examination of the influence of market dynamics and policymaker values of maintaining market dynamics in shaping Farm Bill policy over the 20<sup>th</sup> and 21<sup>st</sup> centuries illustrated why market-based policy approaches are utilized for addressing agricultural problems and why these approaches are ultimately unable to adequately address these problems. Starting with the early Farm Bill that responded to overproduction that led to the Dust Bowl and extreme deflation caused by market fluctuations that led to the Great Depression, policymakers chose to approach addressing economic and environmental crises among farmers through a market-based approach that funneled federal funds to farmers through various programs to make up for lost income (McGranahan et al., 2013; Morath, 2014). These approaches reflect ‘protectionism’

strategies that ultimately try to correct the harmful impacts of market dynamics on farmers, and thus, maintain markets as they are rather than more directly regulate them (Polanyi, 2002). These approaches also reflect the emphasis in neoliberalism to create markets in order to address societal problems (Czarnecki & Fiedler, 2016; Harvey, 2007), with the Farm Bill establishing markets for certain commodity crops and livestock products, agricultural conservation, farm ownership, and risk management. The few supply management programs, which regulated some aspects of agricultural markets for farmers in the Farm Bills leading up to the 80s, were eventually eradicated from the Farm Bill in favor of preserving global economic rigor and presence. This phasing out of supply management from the Farm Bill was done with policymakers being informed of the negative impacts of unregulated markets on farm viability (Leland, 2003). These decisions highlight the managerial role of Farm Bill programs in addressing agricultural problems stemming from market dynamics and imply that the programs are not intended to fully address problems but rather manage them.

As a managerial policy, despite the intentions of the Farm Bill to address economic and environmental problems in agriculture, any outcomes of these programs are displaced by the inability of family farmers, especially under-resourced farmers, to access the programs. The persisting economic crises among farmers along with other structural conditions – access to farmland and labor, which are also constrained by fluctuating market dynamics – that the Farm Bill intended to address are, paradoxically, the very conditions that constrain farmer access to Farm Bill programs (Asare-Baah et al., 2018; Ayazi & Elsheikh, 2015; A. P. Reimer & Prokopy, 2014a). These trends of limited access to Farm Bill resources among family farmers are the direct results of policymakers choosing to emphasize neoliberalism as a continued approach to

the US capitalist economy despite the unregulated market being a root cause of major agricultural problems for family farmers (Graddy-Lovelace, 2017; Graddy-Lovelace & Diamond, 2017; Leland, 2003).

Overall, the decisions of policymakers in defining agricultural problems and their solutions in the Farm Bill emphasize how poorly defining problems during the agenda-setting stage of the policy process can lead to inadequate policy solutions (Baumgartner & Jones, 2010; Hilgartner & Bosk, 1988). The Farm Bill case also demonstrates the constraints in the current approach to public policymaking in the US. Policymakers, who ultimately are the only actors who decide what policy addresses and how policy problems are defined, have historically centered market prosperity and associated lobbying efforts from powerful and wealthy agribusinesses, food retailers, and processors over family farm viability (Bellemare & Carnes, 2015; Grant, 2024). Furthermore, policymakers continue to center Farm Bill programs as the main policy solutions for addressing agricultural problems (Schnepf & Monke, 2020; The White House, 2022) despite ample evidence from the literature demonstrating persisting trends of limited access to financial, farmland, labor, and government resources among farmers. In response to these persisting challenges and the historic choices of policymakers to elevate agribusiness agendas in agricultural policy, recent farmer opinion pieces note the abandonment that farmers feel related to policymakers, with one farmer writing, "...in conversations with farmers, what comes across most powerfully is a combination of sadness, bewilderment, and a sense of abandonment... [family farmers'] desperation goes unheeded by our political, media, and business leaders." (Jim Hightower, 2019).

### Implications for CSA Policies

The case of the Farm Bill in not fully defining and then not adequately addressing agricultural issues points to critical implications for the emerging CSA policies that utilize the same market-based approaches to addressing climate change as other Farm Bill programs. First, given the short-comings of Farm Bill programs in actually addressing their intended objectives through market-based approaches, as opposed to more directly regulating market dynamics that cause economic challenges for family farmers, the market-based approaches to CSA policies are likely to also come short of adequately addressing climate change mitigation. This shortcoming is especially due to the structural nature of climate change mitigation (Brownstein et al., 2022; Jacobson et al., 2017), which, on farming operations, is the result of intensified monocultural crop and livestock systems that either directly emit GHGs or indirectly emit GHGs through livestock or indirectly through fertilizer inputs (Hatfield et al., 2013; Rojas-Downing et al., 2017). Monoculture systems and the intensification of agricultural inputs are enabled by Farm Bill policies, foreign trade agreements, and market dynamics that emphasize the production of certain commodity crops and livestock products (Traldi et al., 2024). To more holistically address climate change, ultimately these policies and agreements would have to be adapted away from incentivizing monoculture systems and intensification practices, and then further intervention with markets would be necessary. CSA policies, as they currently stand in the US, cannot take a holistic approach to mitigating GHG emissions from farming operations, as the approach exists in a silo from other agricultural policies that indirectly enable climate change, and the approach does not intervene with the underlying market dynamics that drive agricultural policies and climate change.

Second, given the trends of limited farmer access to government resources, CSA policies allocating resources that would aid GHG mitigation from farming operations to farmers will likely face the same accessibility challenges that limit Farm Bill outcomes. The current economic conditions of the US – semi-free-market capitalism – guided by a neoliberal approach, facilitate government resource access for economics of size, i.e., larger farming operations, and by limiting the ability of agricultural resources to only correct the effects of market dynamics on family farmers, economic conditions remain challenging for family farmers and continue to constrain access (Graddy-Lovelace & Diamond, 2017). This potential outcome would be contradictory to the underlying objective of CSA programs, as by not being able to access CSA government resources, family farmers would also be limited in their ability to adopt CSA practices that reduce GHG emissions from farming operations.

Finally, due to the decision-making power that policymakers hold over defining policy problems and solutions and policymakers' neoliberal values and approach to policymaking, CSA policies are also likely to fail in adequately addressing climate change mitigation in agriculture. The continued emphasis on market-based approaches to agricultural problems that are at least in-part driven by adverse impacts on family farmers from market dynamics despite policymaker acknowledgment of the continuing loss of farms on the landscape (Belasco & Smith, 2022; Leland, 2003; The White House, 2022) illustrates inequitable power dynamics between policymakers and family farmers. These dynamics consist of policymakers determining policy agendas that align with their economic values and enhance their future ability to stay in political power (i.e., their ability to control policy agendas) regardless of the persisting adverse impacts to family farmers that then constrain their abilities to access critical resources, including

government resources (Bachrach & Baratz, 1962). This power over or dominating dynamic ultimately deserves critical questioning, as the results of agricultural policy decision-making are disempowering family farmers relative to agribusinesses as perceived by farmers (e.g., Jim Hightower, 2019).

Future evaluations of the emerging CSA policies in the US will need to consider the broader dynamics of CSA policy processes in shaping CSA policy outcomes related to the climate, natural resources, and farmer access to these policy resources. In particular, the agenda-setting and implementation stages of CSA policy processes should be centered in such research, due to the key decision-making in the agenda setting stages that then impact the administration of the CSA policies and farmer access to the policy resources (Birkland, 2019b; Maronie Bendaoud et al., 2020). Within these stages, a closer examination of the power dynamics shaping decision-making in the stages, along with the other structural and institutional conditions existing on the agricultural landscape that shape climate change and program access among farmers, could highlight the ways in which CSA policies and farmers are constrained or enabled in addressing climate change mitigation (Avelino, 2021; Calo, 2020; Giddens & Giddens, 1982; Jacobs et al., 2013). These enabling and constraining dynamics could then lead to understanding if and how CSA policies achieve or do not achieve their objectives and identifying new approaches for CSA and broader agricultural policies in addressing agricultural problems.

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CHAPTER THREE

EXAMINING THE POWER RELATIONS IN CLIMATE-SMART  
AGRICULTURE PROGRAM ACCESS AND PARTICIPATION  
FOR FARMERS IN CALIFORNIA, USA

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Abstract

Amidst the impacts of climate change on the US agricultural sector, it is crucial that all agricultural actors are able to participate in climate change adaptation and mitigation activities. However, with the uptick of federal and state climate-smart agriculture policy solutions targeting farming operations in the past decade or so, there has been little evaluation regarding who is able to or not able to access these policy solutions among farmers. Evaluations of accessibility and participation outcomes are critical for ensuring that policy solutions are not (re)exacerbating social inequities among agriculture actors, which can further lead to environmental justice problems that are contrary to addressing climate change. The current research examines farmer accessibility and participation outcomes related to the administration of California Department of Food and Agriculture Climate-Smart Agriculture incentive programs targeting farming operations. Drawing on concepts of power, this research uses 53 interviews with program actors to understand how power relations among program actors enable or constrain other actors and contribute to program accessibility and participation issues. Our findings demonstrate how and why actors with more power over program administration and adjacent policy development make decisions that serve their own agendas, which ultimately, through complex interactions with multiple actors, create institutional barriers and contribute to structural barriers to accessing programs among farmers. These findings imply the potential for climate-smart agriculture incentive programs to exacerbate inequities among farmers as well as environmental justice issues for farmers who cannot participate in the programs due to said institutional and structural barriers. The future of addressing agricultural climate change must be inclusive and equitable, and thus, future policy solutions must be considerate of these prevalent institutional and

structural barriers to accessing key government resources for addressing climate change mitigation.

### Introduction

In light of increasing climate change impacts, such as extreme heat, drought, wildfire, and flooding, it is imperative that the California agriculture sector in the United States (US) adapts to and mitigate greenhouse gas (GHG) emissions contributing to global climate change. Within California, all activities contribute to approximately 6.2% of national GHG emissions, with the California agriculture sector being responsible for an estimated 7% of all California GHG emissions (EPA, 2022). The resulting environmental impacts from climate change, which include extreme weather conditions, exacerbate the potential risks of crop and livestock loss and adversely impact farm worker health and well-being (Padhy et al., 2015; Pathak et al., 2018). Given the impacts and risks associated with climate change, effective agricultural adaptation to and mitigation of climate change will require the participation of all actors within the agriculture sector (Schipanski et al., 2016; Sperling et al., 2022).

In the past few decades, there has been an increase in state climate change policies and programs affecting agriculture, with a particular focus on addressing on-farm climate change adaptation and mitigation. One of the salient sets of programs includes the state government Climate-Smart Agriculture (CSA) incentive programs for farmers in California. Having been established throughout the 2010s, these programs serve as the first incentive programs for farmers that directly connect agricultural conservation practices and technologies to GHG mitigation. The programs are administered by the California Department of Food and Agriculture's Office of Environmental Farming Initiative (CDFA-OEFI) and provide grants to

voluntary and eligible farmers to implement GHG mitigation practices and technologies on their farming operations (Berkeley Law, 2019). The programs operate similarly to the US Department of Agriculture Natural Resources Conservation Service (USDA-NRCS) Farm Bill conservation programs. However, the key difference is that Farm Bill conservation programs historically tended to address soil and water conservation issues (although climate priorities have emerged in these programs in recent years ([The White House 2024; 2022]) whereas CDFA CSA programs focus primarily on mitigating GHGs from farming operations (Lewis & Rudnick, 2019; Stubbs, 2022). CDFA CSA programs include four programs: 1) a program to sequester carbon and enhance soil health through nature-based practices – Healthy Soils Program (HSP); 2) a program to mitigate GHG emissions from irrigation systems and promote water efficiency by replacing water management technologies – State Water Efficiency Enhancement Program (SWEEP); 3) a program to mitigate GHG emissions through manure management practices – Advanced Manure Management Program (AMMP); and 4) a program to capture enteric methane emission on dairies through biodigesters– Dairy Digester Research and Development Program (DDRDP) (Babin et al., 2024). CDFA also administers a program that funds technical assistance providers to support farmer access to the CSA programs and practice adoption (CalCAN California Climate & Agriculture Network, 2020).

Although there is much optimism in environmental policy solutions such as Farm Bill conservation programs or CSA programs to correct issues within society and nature, poorly designed policies may only exacerbate environmental and social problems. Regarding CSA policies, researchers warn of the potential of designed CSA policies to ‘greenwash’ agricultural activities that are responsible for GHG emissions and natural resource degradation, and thus

further contribute to climate change and other environmental issues (Chandra et al., 2017; Lipper et al., 2014). Likewise, policies may exacerbate existing social inequities as unintended consequences by (un)intentionally excluding marginalized or disempowered actors from the resulting benefits and resources (Flyvbjerg, 2004). With the relative newness of government incentive programs focused on mitigating GHGs from farming operations, evaluation of CSA program outcomes is necessary to ensure that programs are meeting their intended outcomes, in addition to identifying unintended outcomes from the programs. In particular, due to the needed participation of all agriculture actors in climate change adaptations and mitigation, identifying beneficiaries and non-beneficiaries of program benefits, along with the processes and factors that shape who benefits and who does not, may help prevent CSA programs from exacerbating existing inequities (Flyvbjerg, 2004). Assessments of processes and factors that shape program outcomes in terms of (non)beneficiaries should also consider power relations and mechanisms, as power relations shape all phases of the policy process in addition to social and environmental transformations (Avelino, 2021; Birkland, 2019b). Power also shapes who can access government resources in agriculture, such that farmers with more power (i.e., ample resources) are more likely to access government resources, such as CSA programs (McFadden & Hoppe, 2017). We ask the following research questions regarding the administration of CDFA CSA programs to explore how and why program actors enable and constrain each other with regard to program accessibility outcomes among farmers:

1. Who is enabled and constrained, and by what mechanisms of power?
2. What are the social outcomes of these enabling and constraining dynamics?

## Background Literature

Two relevant bodies of literature contribute to framing this study: 1) barriers to participation in Farm Bill conservation programs and adoption of on-farm conservation practices, and 2) how Farm Bill resources flow to different agricultural actors. Farm Bill conservation programs are comparable to CDFA CSA programs, as the CSA programs are designed after Farm Bill conservation programs and utilize similar incentive-based approaches and practices (Lewis & Rudnick, 2019). Barriers to conservation program participation and adoption can be categorized into three types: 1) *interpersonal*, resulting from interactions between actors laden with underlying values, beliefs, attitudes, and ideologies (e.g., racism, neoliberalism) between actors/groups; 2) *institutional*, or resulting from institutions, including policy tools, formal and informal organizations that make decisions about these tools, and the processes associated with these tools (Crawford & Ostrom, 1995; Knight, 1992); or 3) *structural*, or broader frameworks or patterns (e.g., poverty, semi-free-market capitalism) that impact how actors can act, institutions, and culture (Althusser, 2005; Assiter, 1984; Mouzelis, 1988). Much research within this body of literature highlights key barriers to practice adoption among general farmer populations, including lacking time, money, and owned land within an operation to adopt practices (Broussard et al., 2020; Chapman et al., 2019; Maher et al., 2023; Prokopy et al., 2019a; Ranjan, Church, et al., 2019; A. P. Reimer & Prokopy, 2014a).

Further research examines various groups of under-resourced farmers, including Black, Indigenous, Asian, Hispanic, women, veteran, beginner, and small-farm operators. In addition to facing the aforementioned structural barriers – which are often exacerbated compared to the average US farmer (Ayazi & Elsheikh, 2015; Carter, 2019; Gilbert et al., 2002) – many of these under-resourced farmer groups also face interpersonal and institutional barriers to program

access and participation, and thus, practice adoption. Interpersonal barriers, particularly among historically excluded under-resourced farmer groups, entail a lack of key connections to administrative agencies, technical assistance providers, and other agricultural actors that may connect farmers to conservation programs. Interpersonal barriers are also marked by historic and current discrimination towards farmers of color and women farmers from individual USDA agents (Douglas & Walljasper, 2021; USDA, 1997), with agents steering eligible under-resourced farmers away from applying to Farm Bill conservation programs (Fagundes et al., 2020). Institutional barriers take the form of policies that (un)intentionally exclude under-resourced farmers by, for example, setting credit score eligibility requirements far above the mean or median credit scores among under-resourced farmer groups (Asare-Baah et al., 2018; Fagundes et al., 2020; M. K. Johnson et al., 2018). Another salient example is the exclusion of Indigenous farmers through the exclusion of Indigenous agricultural conservation practices from the list of practices funded through Farm Bill conservation programs (M. K. Johnson et al., 2018). Although Indigenous farmers may not be the primary farmer groups responsible for environmental degradation from agriculture, their exclusion from these programs also means exclusion from funding that would support implementing conservation practices.

These barriers to under-resourced farmers' participation in Farm Bill conservation programs suggest that less Farm Bill conservation funding would be received by under-resourced farmers. Research on the flow of these resources indeed shows a trend of Farm Bill conservation program funding increasingly flowing towards high-income farms over time with disproportionately fewer under-resourced farmers participating in programs than well-resourced farmers (Asare-Baah et al., 2018; Effland, 2021; Fagundes et al., 2020; Nickerson & Hand,

2009). For example, 54.7% of working lands programs funds, the most utilized Farm Bill programs, in 2006 went to family farms with incomes of \$350,000 or more and nonfamily farms, whereas in 2015, this percentage is 68.7% (McFadden & Hoppe, 2017). Considering that in 2017, a majority of farms in the US had incomes of less than \$249,999 (USDA-NASS, 2022a), this flow of Farm Bill conservation program funding is disproportionately flowing to larger, wealthier farms.

The implications of this disproportionate funding flow, in addition to critical program access barriers faced by under-resourced farmers, include the exacerbation of environmental justice issues. While much research is needed on this potential implication, some studies are beginning to connect exclusion from Farm Bill conservation programs to on-farm environmental issues specific to under-resourced farmers. A 2020 study describes the connections between the disproportionately high prevalence of invasive plant species on Black farmers' operations in Oklahoma and the disproportionately high rejection rate of Black farmers' applications to one of the Farm Bill working lands programs as compared to white farmers. The studies' findings attribute exclusion to institutional discrimination and imply that the exclusion of certain groups of farmers from Farm Bill conservation programs can exacerbate environmental issues on said farmers' operations (Fagundes et al., 2020). These consequential outcomes, although unintended, are contrary to the purpose of Farm Bill conservation programs and reinforce structural barriers that prevent under-resourced farmers from accessing critical agricultural resources (Ayazi & Elsheikh, 2015).

Although research has categorized these key barriers to program access and conservation practice adoption, more information is needed on how barriers *and* opportunities among farmers

are shaped by institutions and their staff and interacting public policies and institutions. Identifying driving forces that constrain and enable farmers in their pursuit of government resources, such as CSA program resources, is critical for alleviating constraints and enhancing more opportunities among farmers (Lipper et al., 2014). These forces include other human and natural actors' actions and broader influence over public policy agendas (Birkland, 2019b; McGinnis & Ostrom, 2014). Therefore, next we consider how concepts of power provide a critical understanding of how barriers and opportunities to program access among farmers are shaped by different human and natural actors (Avelino, 2021; Chandra et al., 2017).

### Concepts of Power as Analytical Tools

Conservation social scientists have increasingly called for the inclusion of power relations in analytical frameworks in the evaluation of natural resources management activities and strategies (Chandra et al., 2017; Ingalls, 2017; Locke et al., 2014). Such research defines power as an actor's ability to pursue personal or collective goals *and* the social, economic, cultural, political, and natural resources that enable this pursuit (Avelino, 2021; Birkland, 2019b; Heiskala, 2001). Power is critical in shaping policy processes and associated outcomes in the US, such that actors with more power to influence public policy agendas may benefit more from those policies (Birkland, 2019b; Lukes, 2021). Likewise, public policy dictates how people should act and how resources should be distributed throughout society, and thus holds power over people and resources (Foucault, 1980). Given the implicit power relations among actors that are embedded in policy processes, the concept of power is relevant to evaluating environmental policy solutions such as climate-smart agriculture (CSA) incentive programs.

In addition to defining the concept of power within power relations, political scientists and philosophers also described how power is used, or the mechanisms of power. These mechanisms include *power to*, *power over*, and *power with* (Berger, 2005; Follett, 1977; Lukes, 2021; Pansardi & Bindi, 2021; Partzsch & Fuchs, 2012). *Power to* describes individual power to pursue an individual agenda. *Power over* describes when one actor/group makes decisions for their own agenda that may enable or constrain another actor/group in pursuit of their own agenda (i.e., their *power to*), regardless of whether said other actor/group supports these decisions. *Power over* is also referred to as the authoritative, dominating, or controlling mechanism of power (Partzsch, 2015), and describes much of the power dynamics within top-down administration from government agencies to different public actors. *Power with* describes collective power between actors or groups used to pursue collective agendas. The mechanisms of power can shape the power outcomes of other actors, as demonstrated with *power over*. These outcomes include enabling or constraining other actors' abilities to pursue their own agenda (referred to as enabling and constraining dynamics in the research presented here [Avelino 2021; Giddens and Giddens 1982]), and relates to how farmers are able (or not) to participate in CSA incentive programs. The research presented here examines the role of power relations and mechanisms in shaping CSA program outcomes, with a focus on how actors are enabled and/or constrained within the implementation stage of the programs' policy process.

## Methods

### Interviews

This paper is part of a broader investigation that evaluated the efficacy of CDFA-CSA programs (Babin et al., 2024). The research team employed a qualitative research design to address the following research questions:

1. Who is enabled and constrained, and by what mechanisms of power?
2. What are the social outcomes of these enabling and constraining dynamics?

First, we used semi-structured interviews with different program actors to gather exploratory data related to general program history, logistics, outcomes, benefits, challenges, opportunities, and recommendations (See Appendices A and B for interview questions). These program actors include CDFA-OEFI staff (referred to as CDFA staff), grant reviewers, technical assistance providers (TAPs), advocacy groups, and farmers who participated in the CSA programs (i.e., program grant recipients). We chose to examine the perspectives of these actors due to their involvement with CSA programs' formation, adaptations, and administration. The program actors were initially identified as potential interviewees through CDFA staff recommendations, as well as publicly available information on organizations' websites. Snowball sampling was also used to ask interviewees to recommend additional participants based on topics discussed in the interviews. We recruited program actors for interviews via email, and then conducted 30–60-minute virtual interviews. This research is covered under California Polytechnic State University San Luis Obispo IRB #s 2022-099-CP and 2023-023-OL.

We recorded interviews with permission from the interviewees and then used TranscribeMe (™) services to transcribe the recordings. Once transcribed, we used a combined

deductive and inductive thematic coding analytical approach for data analysis (Fereday & Muir-Cochrane, 2006), along with initial intercoder reliability methods to ensure the analysis was rigorous (Church et al., 2019). One researcher created an initial coding framework that included key topics discussed in the interviews, along with enabling and constraining dynamics on program actors and the different program actors being discussed in these enabling/constraining dynamics. Once the initial coding framework was developed, two researchers separately coded the same subset of interviews (~10% of the interview sample, or n=5) using the coding framework. They then used Excel software to calculate Cohen's Kappa scores (Mouter & Vonk Noordegraaf, 2012), which reflects the agreement between each researcher's coding of the same subset of interviews. A Cohen's Kappa score of >0.7 indicates enough agreement between each researcher's coding to then complete the analysis of interview data with a given coding framework (Landis & Koch, 1977). To achieve this score, the two researchers completed three rounds of coding a subset of interviews, calculating a Cohen's Kappa score, discussing places of agreement and disagreement with the applications of the coding framework, and then adapting the coding framework accordingly. On the third round, a Cohen's Kappa score of 0.74 was achieved, and once the final coding framework was agreed upon by the two researchers, the two researchers coded the remaining interviews (see Appendix C for coding framework). After the interview data were analyzed, we developed six conceptual models of the power dynamics between actors as discussed in the data. These models illustrate enabling and constraining dynamics among program actors and describe which actors contribute to these effects through different mechanisms of power.

## Results

### Demographics and Overview

A total of 53 interviews were conducted with different actor groups, including CDFA staff and CDFA grant reviewers, program advisory board members, other state or federal agency staff, TAPs, advocacy groups, and program grant recipients. Some interviewees held multiple roles (i.e., grant recipient and program advisory board member). Thus, interviewee counts by type are skewed to reflect these multiple roles (see Table 1). Our interviews revealed a cascade of enabling and constraining dynamics set in motion by policy, with a flow through program administrators and TAPs to farmers and natural resources. These dynamics, driven by the mechanisms of *power over*, are interconnected. Our interviews also highlighted the use of *power with* between groups, which can either enable or constrain policy agendas and thus, impact the goals and administration of the programs. These findings underscore the crucial role of each actor in the context of natural resource management and how their decisions influence the overall dynamics of the agricultural system. In addition to enabling and constraining dynamics between program actors, we also identify institutional and structural factors external to the programs that enable and constrain farmer access to the programs.

Conceptual models are dispersed throughout the body of the results. The conceptual models are set up to resemble the top-down administration structure of CSA programs as administered by CDFA, such that resources and power trickle down from existing policies (i.e., the legislation establishing the programs), to government administrators (i.e., CDFA), to non-government administrators (i.e., TAPs), to target recipients (i.e., farmers), and then to natural resources. Three of the conceptual models demonstrate the enabling dynamics among program

actors and silo these effects to show which mechanisms of power – *power over* and *power with* – are causing these effects (Figure 1). The other three models demonstrate the constraining dynamics among program actors and also silo these effects based on mechanisms of power (Figure 2).

Table 1: Number of Interviews by Interviewee Type; N=53

Interviewee Type	Number of Interviews
Advocacy Group Staff	10
Application Reviewer	2
CDFA Staff	11
Grantees (i.e., farmers)	14
Program Advisory Board	5
State or federal agency	5
Technical Assistance Providers	11

### Power Over – Enabling Dynamics

First, we discuss enabling outcomes related to the mechanism of *power over*, where actor group A holds power over actor group B and makes decisions that enable actor group B to act in support of different agendas (Figure 1, Model B). Interviewees noted that extreme drought in the early 2010s adversely impacted farmers to the point of enabling the California legislature to address climate change through a set of public policies, including policies establishing the first of CDFA CSA programs. Interviewees attributed the GHG emissions mitigation component of the programs to the initial funding pool for the programs, the Greenhouse Gas Reduction Fund.

“[Name] developed the first Climate-smart Ag program at CDFA called the State Water Efficiency and Enhancement Program [SWEEP] in 2014 as part of emergency drought policy that was passed at that time to help farmers and ranchers with water efficiency reductions, which they also had to do greenhouse gas reductions for.” – Advocacy Group

“2013 was a drought year, and it was really extreme drought. [Name] happened to be available and part of the team when the SWEEP program was initially dreamt up by the legislature. It was emergency drought legislation. Our first funding that we received was 10 million dollars, and it was available through the Greenhouse Gas Reduction Fund. I think if you look at it now, a lot of [program goals] comes from the fact that we got that first money from the Greenhouse Gas Reduction Fund. So a lot of [program] elements are about reducing greenhouse gas emissions as well as conserving water.” – CDFA

Interviewees discussed how the policy authorizing the CSA programs enables CDFA and TAPs to engage in the administration of the programs. The program policies allocate 5% of total program funding to CDFA’s program administration and the Technical Assistance Program to fund TAPs in supporting farmer applications to and administration of CSA program projects. Likewise, the policy directly supports under-resourced farmers, specifically SDFRs, by providing 25% of program funds to SDFR-managed operations. These efforts are meant to enable SDFR access and participation in the CSA programs.

“The Farmer Equity Act just said, ‘We need to ensure that socially disadvantaged farmers are able to participate.’ And then our Farm Equity advisor gave us guidance, and they advised that we have a 25% target. So 25% of the funds are going to folks who identify as socially disadvantaged farmers.” – CDFA

In addition to enabling CDFA, TAPs, and farmers, interviewees also noted that the policy directly supports a climate change mitigation agenda. Overall, this support enables farmers to address climate change, in addition to water quantity and soil health issues, by providing funds to support mitigation and adaptation practices.

“And then using those practices, say prioritizing equity items or environmental concerns over GHGs, getting more programs, getting more projects and practices on the ground in different places that are a priority, totally will mean that they’re

not the best, most effective GHG programs. The best, most effective may be gigantic corporate, huge farms. And that's great from a GHG perspective, but we're not going to solve climate change with a couple of farms. We're going to solve climate change by everybody getting on board. So GHG effectiveness is not our primary goal and it's okay to sacrifice that for other more important, essential co-benefits.” – Agency

Interviewees discussed how CDFA enables farmers to engage in the CSA programs. CDFA allocates funding to eligible farmers who apply to the programs and supports their implementation of CSA practices and technologies. CDFA also allocates funding to TAPs who support farmers’ access to CSA programs, thus enabling TAPs to support farmer CSA practice adoption and CDFA in CSA program administration. Together, CDFA and TAPs enable farmer access to CSA programs, with some interviewees noting that TAPs specifically enable under-resourced farmers access to the programs.

“The most successful strategies have been securing TA funding to help applicants actually apply for [the programs]. Those are TA providers, largely, just getting partners on the ground who are trusted because I don't think the farming community necessarily trusts all government agencies.” – Agency

“...I think the message, overall, is, ‘Greater investment in technical assistance is good for all farmers and can address equity considerations.’ Ideally, it's a lifting of all boats, but it's recognizing that for a lot underserved farmers, these programs have not been working. And so trying to, in particular, on the implementation side, as well as on the TA side, to address some of those inequities.” – Advocacy Group

Through these enabling dynamics, farmers can access the CSA programs and implement CSA practices that contribute to mitigation efforts and the quality/quantity of other natural resources. Practice implementation enables improved natural resource outcomes, including GHG mitigation, enhanced air, water, and soil quality, and enhanced wildlife/pollinator habitat on farming operations. Interviewees describe the types of climate benefits and environmental co-benefits that CSA practices and technologies support:

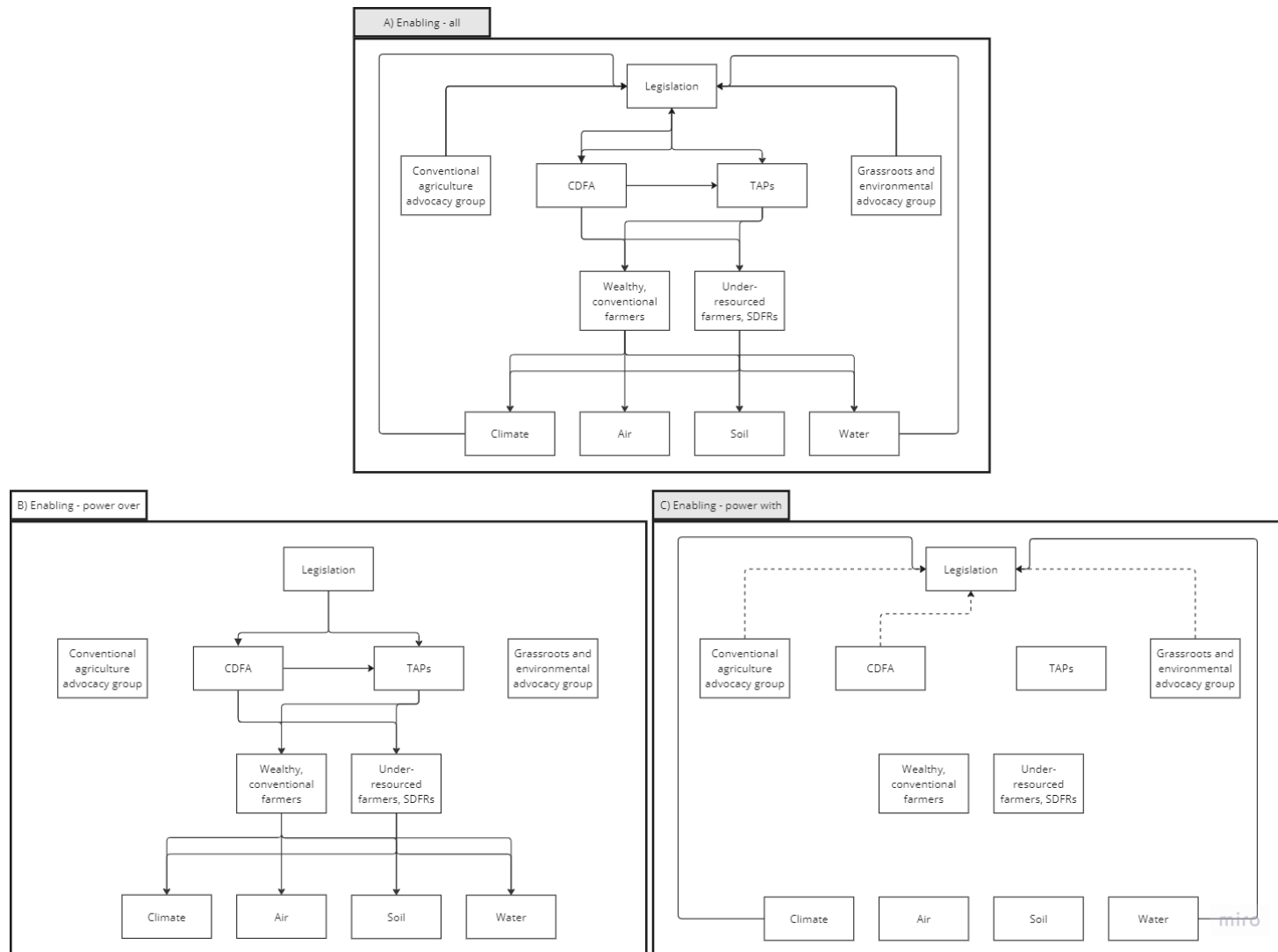


Figure 1: Enabling dynamics among actors, including A) all enabling dynamics, B) power over enabling dynamics, and C) power with enabling dynamics

“A huge success in that [the programs are] achieving that [GHG] goal. The GHG emissions from, say, Healthy Soils and SWEEP are pretty small and not super certain because it's so variable based on weather and climate. I think with the dairy methane, because it's more industrialized, it's very easy to see and get a direct benefit. So I think the GHG aspect of those reductions are very real and very much achieved and I think that's been a great success.” – Agency

“So reducing greenhouse gas emissions, increasing carbon sequestration, building healthy soils for the Healthy Soils Program, and then, of course, implementing water-saving protocols for SWEEP. Now, of course, if you have healthy soils, you should be able to integrate those goals as well.” – Advocacy Group

### Power With – Enabling Dynamics

Enabling dynamics related to the mechanism of *power with* describe when actor group A and actor group B collaborate to pursue a shared agenda, which can, in turn, have enabling dynamics on other actor groups. Interviewees discussed two cases of *power over* enabling other actors in CSA program implementation (Figure 1, Model C). First, interviewees noted that conventional agriculture advocacy groups played a role in the policy development/adaptation stages for programs to enable more funding to be allocated to farmers. Ultimately, this influence contributes to more farmers being able to participate in the programs. Second, interviewees described how severe weather events, such as severe drought in the 2010s, enabled the creation of the CSA policy. Additionally, interviewees discussed advocacy groups' efforts to work with CDFA to help establish the policy authorizing the CSA programs, while aiding in program design. For example, a significant environmental advocacy group wrote the original policy for the Healthy Soils Program with the aid of CDFA.

“Finally, in 2014, once the state started to invest the Cap-and-Trade revenue in diversity of climate programs across the economy, the Digester program was created, the State Water Efficiency Enhancement Program, or SWEEP, was created - of course, we were deep in drought, then - and the Sustainable Ag Lands Conservation Program had been created. And then, in 2016, after lots of tries,

[Advocacy group] was finally successful in getting the Healthy Soils Program in statute.” – Advocacy Group

### Power Over – Constraining Dynamics

While CSA program funding sources and priorities, technical assistance providers, and advocacy group involvement in program policy decision-making enabled farmers to access CSA programs and adopt GHG mitigating practices, *power over* constrains these enabling dynamics (Figure 2, Model B). Interviewees discuss the role of the policy in constraining CDFA’s workforce capacity. Only 5% of total program funds are allocated on an annual basis to CDFA to administer CSA programs. Therefore, CDFA capacity and growth are limited, and staffing is not consistent as program manager contracts are renewed every year (as opposed to long-term contracts). Despite thousands of grant applications associated with the suite of CSA programs, each program only has 1-2 managers dedicated to their administration. As a result of no long-term contracts, interviewees observed that changes in program managers and other supportive positions in CDFA are frequent.

“Is the legislature going to [continue appropriating] money to Healthy Soils? Because that is a political conversation that unfortunately has to happen every single fiscal year and every single budget act, and depending on whose priority it is, who’s the loudest voices, and who gets legislation passed, they could get a bunch of money or no money. And that variability, I think, is very difficult to plan for. Some agencies have pressured for basically ongoing funding to say, whatever happens, we’re getting 5% of whatever the auctions. And yet you have no idea what 5% is going to be because you don’t know what the auction is going to be.” – Agency

“The fundamental issue that I see is the lack of ongoing funding. [CDFA] is operating with one-time funding year-to-year, and that makes it really hard to hire permanent staff, to plan for staffing. And the volume of these things has continued to go up and up.” – CDFA

Interviewees also noted that CDFA changed how it administers some programs to combat its own capacity constraints. For example, the Healthy Soils Program application cycle, which awards the highest number of grants to farmers, changed from a single application deadline to accepting applications on a rolling basis. This decision ensured that CDFA staff could manage the volume of applications as they were submitted. Other decisions around program administration may reflect CDFA's capacity limitations, such as a lack of CDFA-specific program materials in other written languages beyond English.

“It seems like much of the application process has been designed with CDFA in mind and everything they need to do to have all their ducks in a row-- especially around the greenhouse gas and sort of carbon accounting and just making sure that they would pass an audit with flying colors rather than saying, ‘What is going to be the best process for getting all kinds of growers to be able to access this program?’”  
– Farmer

Some interviewees also attributed CDFA's program administration changes to government audits of the agency, with the audits forcing CDFA to adhere more strictly to bureaucratic procedures.

“The other problem is CDFA's grant office and all of the other government entities that they have to interact with. A while ago, they got dinged on a big audit. And then they became paranoid about audits. I understand as a human being why people react this way, right? So then you're going to make sure that never comes back on you ever again. And then you're going to do overkill to try to document everything and check off every box and dot all the I's and cross all the T's.” – TAP

Other interviewees stressed that the constraints faced by CDFA, which further constrain the administration of these programs, may constrain future program funding.

“Part of the big problem is the legislature does not give [CDFA] enough funding to have enough staff. ... it's this sort of vortex, right, where the bureaucracy is underfunded, so then [the policy is] inefficient. Then [the programs are] perceived as inefficient. So people don't want to give it money because they think it's being wasted. The legislature will give CDFA \$60 million for this and \$15 million for that, and then they don't up their staff to administer it. When you're underfunded, then people develop workarounds and habits to cope with that. And that includes things like rejecting applications on minor technicalities because you don't have the time to follow up.” – TAP

As a result of CDFA's decisions for workarounds to accommodate their limited capacity, different groups of farmers' access to CSA programs are either enabled or constrained.

Interviewees described how decisions such as accepting program applications on a rolling basis and only having program materials in English constrain under-resourced and generally non-white farmers from accessing CSA programs. For example, although accepting applications on a rolling basis enables CDFA to manage application review, the process is thus also competitive and often rewards farmers who have the most resources because they can complete applications in a timely manner.

“What you see is that the larger, well-resourced, generally white farmers, they're generally successful, they don't need much help, they have lots of time. Oftentimes they have someone in their office that will just do this whole thing... And so what ends up happening a lot of times every year is that we'll be working with a large group of small-scale farmers for the whole two-month period, trying to track them down, getting answers to the questions for their application, etc. And at the end of the day, they're not able to get their application in time because the application period always closes earlier than the initial due date because the funds just run out...” – TAP

“If you're a big operation and you have your office staff that are used to dealing with government forms, fine, you're going to be able to apply for this program, no problem. If you're a recent graduate from [agriculture program] and you're starting out and you're doing all of most of the aspects of your business operation, not to mention your farming, it's going to be a much higher lift, especially if English is a second language.” – TAP

Interviewees noted that having program materials only communicated in English prevents non-English speakers and writers from learning more about CSA programs.

“Language can be a barrier. It certainly has been for Spanish-speaking and Hmong growers... They are 100% reliant on [TAPs] helping them apply and navigate the process, and then continuing to help them do the paperwork if they get awarded. There was discussion in that advisory group about translating program materials and having applications in other languages... where we settled was the nearer-term priority should just be sort of outreach materials in different ... Because as long as there are technical assistance providers who can help them navigate the process and do the application for them, we don't necessarily need CDFA to be reviewing

applications in Spanish, which would also take capacity building work on CDFA's side.” – Advocacy Group

Although TAPs can help enable under-resourced farmers to access CSA programs, TAPs are likewise constrained by funding allocated to them from the policy. Interviewees discussed that the Technical Assistance Program, while providing extra funds to support technical assistance work, does not support TAPs in expanding their own capacity to aid.

“A lot of [TAPs] can't hire people to work on this because of the lack of kind of long-term funding commitment from CDFA.” – TAP

Some interviewees additionally noted that CDFA and the broader legislature (i.e., policymakers) need to incorporate TAP feedback into program adaptations, implying that TAP feedback is constrained from affecting the policies that establish the programs.

“If the legislature heard two things, one, CDFA needs more staff, combined with two, CDFA needs to take the feedback from technical assistance providers and make its programs better....” – TAP

At the same time, other interviewees noted that CDFA does pay attention to feedback but is constrained from making administrative changes.

“The legislation also required [CDFA] to have this annual feedback session so that the technical assistance providers can give us their thoughts on the program... they are trying to be careful because sometimes they get a lot of negative feedback for things that are bit out of their hands. One of those being the first come, first serve program, mostly negative feedback from the technical assistant providers. But when they have only so much money and they're trying to balance administrative stuff, that sometimes kind of out of their hands. One of the overwhelming challenges is that [CDFA] was somewhat assigned to work on the technical assistance program or administer it, but CDFA doesn't get any administrative funds for this program. So it's just being administered with existing resources.” – CDFA

### Power With – Constraining Dynamics

Interviewees discussed how environmental conditions constrain farmers from being interested in or accessing programs (Figure 2, Model C). Specifically, some interviewees

mentioned how extreme weather events like drought and flooding may make it difficult for farmers to access CSA programs, as farmers may be more focused on managing the impacts of extreme weather events. Additionally, some interviewees mentioned that conventional agriculture advocacy groups' influence over the CDA policy and broader program design may constrain the participation of under-resourced farmers.

“[Conventional agriculture advocacy] groups, they really resent those TA dollars because their membership doesn't need it. And so they say, ‘Why are you spending all this money on TA? You need to make it go directly to farmers. And you're taking away from farmer dollars by paying for this TA money.’ And then [environmental and grassroots advocacy] groups will advocate for the TA dollars because that's what helps the underserved producers access the program.” – TAP

### External Factors

External factors, including actors and social/economic/ecological conditions that reside outside of the direct implementation of CSA programs in California, may also influence enabling and constraining dynamics among actors. Specifically, interviewees discussed the roles of other state and federal policies, other agencies, and economic inflation in these enabling and constraining dynamics.

Cap-and-Trade Program. Interviewees spoke about effects that enabled or constrained CSA program policy authorization. The Cap-and-Trade Program and the associated Greenhouse Gas Reduction Fund (GGRF), whose funding is allocated to the CSA programs and their administration through the policy, are examples. The quantity of available funds in the GGRF fluctuates annually based on contributions to the Cap-and-Trade program. Some interviewees mentioned that the fluctuations of the Cap-and-Trade program can enable or constrain CSA program funding.

“The way that the cap is rising, those credits will become more expensive. In theory, our pot of money will grow until we have no more Cap-and-Trade program. Currently, the Cap-and-Trade program is extended till 2030 as a mechanism to reach our overall carbon goals. If that continues as a mechanism...we'll have funding for these things. So it's totally uncertain and market-driven, but it's been somewhat predictable. And if there's no legislation, if we meet our climate goals and we're totally good by 2030 and we just end it, then those funds do end and it would taper out after that.”– Agency

Likewise, the California Air Resources Board (CARB), the agency that oversees the Cap-and-Trade program and GGRF, was mentioned as working closely with CDFA to ensure CSA programs are adhering to the required usages of the GGRF.

“CARB works pretty closely with CDFA staff in both developing quantification methodologies and doing the ongoing reporting. And they meet regularly to just make sure the implementation of the program is consistent with some overarching guidelines that CARB has put out.” – Advocacy Group

Environmental and Food Safety Policies. Interviewees mentioned how regulatory policies, such as the federal and California state Endangered Species Acts, the California Sustainable Groundwater Management Act (SGMA), food safety laws, etc., constrain farmers from accessing or choosing to participate in CSA programs. SGMA regulates groundwater in regions prone to intense drought in California and requires local agencies to create and implement groundwater management plans (California DWR). Interviewees discussed how farmers are negatively impacted by SGMA, which may play a role in program interest:

“The other issue right now with the whole SGMA process and what all these groundwater basins are going through-- and there's going to be a whole other mechanism coming along to have farmers cut back on water use. And that's a much larger effect that's going to impact every single person who's farming. And I'll be curious how going forward, SWEEP and what it's trying to get people to do will or won't be able to interact with that larger effort.” – TAP

“SGMA is coming down hard in a lot of places, mainly in the Central Valley, but in certain areas, it's saying, ‘Okay, you're going to be relegated to one and a half acre-feet per acre.’ And you can't farm. You can't farm that along the coast here. You need at least two and a half acre-feet... You can't farm. So what are they going to

do? Water accessibility, water pricing, water quality. These are all issues. We're putting people in a situation where [governments] don't want them to farm.” – TAP

With the respective Endangered Species Acts and general food safety regulations, a few interviewees mentioned that these regulations limit farmers’ interests in CSA practices aimed at sequestering carbon through both temporary and permanent plantings. The interviewees' logic was that providing temporary or permanent habitat and food sources could draw in unwanted wildlife, including endangered species and species that are believed to introduce viral disease and bacteria to crops and livestock. Thus, these policies may constrain farmers’ interests in CSA programs, in addition to possibly contributing to participating farmers choosing CSA practices that don’t attract wildlife species.

“They're pushing to get four bumblebees listed as endangered species in California [inaudible]. As a grower, I told them, ‘look, guys, why do I want to put in habitat that's going to attract an endangered species, that I may somehow inadvertently kill one and then be under the gun of Fish and Wildlife?’ Because what my understanding is, if they get these four bumblebees listed, that there are 90 other insects that are in line to be put on endangered species. I told them, ‘guys, for me this will kill the hedgerow planting of pollinator habitat in California if you guys continue to pursue it.’” – Farmer

“You'd go out and see these vegetable fields that would have these hedgerows that had been put in. Then the salmonella hit, and food safety issues hit, and wild pigs and rats and birds, and by God, you'd better get rid of that hedgerow, because that's where the salmonella is coming from. And so all that work we've done for 15 years, suddenly, boom, liability made it so you don't want to have [hedgerows] out there. Biodiversity is a benefit, but it's a liability at other times.” – TAP

More broadly, interviewees discussed the role of general state environmental and agricultural regulatory policies (i.e., no specific policies were named) in constraining the agenda of CSA program policy. Interviewees discussed the general negative attitude towards regulations among

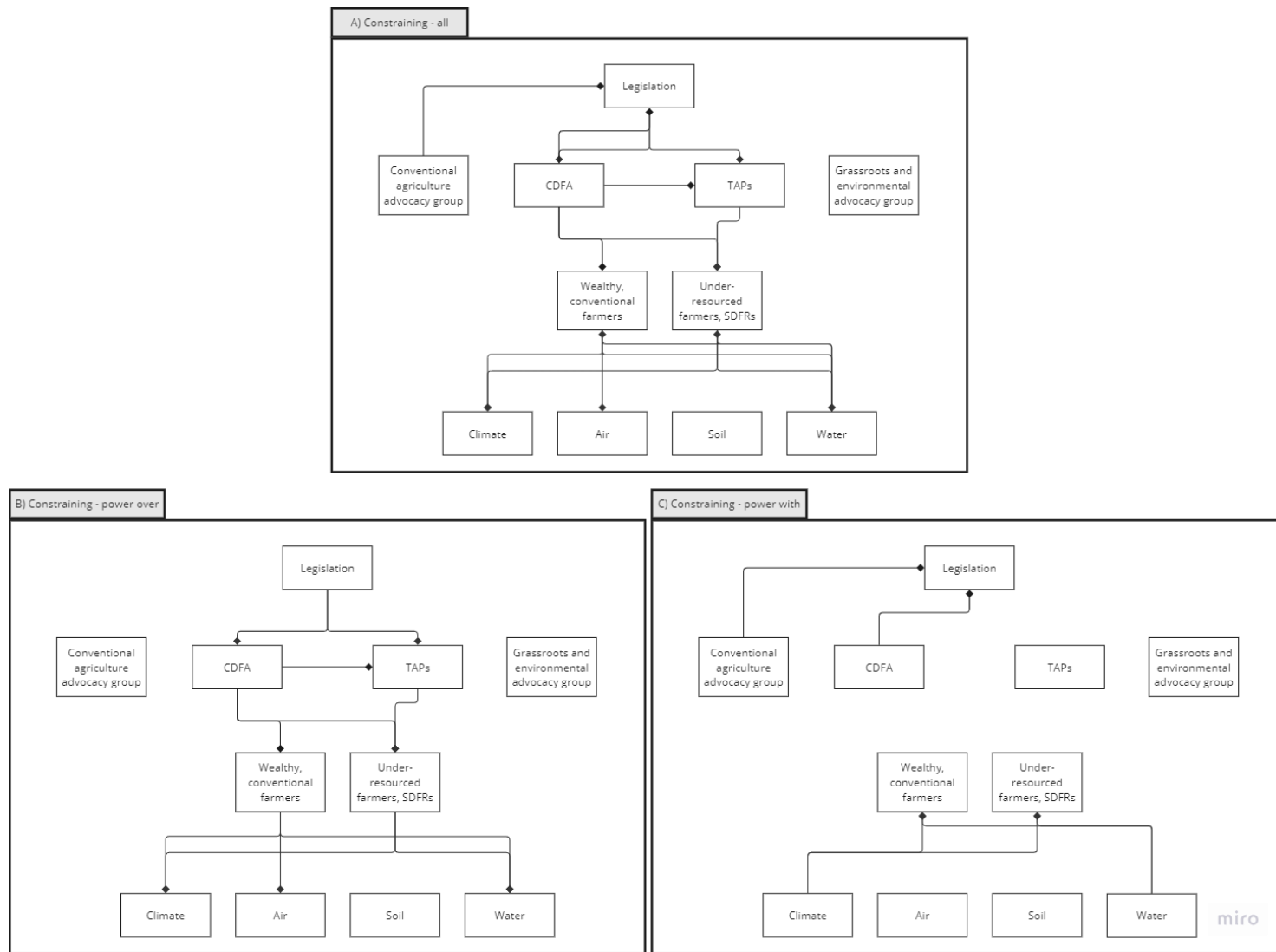


Figure 2: Constraining effects among actors, including A) all constraining dynamics, B) power over constraining dynamics, and C) power with constraining dynamics

farmers, but they also noted that general regulatory policies may be contributing to the trend of farmer migration to other states with less stringent and imposing regulations. For example,

“It's like regardless of their politics, [farmers] hate regulation. And it's not so much they hate regulation, they hate dealing with the regulatory burden of the paperwork and everything like that. I mean, the smaller you are, the higher proportion burden that is.” – TAP

“We want to try very hard that we don't make things so difficult that, case in point, dairies just relocate out of state. They go to Arizona or Nevada or wherever. We don't want that to happen, because the things we're trying to address actually get worse. Now we're importing-- using fuels and energy to import stuff that could be made right here. So you end up actually making the effects worse... Let's say a dairy just could not operate under California requirements and all these heavy regulations, so they just pack it up and leave and they operate across state lines somewhere and they ship their products into California. That's been identified as something that we don't want that happen.” – Agency

Farm Bill Conservation. Additionally, the presence of Farm Bill conservation programs and the Natural Resources Conservation Service (NRCS) on the landscape plays a role in the enabling and constraining dynamics among actors. Interviewees noted that, although CSA programs cover all costs of implementing CSA practices whereas Farm Bill conservation programs are cost-share programs, CDFA intentionally maintains their program payments at rates similar to NRCS Farm Bill conservation program rates so as not to take away potential clientele from NRCS. For example,

“NRCS tries to keep our payment rates and that type of stuff similar [to CDFA]. Not exactly, but similar, and so they try to complement each other. They definitely don't want to get into the competition game though, because it's not a competition. They want to complement each other. NRCS tries to provide guidance to the CDFA staff so that doesn't happen.” – TAP

“Because some of the programs are adopting NRCS payment rates that are looking more towards, nationally, what's the cost to do this practice, California has specific cost constraints, except not really a California eval of what's required financially to actually do the practice.” –Advocacy Group

Although this intentional decision by CDFA may enable a better working relationship with NRCS, it also constrains farmers, who are increasingly combatting price increases for equipment, seeds, fertilizers, land, services, and other critical farming inputs. Some interviewees also noted how these changing factors as affected by inflation or other market dynamics play a crucial role in constraining farmers from accessing and choosing to participate in CSA programs, along with the actual maintenance of CSA program practices and technologies:

“We have a pump company that we no longer work with. It just seemed to get more expensive every year. And we were like, ‘Why?’ They were kind of like, ‘Well, we can ask for 21,000. We can ask for 22.’ And so we don't work with them anymore. But it's frustrating because you have to go through companies to get this stuff done. You can't do it yourself.” – TAP

“A big concern is a lot of those companies are switching to a service fee versus just [selling] the equipment. So let's say a Silicon Valley company is making really expensive fancy moisture sensors plus a whole system of telemetry, weather station, connect to ET sensors and whatever, and gives you this big package that goes to your cell phone, gives you graphs and all this data that you can use. But now, it's a subscription. You have to pay a fee each year to keep using it and to have it serviced and maintained. You can't maintain it yourself. You used to be able to buy software, and you would own it. Now, you have to pay every year to use it as a subscription. Why would you keep that going unless you really felt like it was working for you, right?” – TAP

Structural Barriers. Some interviewees commented on more general structural barriers that farmers face in applying for CDFA CSA programs, including lacking land tenure, general time, and other agricultural resources. Other barriers, which stem from structural barriers, include difficulties for farmers with smaller operations getting services and supplies from agricultural companies.

“Other barriers, sometimes just getting the bids. We've heard that like, if a company is getting a bunch of requests for bids, they're going to deprioritize the bid for the small farm that's only an acre or 10 acres.” – Advocacy Group

Interviewees explained that these difficulties are due to smaller farming operations being less prioritized in business than larger farming operations. As a result of these barriers, interviewees explained how farmers choose not to apply for programs:

“One thing is just thinking about the structural context of some of these farmers like this. Do they have decent enough land tenure to be even interested and involved in trying to do practices that have longer-term payoff? Do they have the management bandwidth to think about it? We were hearing from Spanish-speaking growers in the Central Coast, small-scale, largely on rented land, largely working without a lot of other [agricultural resources], saying, ‘Well, my primary focus is getting a diverse suite of crops to the market. I’d love to think about this other stuff, but I don’t have a bandwidth for it, not to mention the application process.’” – TAP

## Discussion

### The Role of Power

Power relations played a critical role in shaping program access and participation, with multiple key enabling and constraining dynamics between CDFA CSA program actors. The first key dynamic in shaping program access and participation is the role of CDFA in administering program funding. Within the implementation of CDFA CSA programs, CDFA holds immense *power over* how the programs are administered and has different bodies within the agency to make decisions about which farmer applications will receive program funding. While also holding this immense power over program administration, CDFA also faces immense constraints from the amount of funding they receive to support their administration of the programs. CDFA’s own constraints over how they can administer the program force them to structure the administrative process to support their current capacity to do the administrative work – establishing rolling basis application deadlines for popular programs, limiting the amount of program content created in other languages, limiting communications between agency staff and

clientele, etc. These decisions come with a perception among other program actors that CDFA cannot or will not make use of program feedback to better adapt programs for different farmer groups and TAPs. This inability to adapt programs based on program feedback may be more of a symptom of CDFA's capacity constraints. CDFA is heavily supported by TAPs, who try to aid farmers with some of the administrative hurdles created by CDFA's administrative structure. However, the decisions made by CDFA to accommodate their own constraints, in addition to an inability to historically adapt programs, likely further constrain under-resourced farmers from program access. A recent evaluation of the CSA programs demonstrates that relative to the average California farmer, farmers that participate in the CSA programs tend to have larger operations, lease less land, and more farm worker employees on average (Babin et al., 2024), implying that under-resourced farmers indeed may be constrained from program access. Our findings illustrated that these constraints for farmers, as caused by program administration rules and processes, exemplify types of institutional barriers that farmers face when accessing CSA programs (Ayazi & Elsheikh, 2015).

Although most of our results focus on the implementation of CDFA CSA programs, our *power with* results show two historical influences on the policy agendas for the programs that impacted their implementation. Notably, both conventional agriculture and environmental/grassroots agriculture advocacy groups worked with CDFA to influence these policies, with an environmental/grassroots agriculture advocacy group helping write one of the bills establishing a CSA program. Our results likewise suggest that conventional agriculture advocacy groups worked with CDFA to ensure the majority of program funding was directed to farmer payments, in contrast to those who aid program administration such as TAPs. This

influence over how program funding was allocated likely contributed to the constraints that TAPs face in aiding farmers with CDFA CSA program access, which our findings attributed to a lack of administrative funds to provide quality technical assistance to farmers. These results demonstrate how the design of policies further impacts their administration, as policies ultimately hold power over their administrative process by defining rules about how they can be administered (Birkland, 2019b; Locke et al., 2014). The recent evaluation of the CSA programs and the current results together also demonstrate who benefits from programs as a result of advocacy group influence: the environmental/grassroots advocacy group enabled the creation of policies establishing the most accessed program among farmers (Healthy Soils Program), thus, enabling CDFA to address GHG mitigation from farming operations to address climate change and allowing farmers to benefit from CSA practices and technologies. The conventional advocacy groups constrained how program funds were allocated, which further constrained TAPs who help farmers access programs. These dynamics may be in-part responsible for the poor representation of the average California farmer in CSA programs (Babin et al., 2024), as TAPs indicated the lack of funding constraints their ability to help farmers access the programs.

Within our *power over* results are key comments about the accountability of agricultural actors to each other. Specifically, our data show that although mechanisms exist to ensure that CDFA is administering programs according to their policies (e.g., state audits), these mechanisms do not exist to the same degree to ensure CDFA is serving TAPs and farmers in a way that meets their needs within CDFA CSA programs. CDFA is required to administer a TAPs feedback session to gather feedback, but there is no guarantee that session findings will be incorporated into program adaptations, especially considering CDFA's own administrative constraints. In

addition to this feedback session, CDFA has an Environmental Farming Act Science Advisory Board (i.e., the programs' advisory board; EFA-SAP), which reviews and documents the environmental impacts of agriculture to better inform natural and climate resources management strategies for CDFA. The current EFA-SAP Board consists of the following interests and individuals: advocacy groups (2 individuals), natural and agricultural resources management state agencies (5), and farmers (3) (CDFA, 2024). The inclusion of advocacy group members and farmers is critical for the board, as these actors are either farmers or represent groups of farmers who are served by CDFA (Pahnke, 2024). Although the EFA-SAP board serves an important role in making recommendations to CDFA regarding different programs, the high agency representation and lack of TAPs on the board may skew recommendations towards agency perspectives rather than that of TAPs and the farmer groups served by TAPs.

Many agencies also provide opportunities for individuals to comment on proposed policies and their adaptations (Kochan, 2017), although some research shows findings of limitations with commentary processes. For example, research examining the inclusion of public comments in USDA-Forest Service decision-making related to projects found that in the commentary review and response process utilized by the agency, USFS responded to comments questioning bureaucratic practices and processes with discursive arguments that devalued the perspectives presented in the comments (De'Arman, 2020). This public commentary case implies the potential for concerns presented in the comments to not be addressed. In contrast to these accountability mechanisms for ensuring CDFA is administering CSA programs to accommodate farmers, farmers must be fully accountable to CDFA to even be considered for CDFA CSA program funds. Farmers must apply and be willing to share sensitive information

about themselves and their operations with CDFA. Once farmers are approved to receive program funds, they generally have to pay some or all project costs ahead of time and get reimbursed, in addition to submitting reports on the project to CDFA. Farmers must complete all of these activities to participate in CSA programs regardless of how CDFA decides to administer the programs. A lack of meaningful agency accountability to targeted beneficiaries may mean policy change that adversely affects targeted beneficiaries, as their voices may be excluded from decision-making. This lack of accountability may also further reinforce the dominance of agency knowledge and needs over farmer experience and needs in program design and broader decision-making, which then may further reinforce the current program participation trends among farmers (Ranjan, Church, et al., 2019).

As evident with our *power with* results, collective power is necessary to affect the developmental and adaptive stages of the policy process. Collective power requires that collaborating groups share resources and knowledge to achieve shared agendas (Pansardi & Bindi, 2021). However, farmers are overburdened and lack critical resources, and thus, their *power to* access and participate in government programs is constrained. TAPs also face these constraints (D. Johnson et al., 2023), which then impact their ability to affect the developmental and adaptive stages of the policy process. Advocacy groups representing farmers are thus critical in policy processes, as they hold the collective power to be involved in the agenda-setting stage of agricultural policymaking. Although it is relevant to continue alleviating constraints that farmers and TAPs face in regard to pursuing their own agendas, whether they be related to applying to CSA programs or affecting their design or some other activity, ensuring there are

meaningful opportunities for all actors to participate in the developmental and adaptive stages of the policy process is significant for the California and broader US agricultural sectors.

The external factors described by interviewees that affect the administration of CDFA CSA programs and broader program access exemplify how different institutions and the policies they administer interact to create conditions that do not support CDFA CSA program access and participation among farmers. General references to structural processes, such as inflation and changes in service payment structures, highlight typical financial barriers that farmers face to accessing and participating in government incentive programs or adopting conservation practices (Broussard et al., 2020; Maher et al., 2023; A. P. Reimer & Prokopy, 2014a). A lack of or limited land tenure and operating smaller farms are also key barriers to program access and the adoption of conservation practices (Asare-Baah et al., 2018; Ranjan et al., 2022; Ulrich-Schad et al., 2016). Additionally, interviewees discussed the role of regulatory policies in constraining farmers. Many of the specific regulatory policies that interviewees mentioned dictate how farmers must manage agricultural and natural resources and the repercussions of violating these policies are enough to incentivize farmers to avoid violations. In attempts to avoid violations, farmers may perceive participating in CDFA CSA programs or adopting CSA practices as introducing risk to their operation. Broader implications of these regulatory policies include certain groups of farmers, particularly dairy farmers, potentially leaving the state for another less regulated state in the US. The impact of other regulatory policies at the state and national level on farmer decision-making related to CSA and conservation practices and broader farming operations is somewhat documented, but future research around these regulations is critical for

further supporting farming operations in environmental, economic, and social sustainability (Prokopy et al., 2019a).

### Opportunities

Given the implications of our research – that smaller farms and generally under-resourced farmers have less access to CDFA CSA programs, participate less, and thus, receive less program benefits as the result of *power over* mechanisms that constrain and enable different groups via the top-down administration of CDFA CSA programs – several short- and long-term opportunities exist to address unintended program outcomes. Regarding short-term opportunities, increasing smaller farming operators and associated under-resourced farmer participation in CDFA CSA programs can be supported by both direct funding and resources targeting these groups based on their demographics (i.e., farm size, income) and funding and resources targeting program administrators. The current program benefits targeting under-resourced farmers is a cap of 25% of program funds for SDFRs, which is one group of under-resourced farmers. This cap does not provide extra technical support or higher funding rates for SDFRs as Farm Bill conservation incentive programs do. However, more specific targeting of under-resourced farmers, particularly based on farm size (Eastwood et al., 2010), may enhance their participation in the CDFA CSA programs. In addition to more strategic targeting of funds to smaller farming operations and other under-resourced farmers, the removal of the first-come-first-serve application reviewal process would create more equity with how grants are awarded, and likewise enhance the access and participation of under-resourced farmers in the CSA programs. CDFA has already adapted a few programs to be administered as block grants, where eligible technical assistance organizations receive program funds and disperse them among farmers who

apply for the programs (National Nut Grower, 2023). Although this adaptation may serve in connecting more under-resourced farmers with the CSA programs, the ability of technical assistance organizations to access the block grants will likewise be critical for their success (Collins et al., 2016)

Additionally, supporting CDFA and TAPs in their administrative and technical assistance efforts may also enhance under-resourced farmer participation in CDFA CSA programs. As evidenced by our research findings, when facing significant capacity constraints, CDFA is unable to adequately support administrative activities, which then likely contributes to accessibility issues among smaller farming operators and other under-resourced farmers. TAPs also indicated a need for more supportive funding and resources, as they are overwhelmed by the number of farmers that need aid. Providing more supportive resources to CDFA and TAPs would support their administrative and technical assistance efforts, and likely lead to more strategic efforts to increase under-resourced farmer participation in CDFA CSA programs.

In addition to short-term opportunities related to targeted funding, long-term opportunities need to further consider power among agricultural actors. Within the agricultural sector, farmers and farm workers are incredibly constrained and thus disempowered by the limited quantity and quality of resources they have access to, including time, financial, and land resources in addition to more general resources, such as healthcare (Henning-Smith et al., 2022). Although many farmers face these constraints, under-resourced farmers face these constraints in greater quantities as the result of historic exclusion from key agricultural benefits of the 20<sup>th</sup> century (Asare-Baah et al., 2018; Gilbert et al., 2002; Horst & Marion, 2019; Jennings, 2019). These constraints are not only relevant for natural resource conservation or CSA government

incentive programs but also for critical government-supplied resources like crop/livestock insurance, farm ownership loans, crop/livestock subsidies, etc. (Ayazi & Elsheikh, 2015; Hill et al., 2013; Young, 2023). A means to further empower farmers is alleviating the structural constraints to resource access. These activities include furthering farmer and farm worker land tenure, enhancing farm worker rights and protections, and enhancing rural community vitality (Fernandez-Bou et al., 2021; Neef, 2020; Ranjan et al., 2022). Embedded within these activities must also be a critical analysis of the role of agricultural, economic and market dynamics, environmental, and rural public policies in constraining and/or enabling these needed structural changes for farmers.

In California and the broader US, state and federal governments are establishing new public policy and task force efforts to address some of these persisting structural constraints faced by farmers. For example, California passed a bill in 2024 that established a cooperative farm equipment-sharing program administered through CDFA to help farmers overcome equipment access constraints (Larson, 2023). A few bills were also recently passed in California that intend to enhance access to affordable housing for farm workers. At the federal level, USDA is centering on advancing racial justice, equity, and opportunity in its current strategic plan for funding years 2022-2026 through the creation of an Equity Commission that assesses and recommends policy actions in light of equity, inclusion, and diversity initiatives (USDA, 2022b). The Equity Commission also assesses the structures and practices of USDA to consider how they may contribute to the exclusion of farmers from USDA efforts due to unintended racial, economic, health, and other social discrimination. As with CDFA CSA programs, these efforts will also need to be evaluated in the future to understand their outcomes for farmers.

### Conclusion

This research examined farmer accessibility outcomes of CDFA CSA programs associated with the administration of the programs and described the different institutional and structural actors and actions/decisions that shape farmer access to the programs. We used interview methods with program actors to understand how different actors and their decisions shape farmer program access. Our findings overall demonstrate that within the top-down administration of government resources such as CSA programs, constraints to institutional capacities force institutions to make administrative decisions and structures in ways that support their lack of capacity but can further constrain the potential beneficiaries of the resources from accessing said resources. Advocacy groups also influenced the programs by directly aiding CDFA with establishing programs and incorporating their own agendas into the programs. These agendas contributed to enabling CDFA and farmers to address GHG mitigation on farming operations and constraining TAPs abilities to aid farmers, the latter of these dynamics implying increased constraints on farmers' access to the programs. The constraints posed by *power over* and *power with* mechanisms are particularly relevant for potential beneficiaries who already lack the needed resources, and thus, *power to* access government resources. Within the administration of CDFA CSA programs, these constraints likely contribute to disproportionately high participation in programs among well-resourced or wealthy farmers, as opposed to disproportionately low participation among under-resourced farmers, especially those with smaller farming operations. These findings are unsurprising given that institutional and structural barriers have been found relevant for farmer access to and participation in federal Farm Bill conservation incentive programs (Asare-Baah et al., 2018; M. K. Johnson et al., 2018; Prokopy

et al., 2019a; Ranjan, Church, et al., 2019; A. P. Reimer & Prokopy, 2014a), in addition to trends of program funding flowing towards increasingly wealthier farming operations over time .

In light of these results, we suggest power relations would be valuable to consider within the administration of environmental and agricultural public policies to ensure that outcomes of policy solutions targeting farmers are inclusive and equitable rather than exacerbating current social and environmental problems. Our research points to areas in the public policy process that warrant further examination; specifically, how the interaction of public policy agendas and their administration can contribute to key structural barriers to government resource access among farmers and other agricultural actors, and how targeted public policy solutions may alleviate these structural barriers. Efforts to address these equity issues in agriculture are emerging among government agencies, including new policies for sharing farming equipment and the establishment of equity commissions. The future of climate change mitigation and adaptation policy must be inclusive and equitable for all agricultural actors to adequately support needed change (USDA, 2024).

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CHAPTER FOUR

ASSESSING CLIMATE-SMART AGRICULTURE PROGRAMS:  
STRUCTURAL AND INSTITUTIONAL INFLUENCES ON  
POLICY EFFECTIVENESS

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Abstract

Over the past decade, the number of federal and state public policies attempting to address agricultural contributions to climate change has increased significantly. To appropriately gauge the effectiveness of these policy interventions, structural and institutional conditions relevant to agriculture that directly and indirectly enable climate change must also be considered. The current research examines how California's Department of Food and Agriculture climate-smart agriculture incentive programs interact with these structural and institutional (i.e., policies, their processes, and decision-making organizations) conditions to address climate change mitigation on farming operations. We focus on how the programs enable or constrain structural (i.e., resulting from interacting policies, institutions, social relationships, and culture) and institutional (i.e., policies, their decision-making organizations, and their processes) conditions and how these conditions enable or constrain the programs' ability to address climate change. We conducted 16 semi-structured interviews with professionals from agencies, advocacy groups, technical assistance organizations, and universities who engage with climate-smart agriculture programs. We found that the climate-smart agriculture programs enable farming operations to mitigate their greenhouse gas emissions by financially incentivizing the adoption of certain practices. However, a variety of structural and institutional conditions ultimately constrain farmers' access to the programs. The programs do not address a plethora of structural and institutional conditions, such as monoculture farming systems, limited farmland and labor access, market dynamics, agricultural policies, environmental policies, etc., that directly or indirectly contribute to climate change. We recommended that effectively addressing climate change mitigation should include taking a systemic, multi-policy approach, integrating farmers into market

decision-making and policy processes, and conducting research related to the impact of power dynamics on policy decision-making and broader structural conditions that enable climate change.

### Introduction

In response to climate change impacts on agriculture, there has been an uptick in public policies at the United States (US) federal and state government levels to help the agriculture sector adapt to and mitigate climate contributions to climate change while enhancing productivity. As a structural problem (i.e., resulting from interacting policies, institutions, social relationships, and culture), climate change in the context of agriculture is the result of increasing atmospheric greenhouse gas (GHG) emissions produced by various agricultural activities and systems that are incentivized by a variety of policies and economic markets (Hatfield et al., 2013; Rojas-Downing et al., 2017). The results of increasing atmospheric GHGs have resulted in changing climate conditions that spur increasingly intense and frequent natural disaster and weather conditions, both of which adversely impact crop yields, working conditions on farms, and broader uncertainty about farm viability among farmers (Hatfield et al., 2011; Pathak et al., 2018). Federal responses to climate change include integrating practices that aid adaptation and/or mitigation into the US Department of Agriculture Natural Resources Conservation Service's (USDA-NRCS) practices. Practice funding is administered through the Farm Bill conservation title via incentive programs, and the development of climate-smart agriculture (CSA) commodity markets (USDA-FSA, 2022). At the state level, some states have developed or are developing government incentive programs to aid CSA practice adoption on farming operations (e.g., California, Maine) with the broad goal of mitigating GHG emissions from

agricultural activities, inputs, and technologies, while achieving environmental co-benefits such as enhanced soil health, increased water efficiency, and decreased air pollution (Berkeley Law, 2019; Buckley, 2023; CalCAN California Climate & Agriculture Network, 2020). In California, the suite of CSA programs administered by the California Department of Food and Agriculture (CDFA) includes the Advanced Manure Management Program, the Dairy Digester Research and Development Program, the Healthy Soils Program, and the Sustainable Water Efficiency Enhancement Program. In addition to these programs, CDFA also administers a Technical Assistance Provider Program to aid farmers with applying to and implementing practices from the CSA programs (Lewis & Rudnick, 2019).

While it is straightforward to point out the activities, technologies, and inputs that are the largest contributors to agricultural GHG emissions, it is considerably more difficult to address the underlying socioeconomic contexts that contributed to their initial adoption and continued use. For example, the usage of fertilizers and pesticides is in part driven by the existence of monoculture crop and livestock systems, both on individual farming operations and the broader landscape, and the intensification of agricultural inputs to produce high yields (Berka et al., 2001; Rojas-Downing et al., 2017). Monoculture is further driven by a mix of Farm Bill policy, foreign trade agreements, market dynamics, financial flexibility among farmers, and other policies that emphasize the production of certain agricultural products (Traldi et al., 2024). Thus, the context that results in agricultural activities, inputs, and technologies emitting GHGs is laden with complex interacting conditions on the agricultural landscape. Therefore, addressing agricultural contributions to GHG emissions that cause climate change must incorporate a complex, systemic approach (Hatfield et al., 2013; Hirsch et al., 2011; Rogers, 2008).

Given the need for this complex, systemic approach to addressing GHG emissions from agriculture and helping agriculture adapt to climate change, there is a need to understand how current policy tools, such as the CDFA CSA incentive programs, address (or somewhat address) the underlying conditions that produce GHG emissions in agriculture and contribute to climate change (Glenna, 1999). In particular, we consider structural (broad, abstract conditions resulting from the interaction of policies, organizations, relationships, and culture) and institutional conditions (policies, their processes, and the formal and informal organizations that make decisions about these policies) in this research, given the structural nature of climate change and the institutional nature of addressing climate change. We use the word ‘condition’ to neutrally describe persisting institutions and structures. Conditions can be described as barriers or constraints when they constrain individual actors or other conditions (as institutions and structures can enable and constrain each other), and conditions can also be described as opportunities or openings when they enable actors or other conditions. Describing institutions and structures as conditions opens the interpretation of persisting structures and institutions as constraints and opportunities, depending on their impacts on actors and other conditions. By understanding how policy tools address these conditions, efforts towards reducing GHG emissions can then be directed towards changes in current policy tool objectives and outcomes that enable emissions of GHG from agriculture. Likewise, how these conditions interact with policy tools to enable or constrain outcomes is critical for understanding whether the current policy tools are able to address climate change (Giddens & Giddens, 1982). The objectives of this qualitative research focus on identifying the underlying conditions relevant to agriculture that constrain farmers’ abilities to address climate change, understanding how CDFA CSA

programs enable or constrain change to these conditions, and then examining how these conditions enable or constrain the intended outcomes of the programs. The current research asks the following research questions about the CDFA CSA programs:

1. How do CSA programs interact with structural and institutional conditions to enable GHG mitigation?
  - a. How do CSA programs enable or constrain structural and institutional conditions to mitigate GHGs through program participation?
  - b. How do these structural and institutional conditions enable or constrain farmers' access to CSA programs and the programs' ability to mitigate GHGs?

Context: Environmental Policy Tools for Agriculture

An abundance of research over the past few decades has evaluated the outcomes – including impacts and program access – and general trends associated with the Farm Bill conservation incentive programs and their practices. Research examining Farm Bill conservation program access trends can lend to understanding potential access trends for the CDFA CSA programs, as both programs utilize an incentive structure and similar nature-based practices for addressing GHG mitigation or other environmental issues (Daniels, 2022; Lewis & Rudnick, 2019). The research highlights major constraints to accessing programs and/or adopting conservation practices generally among farmers (Prokopy et al., 2019b; Ranjan, Church, et al., 2019; Ranjan, Wardropper, et al., 2019; A. P. Reimer et al., 2013; A. P. Reimer & Prokopy, 2014a). These constraints include a lack of time, economic capital, and access to farmland. These constraints are especially true for under-resourced farmers, or farmers who lack critical agricultural resources and are thus ‘under-resourced’ or disempowered compared to the average

farmer (Asare-Baah et al., 2018; Ayazi & Elsheikh, 2015; Carter, 2019; Fagundes et al., 2020; M. K. Johnson et al., 2018; Nickerson & Hand, 2009). Under-resourced farmers, as defined by this research, include Black, Indigenous, Asian, Hispanic, and other racial/ethnic minority farmers, women, veterans, small-sized, and beginner farmers (Ayazi & Elsheikh, 2015; Carter, 2019; Effland, 2021; Guynn et al., 2024; USDA, 2022a). Some of these groups have faced violent and oppressive historical conditions, such as genocide, segregation, and/or discrimination towards these farmer groups (Eissinger, 2008; Minkoff-Zern, 2018; Walters et al., 2010) in addition to a lack of attention given to these groups by public policy and policymakers (Keeney et al., 2003), all which contributed to the marginalization of these groups resulting in them being under-resourced and disempowered (Eissinger, 2008; Minkoff-Zern, 2018; Walters et al., 2010).

In addition to highlighting these major constraints, research demonstrates a trend of Farm Bill conservation program funding flowing towards increasingly wealthier farmers over time. In particular, data from the mid-2000s focusing on the working lands conservation programs (Environmental Quality Incentive Program, Conservation Security Program) shows that a majority of program funds are going to family farmers who make \$150,000 or more in gross cash farm income. A minority of funding went to farmers who made \$149,000 or less in gross cash farm income, who represent a majority of family farmers in the US (Hoppe, 2014). However, in 2015, the percentage of funding for family farmers making \$150,000 or more increased whereas that for family farmers making \$149,000 or less decreased (McFadden & Hoppe, 2017). Overall, the funding trends of the Farm Bill conservation programs show funding flowing predominately towards farmers with higher-than-average incomes, suggesting that the average farmers and

anyone who has less income than them are at a disadvantage when trying to access Farm Bill conservation programs.

### Structural and Institutional Conditions

Although incentive programs are meant to serve as a policy tool to aid farmers in overcoming cost and knowledge barriers related to implementing CSA practices, farmers continue to face institutional and structural barriers to accessing and participating in government incentive programs. These constraints are also relative to accessing other government resources, including commodity subsidy loans, farm ownership loans, and crop and livestock insurance provided by different Farm Bill titles (Asare-Baah et al., 2018; Ayazi & Elsheikh, 2015; Callahan & Hellerstein, 2022; Gilbert et al., 2002; Horst & Marion, 2019; Young, 2023). Structural constraints include conditions that result from interactions of institutions (i.e., policies, processes, and the formal and informal organizations that make decisions about policies and processes [Crawford & Ostrom, 1995; Knight, 1992; Ostrom, 1990]), and the nature of societal and ecological relationships, beliefs, attitudes, perceptions, norms, and knowledge (Giddens & Giddens, 1982; Jacobs et al., 2013; Shiao & Woody, 2021). Conceptualized through a social-ecological lens, structural conditions include 1) *social conditions* (e.g., wealth and poverty, the dynamics of markets, the presence and nature of development, land tenure, and the working conditions of an industry), and 2) *ecological or environmental conditions* (e.g., natural disasters, water and soil quality and quantity, climate change, and the type and prevalence of crops and livestock on the landscape). Structural conditions can enable and constrain institutions and individuals' power to achieve goals associated with collective and individual agendas (Avelino, 2021; Giddens & Giddens, 1982). Farm Bill crop insurance, farm ownership loans, and

commodity subsidy loans, various studies identify structural constraints to accessing these resources as a lack of farmland ownership in place of renting farmland, economic capital, and adequate farm labor (Ayazi & Elsheikh, 2015; Chapman et al., 2019; Maher et al., 2023; A. P. Reimer & Prokopy, 2014a).

In the context of the Farm Bill, institutional conditions such as the eligibility requirements for participating in crop insurance, commodity subsidy loans, farm ownership loans, and conservation programs can be constraining to farmers who may want to participate in these programs but do not meet the eligibility requirements (Asare-Baah et al., 2018; Fagundes et al., 2020; M. K. Johnson et al., 2018). For example, many Black farmers, who have been historically marginalized and financially disadvantaged by being overlooked by general public policy (i.e., not being on the receiving end of critical public resources) leading into the mid-20<sup>th</sup> century, were not eligible to participate in the farm ownership loans program because their credit scores and finances did not meet the credit score and financial eligibility requirements of the programs (Ayazi & Elsheikh, 2015; Gilbert et al., 2002; Horst & Marion, 2019; USDA, 1997). This particular example also demonstrates how historical institutional conditions – general public policy and its resources – generate social conditions – financial disparities among Black farmers through their exclusion from public policy agendas – that then constrain other institutional conditions and their goals – in this case, enhancing land ownership among farmers through Farm Bill programs.

#### CDFA CSA Programs

The suite of CDFA CSA incentive programs was developed in the 2010s before climate change mitigation and adaptation efforts were prioritized in Farm Bill conservation programs. As

such, the CSA programs serve as a champion for current policy efforts addressing climate change mitigation on farming operations. The CSA programs have only recently been formally evaluated for their efficacy (Babin et al., 2024). The recent evaluation methods included a mix of qualitative interviews with various program actors (primarily agency staff, advocacy group personnel, technical assistance providers, and farmers who participated in the programs) and a quantitative survey with farmers who participated in the programs between 2017 and 2022. The evaluation reflects positive program outcomes, including a reported 75% of participating farmers indicating an intention to maintain the CSA practices or technologies adopted from programs. Around 57% of the surveyed farmers indicated that adopting a CSA practice or technology from the programs also encouraged them to adopt another practice(s). Although these behavioral outcomes that enable mitigation of and adaptation to climate change are positive, the evaluation also highlights various challenges and risks for farmers. Around 20% of farmers who participated in the Healthy Soils Program indicated that they did not have the adequate labor or equipment to implement the CSA practices. Additionally, a majority of responding farmers were “extremely concerned” about a variety of conditions that impose risk upon the viability of their farming operations, including water supply, inflation, and regulations. Furthermore, interview data suggested that the administration process of the CSA programs created constraints on farmers' access to the programs (Babin et al., 2024).

For CDFA CSA programs to be effective, they must also consider the structural conditions under which farmers work (Ayazi & Elsheikh, 2015; Giddens & Giddens, 1982). If those conditions are constraining farmers' ability to adopt CSA practices and, more broadly, change structural conditions that contribute to climate change, then CSA programs might also

consider addressing these conditions. To further understand these conditions and identify priorities for CSA programs, it is critical to identify these key structural conditions and how they contribute to climate change and understand how CSA programs address these structural conditions.

### Methods

We approached answering the following research questions with exploratory qualitative methods (Patton, 2014):

1. How do CSA programs interact with structural and institutional conditions to enable GHG mitigation?
  - a. How do CSA programs enable or constrain structural and institutional conditions to mitigate GHGs through program participation?
  - b. How do these structural and institutional conditions enable or constrain farmers' access to CSA programs and the programs' ability to mitigate GHGs?

We conducted semi-structured interviews with professionals who engage with CSA policies and programs in California, including agency staff, non-governmental organization (NGO) staff, technical assistance providers, and university researchers. We chose to interview these professionals due to the policy and program-oriented nature of the research questions, which these professionals would engage within their job roles and hold valuable expertise in. These CSA policy and program professionals were identified through publicly available biographies on agency, NGO, or university websites, as well as recommendations from interviewees who participated in the interviews.

To answer our research questions, we created an interview guide with a set of 13 open-ended questions that included the following topics: challenges faced by California agriculture in light of climate change, opportunities to address these challenges, CSA policy/program outcomes, policy or program-specific and external factors that enable/constrain these outcomes and needed changes within CSA policies and programs (see Appendix D for interview questions). We invited potential interviewees via email during July-October 2024 to participate in an interview and provided information about the study at that time. Participants were then briefed before the interview on giving informed consent and interviewed over Microsoft Teams or Zoom™ video calling software. The software also recorded the interviews, and we used Otter.ai to transcribe the audio recordings. This research is covered under Montana State University IRB Protocol #2024-1566.

To analyze our data, we developed an inductive and deductive coding framework based on the interview question topics and other topics that arose throughout the interviews (Fereday & Muir-Cochrane, 2006). The codebook includes codes related to enabling and constraining factors, institutional and structural conditions, climate change challenges, and climate change opportunities (see Supplemental Material for codebook). To ensure the coding framework was rigorous, two researchers engaged in two rounds of applying the codebook to 2 (or ~10%) interview transcripts, comparing and discussing their application of the codes, and adapting the codebook as needed to enhance similar applications of the coding framework between the researchers (Church et al., 2019). After two rounds of codebook refinement, one researcher coded the remaining transcripts and synthesized the results through the lens of our research

questions (see Appendix E for coding framework). The results presented in this paper reflect this final synthesis of the data.

### Results

We conducted 16 interviews with CSA professionals, including individuals with the roles of project/program manager, agency/department director, science/research/conservation director, and technical assistance provider from state agencies, advocacy groups, technical assistance groups, and California universities. Some interviewees hold multiple roles (e.g., technical assistance provider and advocacy group staff). Thus, the numbers for types of interviewees are skewed to reflect these multiple roles (see Table 2). Among this sample, many have historically been involved in California CSA policy and program creation, adaptation, and research efforts.

Table 2: Number of Interviews by Interviewee Type; N=16

Interviewee Type	Number of interviews
Academics	1
Advocacy Group Staff	6
Agency Staff	6
Technical Assistance Providers	6

### Agriculture and Climate Change – Contributions and Impacts

Interviewees attributed climate change to GHG emissions produced from fertilizer inputs and livestock operations (i.e., fertilizers and livestock operations enable climate change). For example,

“Fertilizers are responsible for a huge part of those emissions now, and obviously, most of the emissions come from livestock; probably 5% of the total emissions of California are livestock. But the other 3% come mostly from fertilizers and from related activities...” – Advocacy Group

Interviewees discussed a variety of structural challenges faced by California agriculture and rural communities in light of climate change. Topics discussed included environmental conditions seen as constraints, including water availability fluctuations, changes in pest distributions, increased wildfire activity, and decreasing biodiversity as a result of changing climate conditions. For example, interviewees discussed how changing environmental conditions constrain farmers by impacting agricultural productivity:

“We have issues related to floods, soil fertility, loss of soil, organic matter. Along with heat and temperature for a lot of the crops, we’re helping folks work in really big changes in temperature patterns, which often relate to less or fewer winter chill hours, which impacts cropping patterns. Lower yields is a huge issue. We’ve heard a lot about the loss of suitability of certain crops in regions like the Central Valley and the desert, which has really big impacts for what can be grown when the timing.” – Technical Assistance Provider

### CSA Policy and Programs – Enabling Factors

Funding Source. Interviewees discussed how the CSA programs’ funding source enables the programs’ intended outcomes. Interviewees described the intended outcome of the programs as GHG mitigation through carbon sequestration, methane capture technologies, and irrigation system changes. The programs’ funding source is the Greenhouse Gas Reduction Fund, which gains funds from the Cap-and-Trade Program administered by the California Air Resources Board to support GHG mitigation. The co-benefits associated with these outcomes include enhanced soil quality, air quality, and water savings, as described here:

“So the funding requires, because we're using climate funds to do this, we have to focus on [GHG mitigation]. We're using other funds to more holistically address some of the issues. Climate-smart ag focuses on soil health. There is a pretty big

hyper-focus on greenhouse gas emissions, but the benefits are really broad. Water management, which is a huge issue, but also there is a nexus of greenhouse gas emissions and renewable energy and providing alternatives and options for farmers to switch out their equipment or where they're getting their energy.” – Agency Staff

In addition to the funding sources enabling desired GHG mitigation outcomes from the programs, interviewees also explained how the practices implemented under the programs enable other environmental co-benefits. For example,

“And [Healthy Soils Program practices] also happen to sequester your carbon, but that's not a huge priority often for growers. But, reducing compaction or you know increasing water infiltration is a big priority. Matching up their goals with the program goals is really helpful.” – Technical Assistance Provider

Incentive Structure. Interviewees also discussed how the incentive structure of the programs enables intended program outcomes. Many interviewees expressed the importance of the incentive structure, stating that incentives enable farmers to adopt new practices and technologies in light of financial structural constraints, such as risk. For example,

“You get a high risk of failure...I think what this has done is it has allowed growers to take a risk on doing some of these climate practices without having to be financially at risk themselves. By getting a payment, it reduces their financial risk on the farm, which enables them to try it, which enables them then the outcome to be positive and whatever in terms of soil organic matter or agronomic benefit.” – Technical Assistance Provider/Advocacy Group

Technical Assistance. Interviewees also discussed CDFA’s technical assistant (TA) program as important to enabling intended CSA program outcomes because the TA program helps farmers access CSA programs and implement practices. Interviewees described the TA program as enabling outcomes because of the crucial relationship that technical assistance providers have with farmers. As one interviewee described it:

“... The [Rural Conservation Districts] have always been mostly just a partner. There's already been these long-standing relationships and using that trusting relationship to help them access the funds has increased adoption pretty widespread.” – Agency Staff

### CSA Policy and Programs – Constraining Factors

Funding Source. Interviewees described numerous institutional conditions related to the CDFA CSA programs that constrain the intended outcomes of the programs (i.e., GHG mitigation). One overarching program element identified as constraining outcomes was the general funding structure of the programs. Interviewees noted that the annual allocation of funding for the programs, including funding to support CDFA’s administration of the programs, constrains CDFA’s ability to administer the programs.

“I think the number one challenge is that the funding is so unreliable. Generally speaking, it needs to be spent within a year. We've had as much as \$99 million dumped into one program in one year and you have to get it rid of it all in one year... There's no feasible way to manage that much money as a competitive application, at least with the resources that we have. The unreliability, the boom-and-bust cycle of the funding is a huge impediment to improving the administration of some of the programs and improving customer service, having time to evaluate and change the programs.” – Agency Staff

Additionally, interviewees explained how CDFA’s funding constraints result in lost trust and misunderstanding about the programs among farmers. For example:

“There are unintentional barriers probably created because of the funding source. You can imagine that there are impacts both for the state to be able to implement fully the programs, and that trickles down all the way to lost trust and misunderstanding about the program at the farm level.” – Agency Staff

Practices. Interviewees also discussed the suite of available practices not necessarily being suitable for the diversity of farming operations present in California (i.e., structural conditions). For example:

“I often get feedback that farmers looked at the practices and none of the practices might be applicable to their farm, which means the diversity of practices isn't adequate to support all the 200 different crop commodities in the state. You know, the practices are really geared towards the row crop, orchard crop, and some range land, but the range land is really limited like you know you get just prescribed grades thing to forensic land... You know, there's not a huge diversity of all the

practices in the conservation practice standard. I think someone might say that's the limiting factor.” – Technical Assistance Provider/Advocacy Group

Other interviewees described how practices may constrain program outcomes by not directly addressing or exacerbating current environmental issues. For example:

“We're talking about the biodiversity that exists within soils and agricultural soils and whatnot. There isn't really much emphasis on that, and I don't know to what degree CDFA is taking that in terms of their programs. But there's a lot of potential there.” – Technical Assistance Provider

Incentive Structure. Interviewees also noted that the incentive structure of the programs and other institutional conditions related to program structure and payment rates as generally constraining to program outcomes. Payment rates are especially constraining, considering other structural conditions and processes, such as inflated prices of practice materials and technologies and agricultural equipment shortages among farmers.

“Even if they're getting reimbursed or they're getting paid to do it, sometimes they're still paying extra out of pocket. The availability of some of the materials is limited. If it requires equipment to also implement these practices, how do they get access to that equipment? Do they need to buy it? Do they need to rent it and borrow it? Is it accessible? Are you moving it super far? Long distance like what is the cost of compost? How far away is your composting facility?” – Technical Assistance Provider/Advocacy Group

Some interviewees highlighted how the incentive structure of the programs is particularly constraining to under-resourced and small-scale farmers.

“Most small-scale farmers and BIPOC [Black, Indigenous, People of Color] farmers, SDFRs [Socially Disadvantaged Farmers and Ranchers], etcetera, there is an advanced payment option, but it's extremely difficult for people that navigate because of the timing requirements and restrictions.” – Technical Assistance Provider

Additionally, some interviewees discussed how the timing of the programs does not align with the timing of agricultural activities and thus poses a constraint to program participation.

“A lot of government programs are very slow. I think that can be really frustrating for anybody working on these programs, but particularly it can be difficult with farming because often the timing cycles of these programs don't line up with like the cycles of farming. Farmers get frustrated because they feel that like it's like these bureaucrats up in Sacramento don't understand that it's going to rain in November and you got to get a cover crop in the ground before then.” – Technical Assistance Provider

Inequitable Access. Many interviewees commented on institutional conditions of the programs that constrain CSA program access, describing how a plethora of institutional and structural barriers prevent under-resourced farmers from accessing the programs. For example, some interviewees described how the programs and their application processes are set up for farmers who already have access to key resources such as adequate labor and farmland as opposed to farmers who operate less farmland and have less access to farm workers.

“The program administration, the availability and accessibility of paperwork for these tinier, more independent growers like that is a that is definitely a constraint. And in how the program is administered that prevents more independent farmers, more small-scale farmers from being able to take advantage of these, these state-based funds.” – Advocacy Group

“A big issue is the huge difference in access to programs and access to different things in the size of farms. So small farm family farmers just have a lot more difficult time accessing some of these programs or even being targeted by some of these programs that are interested in, you know, just huge amounts of acreage.” – Technical Assistance Provider

Likewise, some interviewees commented on a lack of program materials in languages beyond English as a constraint for program access. Some interviewees attributed these access issues to resulting in inequitable outcomes for socially disadvantaged farmers and ranchers (a CDFA term for under-resourced farmers who are Black, Asian, Indigenous, Hispanic, Middle Eastern, and other racial or ethnic minorities).

“CDFA, even though they are prioritizing SDFRs [Socially Disadvantaged Farmers and Ranchers], the way the program and the staff are set up, they are hugely underprepared to provide the support the SDFRs need to do the grants... [They're]

having people sign legal contracts that are in a language they do not speak. They have interpreters. They go through the grant agreement and the farmers listen best they can, and then they sign a legal contract in a language they don't speak.” – Technical Assistance Provider

Program Approach. More generally, some interviewees discussed how CSA programs and their institutional conditions are not addressing the root causes of agricultural challenges under climate change and emphasized the inability of the programs to address structural issues. For example,

“CSA programs and policies are like trying to apply Band-aids to a like the larger gushing wound of like social and political and like power-based systems that contribute to the climate crisis in California.” – Advocacy Group

“Even though [policymakers] are putting in place really good funding sources or pieces of legislation that are kind of moving the needle on renewable energy or food waste reduction or you know the adoption of these practices -- they oftentimes don't get the root causes of a lot of these issues. For producers to fully transition to climate-smart ag, it's probably going to take more than a three-year financial incentive program, and that may not address root causes like land tenure. People through these programs have to get landowner permission to adopt practices for example. But that doesn't necessarily address the root cause of who owns the land, who has the ability to farm it and communities of color or who are already disproportionately impacted by climate change.” – Technical Assistance Provider

### Structural Conditions External to CSA Programs

Interviewees described a profusion of structural and institutional conditions external to CSA policy and programs that primarily affect CDFA CSA programs. Structural conditions include economic and market influences, monoculture and diversified farming operations, policy processes and power dynamics, farmland access and consolidation, and structural discrimination.

Markets and Economics. Many interviewees commented on the role of markets in enabling and constraining the adoption of CSA practices and, thus, program outcomes. In this research, the market is defined as a broader system of supply, demand, pricing structures, and

other pressures related to the sale and purchase of agricultural commodities and other resources critical to agriculture (e.g., land, labor). Market dynamics are defined as the fluctuation changes to this broader system. Interviewees explained how agricultural market dynamics ultimately constrain farmers' ability to address climate change mitigation by constraining the financial flexibility of farmers.

“The market’s influence is the number one [barrier] for most farmers adopting these practices. The factors influencing those financial barriers are multifaceted – operation laws, the price of labor, all of those things have bearings on a farm’s finances.” – Technical Assistance Provider

“Most farmers are focused on surviving this season or the next. Many are dealing with really complicated challenges related to labor shortages and labor costs. And of course, there's always been variability in markets. The sort of instability of that and uncertainty makes it hard to invest in, and it makes it hard to take risks generally in changing production practices, but especially the financial risks and invest in things that are sort of uncertain or new.” – Advocacy Group

Other interviewees also described the role of consumer opportunities and preferences in shaping these markets and the variety of crops grown on the California landscape:

“One of the reasons why we grow such, you know, water-intensive crops in California is because they're demanded by producers or by consumers. The market has a huge influence on what's grown, how it's grown.” – Technical Assistance Provider

Monoculture and Diversified Systems. With crop and livestock systems, interviewees discussed lock-in to monoculture systems of crop and livestock production as a factor constraining program efficacy. For example,

“Growing in a field, obviously, monoculture is a big problem. The more vulnerable to pests agriculture is, so maybe more agricultural diversity can also help... [Farmers with diversified systems] depend less on pesticides because they have more diversity or they do not need to apply so much pesticides. If you combine that with cover crops with mulch permaculture, then you can create very resilient agricultural systems that can actually provide for a family.” – Advocacy Group

Other interviewees commented on incentives for monoculture farming operations, and stressed a need to enable diversified farming operations:

“We’re incentivizing huge monocrops. Why aren't we incentivizing, you know, diversified systems that have proven to realize better productivity, better environmental and human health outcomes, like across the board. It’s just a very backward approach.” – Technical Assistance Provider

Some interviewees stressed the need for approaching farms as ecosystems and diversifying crops to enable CSA outcomes:

“We need to think of farms as ecosystems. We need more crop diversification. There are these bigger systems that need to change in order for climate-smart agriculture to be realized.” – Advocacy Group

Policy Processes and Power Dynamics. Some interviewees identified politicians, policy processes, and associated political power as having a role in enabling and constraining the outcomes of CSA programs. In particular, interviewees stated that lobbying influences policy agendas to constrain a more prevalent climate change agenda from emerging in agricultural policies.

“The lobbying interests and how those play out and end up affecting the folks that are trying to be a lot more forward-thinking and innovative in terms of their adapting to climate change.” – Technical Assistance Provider

“Livestock is a very powerful sector and they control a lot of the politicians around here and they do whatever they want. They lobby a lot and they just [share] their own side. They don't show the reality or what is going on.” – Advocacy Group

One interviewee commented explicitly on power and how individuals who already have resources and associated power may be exacerbating conditions that constrain addressing climate change. This is due to some individuals already having more access to resources than under-resourced farmers, who are currently constrained from accessing critical agricultural resources. This comment implies that resources, and thus, power within the agriculture sector is

being concentrated away from disempowered farmers and that this concentration of resources and power may exacerbate already existing inequities among farmers.

“The people who already hold power, they hold land, and they have money, are now accessing more. It could be exacerbating some existing issues.” – Agency Staff

Farmland Access and Consolidation. Some interviewees described how farmers’ access to land is constrained due to high land costs driven up by powerful corporations. For example,

“Access to land is almost impossible, and we see a lot of hedge funds, insurance companies, big corporations that are investing online, and they are raising the prices or driving the prices very high. It makes it almost impossible for small farmers to buy land or sometimes even to rent land.” – Advocacy Group

Other interviewees noted that limited farmland access would limit the outcomes of CSA programs and stressed a need for changing land ownership:

“Until we change who owns the land and break up the fact that there are very few opportunities for new farmers and ranchers to even break into the industry because they can't get access land, it's going to be hard for agriculture to be different and to look different and it's going to be hard to implement climate-smart ag programs at scale until those more systemic issues are resolved. That's like beyond the scope of what CDFR can do.” – Advocacy group

A few interviewees also connected farmland consolidation to CSA program outcomes as a potential. For example,

“There's a lot of things that are trending towards large consolidation of Ag, which is a problem for a lot of reasons, especially for climate change, and I don't really know what the solution would be for that.” – Technical Assistance Provider

Equity. Some interviewees commented on inequities related to structural racism and associated program access and information gaps, and described how program information gaps constrain under-resourced farmers. One interviewee specifically described this phenomenon related to non-English speaking farmers and ranchers:

“We still have historical and current structural racism within agriculture, and while there may be places and times when that is not apparent and isn't overtly practiced

anymore, it is still inadvertently or underlying many policies and programs that are still preventing access to information... that guides a lot of the disparities that we're still seeing when it comes to serving socially disadvantaged small scale, historically underserved farmers and ranchers who don't speak English as a first language.” – Agency Staff

### Institutional Conditions External to CSA Programs

Institutional conditions that interviewees described as external factors that affect the outcomes of CSA policy programs included agricultural, environmental, and immigration public policies, such as the Farm Bill and its various programs, foreign trade agreements, and water policies.

Farm Bill and NRCS. Interviewees commented on the role of federal crop insurance and investment into NRCS practices as respectively constraining and enabling of CSA program outcomes in California. With federal crop insurance, interviewees described how crop insurance fails to reduce risk, through its failure to incentivize risk-reducing behavior (i.e., crop insurance is a perverse incentive).

“There have been some unintended consequences of the current model of crop insurance in actually disincentivizing or I should say incentivizing risky management practices and disincentivizing good risk management practices.” – Advocacy Group

With NRCS practices associated with the Farm Bill conservation incentive programs, interviewees discussed how the increased funding for NRCS CSA-specific practices should enable CSA practice adoption. For example,

“We've seen amazing, huge investment through the Inflation Reduction Act. I think it's like 20, \$20 billion to NRCS for getting people to adopt these practices, which is so amazing, and it's going to be really helpful.” – Agency Staff

Foreign Trade and Immigration. Interviewees discussed foreign trade agreements and described aspects of these agreements and associated tariffs as constraining to CSA program

outcomes. Other interviewees noted that some trade agreements with other countries contribute to California growing the same crops as those other countries for those countries. One interviewee pointed out that how immigration policies and general agriculture manage migrant farm workers is unethical.

“In California, particularly like the fair-trade agreements with Mexico and South America, we grow many of the same things. But also, the exploitation of those countries for things we can't grow is problematic, and also is very much related to the workforce migration folks from Central and South America here to do ag work.”  
– Agency Staff

“Immigration policy and the way that we treat our migrant workforce it is unethical, it is wrong, and we need to change that before we can even think about having a sustainable agricultural community.” – Agency Staff

Water Policy. Interviewees also described how water policy impacts farmers and thus is relevant to discussions on CSA policy and program outcomes. For example,

“There are a lot of farmers in the next 5 or so years who are going to be making decisions about whether or not they're going to stay in business and that's related to the Sustainable Groundwater Management Act. That's a state policy that's impacting a lot of people, farmers staying in business, and the outcomes of climate-smart ag.” – Agency Staff

### CSA Policy and Programs – Opportunities

Program Practices. Interviewees identified a variety of institutional opportunities to address constraints to program outcomes. Many interviewees discussed changes related to which practices the programs support and prioritize, and included ideas about changing the goals practices should address. Some interviewees noted that in order to address these problems, research on structural conditions is needed. For example,

“I would also like to see more incentives for the right practices, not incentives to sequester carbon or not incentives to, you know, incentives to do the right like follow agroecology practices and you will have this incident period right.” – Advocacy Group

“I wish the CSA, especially the healthy soils program and especially the SWEEP program, I wish those two funding programs awarded and prioritized funding for farmers who wanted to use multiple practices at once. I would love some flexibility in thinking about different about how to reward farmers who are thinking, add an ecosystem level.” – Advocacy Group

Incentive Structure. Interviewees also discussed the CSA program incentive structure.

Interviewees proposed changes to further enable the adoption of CSA practices through the programs, such as adopting a marketing logo to enable the maintenance of CSA practices and adapting incentive rates to meet farmer needs and support CSA practice adoption. For example,

“Well, I think I think that should be a marketing logo for folks who are participating in greenhouse gas projects and that they should be able to put that logo on their product and get some recognition for that. Because no one else is doing that. So if, let's say for the citrus growers, they should get a logo that they can use for three years and then if they continue the practice on their own dime, beyond that they can continue to logo.” – Technical Assistance Provider/Advocacy Group

“There's a valid public policy debate to have about what the right level should be, what you know, in terms of incentive level needed to achieve that option without going over, I don't think we have enough data to know that. So in the absence of that, I think just aiming for full cost of implementation makes it easy for farmers to want to do it.” – Advocacy Group

Technical Assistance. Interviewees also discussed the need to continue and further support technical assistance providers through the TA program, as they enable farmer access to the CSA programs. Interviewees viewed support in terms of enhancing technical assistance organization capacity and providing training opportunities for technical assistance providers (i.e., affecting institutional conditions to enable CSA practice adoption). For example,

“There needs to be more of a development of a workforce around technical assistance providers and training. Right now just in general there's a really uneven distribution of where people can get help. And then when you go into the specific programs, there are areas where there's an uneven distribution of TA providers that farmers can seek out to help them.” – Technical Assistance Provider

Program Approach. Finally, many interviewees commented on how CSA programs could address more structural conditions that constrain program outcomes by changing the institutional approach to addressing climate change mitigation. Some interviewees expressed the need to question access to the programs and whether the current approach is improving outcomes for all farmers.

“But we don't take the minutes to stop and ask why. Does everyone have access to these programs? Are we improving these outcomes for everyone? And then you can start to see how those differences really are impacting individuals and not only individuals, but then you can translate that to the landscape of like greenhouse gas reduction.” – Agency Staff

Others pointed to the institutional approach of perceiving farmers as landowners as flawed and inaccurate due to many farmers having limited access to land. One interviewee specifically described this perspective and pointed out how unstable land tenure can constrain farmer interest in CSA programs. For example,

“The land tenure piece is really important. We have to really get rid of that idea in our minds, a farmer is a person who owns their land. That is not always the case. It's not the reality for many people. Unstable land tenure will directly impact a farmer's impetus for implementing any kind of climate-smart ag program.” – Agency Staff

### Climate Change Opportunities – Environmental Priorities

Outside of CSA policy and program-specific opportunities, interviewees described a variety of institutional and structural opportunities related to water management, pest management, environmental regulations, farmland access and consolidation, equity, and the broader approaches to agriculture and economics in California. Regarding water and pest management as structural constraints, some interviewees commented on the need for new institutional approaches and technologies for managing these resources.

“We need to think beyond just the groundwater. We also need to think about our surface water and how we're allotting and managing water.” – TM

“New pest control tools or pest control tools that are really effective. So as we anticipate more pest pressure and new pest pressure happening like how do we anticipate that and then be prepared and then have those tools actually available to farmers when they need them? So I think there needs to be changes in like how we how we regulate pesticides in terms of whether or not it actually works, whether or not it's affordable. Manage whether or not it is actually registered for the crops that it needs to register for registered for in a timely way.” – Technical Assistance Provider/Advocacy Group

With environmental regulations, some interviewees noted the need to align CSA practices with environmental regulations to enhance the adoption of CSA practices on farming operations.

Some interviewees emphasized how by not linking CSA practices to environmental regulations (and thus, environmental conditions), the programs might not achieve long-term stability as climate change policy solutions. For example,

“...See how many existing regulations can be covered through Climate Smart Act practices. For example, if you're doing a hedge row for the Healthy Soils Program, hedgerows can limit sediment erosion into the waterways... At the end of the day, if you don't link regulations to climate-smart practices and the other way around, climate-smart practices to the benefits of reduced regulations, you are never going to get long-term stability. It's just going to be a money program that comes and goes when there's money, but it's never going to be a solidified in a long-term system.”  
– Technical Assistance Provider/Advocacy Group

### Climate Change Opportunities – Transformative Change

In addition to interviewees describing that the structural conditions constrain farmers' access to CSA programs and their ability to mitigate GHGs, many interviewees discussed a need to address these challenges in agriculture through a transformational approach.

Land Access. Interviewees discussed helping farmers with smaller farming operations (i.e., small or smaller farmers) access land to maintain farming in the future. For example,

“We have tons of other incentive programs for the state and federal level for small businesses. We need to give the same care and attention to small farms, and I think advancing policies that support small farms and land access to a variety of landowners and research that serves smaller operation types are really important. [We need] a reorientation of resources to the types of operations that have the least capacity to do things on their own.” – Agency Staff

“More access to land so that farm workers become small farmers. Less consolidation and more small farms and less land in bigger forms so that because small farms contribute to biodiversity.” – Advocacy Group

In addition to these issues related to farmland, some interviewees also commented on the conversion of farmland in favor of human development. With many of these challenges, interviewees discussed the potential of policies to address these structural conditions:

“The conversion of farmland is a huge issue in California as the price of land increases, land is being converted for housing, retail, etc. So any policies and programs that can protect farmland are really, really important.” – Technical Assistance Provider

“The financialization of farmland and the investment in farmland as a financial asset that requires financial regulations.” – Advocacy Group

Equity. Leading into discussions about equity opportunities, some interviewees described institutional avenues for addressing structural equity challenges under climate change. These avenues included discussions related to using institutional conditions to enhance under-resourced farmer access to state resources, improve farm worker working conditions, and the inclusion of farmer voices and perspectives in policy-related decision-making.

“Finding ways, particularly for communities of color and underserved communities, to access tax incentives or rebates to adopt renewable energy instead of fossil fuel-based energy sources and then from a social standpoint, improving farm worker conditions for those in the fields, those who work outside, that's a really big issue.” – Technical Assistance Provider

“Any policies that can be informed by local constituents, whether that is the producers themselves or farm workers or local communities?” – Technical Assistance Provider

In some cases, interviewees argued that family and small farmers are interested in sustainable farming as a rationale for supporting under-resourced farmers. For example,

“Wherever the state can step in and the types of programs that they provide to just have those geared towards family farmers and small farmers wherever possible to keep those farms in business, which also benefits climate as well because they're just inherently more interested in keeping their farms sustainable for future generations or for whatever reason.” – Technical Assistance Provider

Markets. Some interviewees discussed the need for institutional intervention in agricultural markets as a way to manage the economic constraints that farmers face. One interviewee discussed this intervention and the need for a revision of markets to include farmers in market decision-making. For example,

“We also have on the input side, tremendous consolidation and seeds and fertilizer, etc. We also need to address anti-competitive markets if we want to have improved resilience because we know that resilience relies upon diversification, both on farm and off, and we need market diversification and different economies of scale and opportunities for farmers. We probably need a revisioning, a reimagining of farmer cooperatives, where the farmers have decision-making power in the marketplace in ways that they don't currently... We need to think collectively, looking at some of the economic barriers to climate resilience.” – Academic

Agriculture Operations and Farmer Perspectives. Finally, many interviewees expressed the need for a fundamental change in how California approaches managing agriculture and associated climate change challenges. Some of these approaches involved shifting the types of farms and crops that are grown on the landscape and targeting institutional resources to support a transition away from industrial agriculture:

“Transitioning to away from kind of the industrial farming practices... I think that what we've seen is most effective for investment is peer-to-peer learning and building trust, and that trust happens with small communities. It's really difficult to break through when a lot of farmers have to be responsive to contracts and yield demand and these expectations that aren't realistic. We've seen a lot more adoption of organic and realistic farming, like small community farming cooperatives. If we could transition to that and support that model of farming with a variety of

mechanisms, we would get closer to our climate adaptation and resiliency goals.”  
– Advocacy Group

Other approaches described by interviewees involved thinking about how farmers engage with problems and including farmers in the policy process. For example,

“It's really changing fundamentally how we're approaching policies and programs... and the inclusion of the voices of those that are being served and, in the process, or from the beginning, that is a big factor... How are we identifying these problems and these terms of what we want to see happen in the land and in landscape and in incentives for farmers? How is that being driven by those farmers themselves? You know, how are they defining and driving the incentives?” – Agency Staff

### Discussion

Our results ultimately demonstrate that CDFA CSA programs serve as an institutional solution to addressing the structural problem of climate change on farming operations in California. The programs operate by trying to address structural problems that contribute to climate change, mainly GHG emissions produced by agricultural activities, inputs, products, and non-renewable energy sources, such as fertilizers, habitat removal, livestock, and electric or gas-fueled irrigation systems. CSA practices include those that sequester carbon in plants and soil, capture methane from manure, and switch fossil fuel dependent energy sourced farming equipment with technology that utilizes renewable energy sources (Lewis & Rudnick, 2019). The incentive structure of the programs attempts to account for the constraining economic conditions faced by farmers that would prevent them from potentially participating in CSA programs. Despite the incentive structure, structural conditions, such as the broader funding and associated decisions about funding, affect institutional conditions relevant to the programs, such as the

capacity of CDFA and aspects of program administration, which then constrain farmer access to the programs.

Moreover, our interview data identifies a significant number of structural conditions that constrain the adoption of CSA practices and thus broader climate change adaptation in California's agriculture sector. Although CDFA CSA program outcomes are explicitly tied to GHG mitigation from farming operations, the programs do not account for, for example, the high presence of monoculture crop or livestock systems in California. The desert Central Valley region of California in particular is known for fruit, nut tree, and alfalfa monoculture – a majority of which, in addition to being associated with fertilizer and pesticide usage, require unsustainable irrigation in light of drought impacts from climate change (Altieri, 2009; Morris & Bucini, 2016). Monoculture systems are structural conditions that we found links to institutional conditions like federal crop insurance programs and structural conditions such as market decisions and dynamics. Our data furthermore connects these market decisions and dynamics to other structural drivers like policy processes and broader politics, which also drive the agendas of policies (i.e., institutional conditions). Research from the Midwest region of the US, which has a high prevalence of corn and soybean monoculture systems, also highlights generally limited farmer financial flexibility and market dynamics as enablers of monoculture systems and constraints to diversified systems (e.g., Traldi et al. 2024). Monoculture systems also enable the very structural conditions that CSA practices are trying to address as co-benefits – unsustainable water usage and intensified usage of pesticides and fertilizers (Berka et al., 2001; Hatfield et al., 2011) – which drive the broader challenging structural conditions of fluctuating water availability, extreme heat and temperature change, wildfire, biodiversity loss (especially soil

biodiversity), and soil erosion. These structural conditions contribute to crop yield losses and increasingly harmful working conditions for farm workers, the latter of which affects the availability of farm labor and rural community vitality (Fernandez-Bou et al., 2021).

Our data also highlights enabling and constraining interactions for the structural conditions of limited farmer financial flexibility and high risk. Although the incentive structure of the CDFA CSA programs attempts to cover the full costs of implementing CSA practices, our data suggests that the costs of materials sometimes supersede program payments and that some farmers lack the resources to comply with the reimbursement structure of the program payments. Our data furthermore suggests that many farmers, especially under-resourced farmers, are not able to access the CSA programs due to structural barriers such as limited land access, lacking farm workers, and challenging economic situations that feed into the former two constraints. Land access is associated with increasing farmland consolidation, which our data attributes to competitive market conditions and a lack of existing institutional conditions that would regulate the farmland market. The lack of farm workers is attributed to constraining immigration policy and poor working conditions, the latter of which is enabled by climate change impacts like extreme heat and wildfire (Castillo et al., 2021).

In contrast to the complex system of interacting structural and institutional conditions that shape the agricultural landscape, CDFA's approach to addressing climate change through CSA programs is rather siloed. Our results emphasize the need for a more systemic approach to addressing climate change in agriculture that goes beyond focusing on mitigating GHG from agricultural operations and considers the interactions of structural and institutional conditions that consist of the general approach to the California agriculture sector. By considering these

interactions, ideally, a better system of public policies could be created or adapted to adjust the challenging aspects of agriculture that constrain efforts in addressing climate change (Rogers, 2008). Our data suggests that these policies could provide support to overcoming challenging structural conditions, including limited farmland access and consolidation, general economic challenges for farmers, monoculture crop or livestock systems, and broader social inequities that persist among farmers and their rural communities.

In particular, a few structural conditions are overarching drivers of structural conditions that constrain addressing climate change mitigation: market decisions and dynamics, policy processes, politics, and decision-making power. With market decisions and dynamics, our data demonstrate how markets play a significant role in affecting farmland access and harmful consolidation, enabling monoculture crop or livestock systems, and overall contributing to challenging, fluctuating, and risky economic conditions for farmers (Graddy-Lovelace & Diamond, 2017; Kelley & Lodoen, 1995; Leland, 2003). Our data highlight opportunities for addressing these challenges associated with the market, including solutions such as giving farmers more of a role in market decision-making and regulating the sale of farmland. Given the role of agricultural markets in shaping farmers' financial flexibility and access to farmland, the incentive structure of the CDFR CSA programs is ultimately responding to the constraining impacts of markets on farmers' financial flexibility. As such, addressing climate change mitigation on farming operations must especially prioritize addressing how market dynamics (i.e., changes in supply, demand, pricing, and other factors) related to agricultural commodities, land, labor, and other critical agricultural resources influence farmers and the further influence of

markets on policy process, politics, and associated decision-making power (Graddy-Lovelace & Diamond, 2017; Leland, 2003).

With policy processes, politics, and decision-making power, our data suggests that politicians, bureaucrats, and broader lobbying efforts related to agricultural policies tend not to represent farmers, especially under-resourced farmers (typically described as smaller farmers in the data), and in fact constrain farmers who want to take more actions to enhance their farming operations' environmental and financial sustainability. As with markets, our data suggest that incorporating farmer perspectives and voices better into decision-making associated with policy processes could help reorient policies towards farmer needs under climate change. Farmer advocacy groups already represent farmers' and farm workers' needs through lobbying efforts in policy processes, although whether this representation is enough for farmers may require deeper inquisition. Likewise, although the inclusion of farmers and their perspectives in policy processes is a necessary start to addressing climate change mitigation, this solution does not consider that farmers are not the individuals making decisions on policies. Furthermore, this solution may falsely assume that elected officials would listen to farmers if only they had the option to speak with each other, which contradicts findings in political science research demonstrating that economic elites and organized groups representing business interests hold much influence over policy agendas and that elected policymakers make policy decision related to their future electability (Gilens & Page, 2014; Grant, 2024; Mitchell & Munger, 1991). Rather, research assuming a critical perspective of the power dynamics of policy processes should inform how policy processes should change to adequately address climate change mitigation. Power dynamics shape the (re)production of structural and institutional conditions (Avelino,

2021; Heiskala, 2001), and thus highly shape the outcomes of policy processes (Birkland, 2019b). This research perspective includes considerations of who has the power to legally (and illegally) influence decision-making within the policy process, how these power dynamics overall inform policy agendas, who/what benefits from or is constrained by policy, and how these power dynamics support or do not support addressing climate change as a structural, complex problem (Chandra et al., 2017; Goldman et al., 2018).

### Conclusion

The current research examined the interactions of CDFA CSA programs with structural and institutional conditions in California that enable climate change and focuses on understanding how the CSA programs enable and constrain changes to structural conditions that contribute to (or enable) climate change and how structural and institutional conditions constrain CSA programs' abilities to address climate change. Our findings demonstrated that CDFA CSA programs enable farmers to adopt practices aimed at mitigating GHG emissions from farming activities, inputs, and technologies by providing financial incentives to account for farmers' economic constraints. Although the programs do benefit some farmers, the administration and design of the programs pose constraints for many farmers. Many of these constraints are also the result of structural conditions on the landscape, like limited access to farm labor, farmland, and economic resources (Prokopy et al., 2019b; Ranjan, Church, et al., 2019; A. P. Reimer & Prokopy, 2014a). These structural conditions are further enabled by other structural and institutional conditions in the landscape. For example, farmers have limited access to farmland due to market conditions that drive consolidation (Callahan & Hellerstein, 2022). Likewise, CSA programs do not address a multitude of structural conditions that contribute directly or indirectly

to climate change – monoculture crop and livestock individual farming systems, limited farmland access and increasing consolidation, limited labor access, market dynamics, and policy processes. Furthermore, a variety of institutional conditions exist on the landscape that enable these structural conditions. For example, Farm Bill programs like federal crop insurance enable monoculture systems that require certain inputs that emit GHGs (Kelley & Lodoen, 1995; Traldi et al., 2024).

Given the complex interactions between the CDFA CSA programs and other institutional and structural conditions that enable climate change, our data emphasized the need for a more systemic policy approach to addressing climate change mitigation that goes beyond the CSA programs. In addition to the CSA programs, a multitude of policy tools is needed to address the key structural conditions that enable climate change (Morath, 2014). Our data particularly emphasizes the influence of market dynamics and policy processes over a majority of structural and institutional conditions, with market dynamics in-part driving the policy process that then informs institutional conditions. We contextualized these dynamics in the discussion by explaining how adverse market dynamics in the 20<sup>th</sup> century, in combination with a neoliberal perspective among powerful elected officials who influenced policy processes, drove the creation of market-based programs in the Farm Bill to ultimately support farmers staying in business and broader food security in the US (Czarnezki & Fiedler, 2016; Graddy-Lovelace & Diamond, 2017). We described how, despite the Farm Bill's adaptations over time and its continued support by powerful elected officials (The White House, 2022), Farm Bill resources remain inaccessible for a majority of farmers in the US (Ayazi & Elsheikh, 2015; Fagundes et al., 2020; M. K. Johnson et al., 2018; McFadden & Hoppe, 2017; Young, 2023) and there has been a continued

decline in the number of farms and acres of land in farmland across the US (Callahan & Hellerstein, 2022; Gilbert et al., 2002; Horst & Marion, 2019; USDA-NASS, 2019), the latter of which is contrary to the original goals of the Farm Bill (Graddy-Lovelace & Diamond, 2017; McGranahan et al., 2013; Morath, 2014).

In the context of climate change, we contended that the CDFA CSA incentive programs that intend to address climate change mitigation operate similarly to Farm Bill conservation programs in terms of overlooking the root causes of agricultural problems. As such, our findings emphasized the need to integrate farmers and their perspectives into market decisions and policy processes. In addition to the need for a systemic, multi-policy approach to address the structural problem of climate change in agriculture and integrating farmers into market decisions and the policy process (Morath, 2014), we contended that a deeper examination of how power dynamics in the policy process affect structural conditions is needed (Avelino, 2021; Chandra et al., 2017). We argued that this research is necessary for adequately addressing climate change mitigation, as power dynamics ultimately shape the broader structural and institutional conditions that both drive and can be solutions to climate change (Avelino, 2021; Heiskala, 2001).

Key limitations to this research include the lack of direct farmer perspectives represented by the research findings outside of farmer advocacy group perspectives. Although we considered including farmers in these interviews, ultimately the growing and harvesting seasons were considered to be too major of constraints to participation (Baur, 2022). Rather than poorly attempting to include farmers in this research, future research needs to consider the usage of participatory action research (PAR) methods to engage farmers in meaningful research that empowers them to respond to the challenges they face in agriculture (Jackson-Smith & Veisi,

2023; Ozanne & Saatcioglu, 2008). The PAR manner of conducting research requires time and resources to support relationship and trust building between researchers and community research subjects (Cornish et al., 2023; Swantz, 2008), which are beyond the resources, experience, and capacity supporting the current research project.

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CHAPTER FIVE

BEYOND GREENHOUSE GAS MITIGATION: IDENTIFYING  
ADDITIONAL PRIORITIES FOR CLIMATE-SMART  
AGRICULTURE POLICIES IN CALIFORNIA

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Abstract

In efforts to address the contributions of and need for agriculture to adapt to climate change, federal and state governments in the United States are adopting the climate-smart agriculture (CSA) approach as defined by the Food and Agriculture Organization of the United Nations into climate change mitigation policies and programs. The state of California has established a suite of CSA incentive programs targeting greenhouse gas mitigation on farming operations. Although a recent evaluation of some of these efforts implies positive climate and natural resource benefits from these programs, family farmers and under-resourced farmers are still constrained from accessing the programs due to a variety of structural conditions. Our research suggests that a focus on greenhouse gas mitigation in these programs may ignore the variety of direct and indirect drivers of climate change that need to be addressed. This research examined the perspectives of CSA professionals' perceptions on what other priorities should be incorporated into the California CSA approach. Using semi-structured interviews with 16 professionals who engage with the California CSA programs, we found that the interviewees felt the CSA approach should include a variety of social and environmental priorities outside of GHG mitigation to further support addressing climate change mitigation and adaptation in agriculture. Our results suggest a need for a more holistic approach to CSA in California, which thereby implies a need for coordinated policies to address climate change and target family and under-resourced farmers, farm workers, and rural communities who are not well represented in policy decisions. We contend that future research should use a community-based participatory research approach with these groups to determine if and how grassroots efforts could address climate change mitigation.

### Introduction

In light of the increasing impacts to farmers from the changing climate, the United States (US) agriculture sector needs to adapt to and mitigate its contributions to climate change. In response to these needs, there has been a recent uptick in climate-smart agriculture (CSA) policies and government programs targeting greenhouse gas (GHG) emissions mitigation on farming operations. As defined by researchers working in the global south and the Food and Agriculture Organization of the United Nations, CSA is a transformational framework that addresses food insecurity under climate change and is centered on the following key priorities: mitigating GHGs, enhancing agricultural adaptations and associated resilience to climate change, and enhancing agricultural productivity to support farmer incomes and food security (FAO, 2010; Lipper et al., 2014). To address these priorities, CSA emphasizes disrupting conventional agricultural activities that contribute to climate change and broader natural resource degradation, including the intensification of agricultural inputs into farmland and monoculture crop and livestock systems. This approach consists of multiple activities, including evaluating barriers and identifying how to measure outcomes, enhancing adaptive capacities of governments and other organizations that support the CSA transformation, coordinating agricultural, environmental, climate change, economic, and other relevant policies to address climate change, and targeting and increasing financial incentives that promote the CSA transformation (Lipper et al., 2014).

In the US, federal and state policy solutions to climate change mitigation are explicitly labeled as CSA policies or programs that entail promoting GHG mitigation from agricultural inputs and technologies by incentivizing CSA practice and technology adoption. These practices consist of ‘nature-based solutions’ that sequester carbon, such as cover crops and permanent

habitats like hedgerows, and technologies that capture GHGs or replace fossil fuel-based sources like dairy biodigesters or solar-based irrigation systems (Daniels, 2022). Other CSA solutions include the creation of CSA commodity markets by the Biden administration to incentivize the production of climate-smart crops (USDA-FSA, 2022). The state of California has been the historic champion of CSA policies, having established a suite of CSA incentive programs for farmers in the early 2010s before NRCS linked their conservation practices to GHG mitigation (Berkeley Law, 2019; Lewis & Rudnick, 2019). These programs include the Advanced Manure Management Program, the Dairy Digester Research and Development Program, the Healthy Soils Program, and the Sustainable Water Efficiency Enhancement Program. To further aid farmer access to the programs, the state of California also established a Technical Assistance Provider Program that financially incentivizes technical assistance providers to aid farmers with applying to the CSA programs and then adopting the program practices or technologies (CalCAN California Climate & Agriculture Network, 2020).

A recent evaluation of CSA programs in California reflected positive outcomes for farmers who participated in the programs, with a majority of farmers perceiving environmental co-benefits from the programs, indicating intent to maintain CSA practices and technologies, and indicating that they adopted a CSA practice as a result of adopting program practices (Babin et al., 2024). However, evaluation results also demonstrated that the average family farmer and under-resourced farmer are not participating in the programs at as high of rates as farmers with larger farming operations. The evaluation also emphasized challenges with program administration processes that constrained farmer access to the programs, such as first-come-first serve application deadlines that primarily serve well-resourced, larger farming operations (Babin

et al., 2024). These trends are contradictory to the broader CSA framework as established by researchers that emphasizes equitably increasing income among farmers as part of enhancing agricultural productivity for food security (Lipper et al., 2014).

Concerns that California's CSA programs foster contradictory CSA priorities may be due to the California government highly prioritizing reducing GHG emissions from farming operations over other priorities. The focus of California CSA programs on GHG emission reductions is critical, given the role of agriculture in contributing to climate change. However, a GHG focus may ignore the other CSA that could enhance agricultural adaptation and productivity for equitable incomes and food security; this focus may also promote agricultural system 'greenwashing' that inherently contributes to climate change and natural resource degradation (Lalande, 2024; Rosenstock et al., 2016; Stabinsky, 2014). For example, the focus on GHG emissions reductions from farming operations may ignore GHG emissions produced from shipping agricultural products all over the world (B. B. Lin et al., 2011). Small-scale farmers that make up a large portion of family farmers in the US particularly are vulnerable to being left out of CSA efforts focused on GHG emissions due to not being the main contributors of GHG emissions in agriculture (Azadi et al., 2021). Furthermore, the lack of consideration for regional variation in the CSA approach may ignore the variation of climate change needs that exist across the landscape. For example, in California, agriculture is susceptible to wildfire impacts and extreme drought, whereas agriculture in the northeast region of the US is more susceptible to flooding (Pathak et al., 2018; Warner et al., 2017), necessitating different approaches to managing natural resources. Thus, CSA priorities need to be further defined and possibly expanded within the regions where CSA solutions are being applied.

The current study attempts to understand the potential for expanded CSA priorities for the state of California. We use the case of state CSA policies and programs as the pivotal point of discussion for what other priorities should be considered under the state's CSA approach. We use responses from interview data with a variety of professionals who engage with CSA policies and programs to identify these priorities. The research question specific to this research is:

1. Should additional priorities be included in California's CSA policy approach beyond the foci of GHG mitigation, adaptation, and agricultural productivity; if so, what should be (more) prioritized?

### Methods

Given the exploratory nature of this research, we approached addressing our research question through semi-structured interviews (Patton, 2014). Our methods consisted of the same methods presented in research chapter 3 and utilized the same interview dataset. We developed an interview guide with open-ended questions asking about climate change challenges for agriculture, potential opportunities for addressing climate change, how CSA programs' design and administration enable or constrain programs' goals, external factors to the programs that enable or constrain their goals, and needed priorities for the broader CSA framework utilized in California (see Appendix D for interview guide). Potential interviewees were initially identified through publicly available bios on websites, also identified by interviewees, and contacted via email about the interview participation. Interviews were conducted over Zoom or Microsoft Teams and then transcribed via Teams or Otter-ai software. This research is covered under Montana State University IRB Protocol #2024-1566.

The transcribed data was then analyzed in NVivo qualitative coding software. The analysis included the development of an initial inductive/deductive coding framework (Fereday & Muir-Cochrane, 2006) that included the following coding themes: structural and institutional conditions, specific CSA policies and programs, enabling and constraining dynamics, climate change challenges, and climate change opportunities. Two researchers initially used 2 (~10%) research transcripts to test the codebook and discuss its application to the data. Two rounds of testing and discussion ensued before the codebook was finalized, and then one researcher coded the remaining transcripts and synthesized the results (see Appendix E for coding framework; Church, Dunn, and Prokopy 2019). The results presented in this paper come from this analysis (see Chapter 4 Methods for more details).

### Results

A total of 16 agency staff, advocacy group staff, academics, and technical assistance providers participated in the interviews. Multiple interviewees help multiple roles (e.g., technical assistance provider and advocacy group staff), thus interview numbers are skewed to reflect these roles (see Table 3). When asked about whether new foci should be incorporated into the broader CSA approach in California, given the challenges in addressing agriculture faced by CSA programs and the broader agriculture sector, many interviewees described a variety of social and environmental topics.

Table 3: Number of Interviews by Interviewee Type; N=16

Interviewee Type	Number of Interviews
Academics	1
Advocacy Group Staff	6
Agency Staff	6
Technical Assistance Providers	6

### Social Priorities

Interviewees discussed the need to include foci around social/economic conditions, including farm community vitality, public health and related poor working conditions for farm workers, limited access to farm workers among farm managers, and general inequities around resource access among farmers. Specific to community vitality, interviewees described how supporting rural communities in which agriculture exists could broadly support the goals of CSA. For example,

“If we could switch the conversation about climate-smart ag, to also include the social aspects of a sustainable farm, which is more than just your soil. A sustainable farm is high quality jobs for people who you’re supporting, and it supports the whole community and provides workforce, or can support a workforce that can also support the soil. It’s not just about this carbon, this benefit, will make the more money for a farmer. If we could shift...what a climate resilient agricultural system looks like [that] includes both soil health and community health, and the community health means high paying jobs. It means not being exposed to pesticides. It means having access to health care and access to mobility. It’s a bigger picture of what a resilient ag...than just you’re storing more carbon.” – Agency Staff

Regarding public health, interviewees emphasized the need for increased access to health care among farmers and rural communities in addition to supporting the agricultural workforce and rural communities. For example,

“I think including elements beyond mitigation to develop a resilient agricultural system and to prioritize workforce and high-quality jobs and family sustaining jobs and access to health care in a way that supports the rural communities that [farms] are located in” – Agency Staff

One interviewee linked public health to poor working conditions for farm workers, who are often migrants, and discussed the need to address poor working conditions for farmers under the focus of public health.

“... responding to...our public health crises. I’m really thinking about the working conditions of our farm workers, folks who try to immigrate to this country to build better lives for themselves, who are then forced to work in conditions where they are spraying toxic pesticides and working in them. The hottest days without access to air conditioning or homes with [air conditioning]. They’re unhappy, they’re living in trailer in trailer parks or in trailers; that’s not sustainable.” – Advocacy Group

With limited access to labor and general inequities around resource access among farmers, some interviewees described the need to center equity in accessing resources in CSA and noted that California recognizes the need for centering equity in policy solutions for agriculture.

“Another is that we absolutely need to address the inequities of who gets access to federal and state programs. The Black Farmer Justice Act is really an attempt to try and address historical as well as ongoing discrimination against black farmers, but farmers of color. We have the Farmer Equity Act in California. Those are key pieces as well that we have to kind of marry climate activity with equity considerations, so that we’re not leaving a whole bunch of people out in California. The growing number of when we see new farmers, they are most often farmers of color, and yet, we don’t serve them nearly as well as we should and need to.” – Academic

### Environmental Priorities

Interviewees also described a few environmental topics that should be prioritized in CSA. Topics specific to different natural resources included biodiversity considerations and water management, suggesting that these objectives should be tied into CSA policies. For example,

interviewees emphasized the importance of soil biodiversity and reducing agricultural inputs that affect soil biodiversity:

“We’re starting to learn more about soil health dynamics, biodiversity, the microbes that are in soil. We’re starting to realize that there are some other really important things that we also need to be thinking about, whether it’s our microbial communities, the biodiversity even of our soils. But also, the use of fewer chemicals, which do actually emit greenhouse gas emissions, as well through production and even evapotranspiration. That hasn’t really been as much of a focus on climate smart tag. So, I think I’ll a lot of programs do even go beyond just CSA and do focus on like transition to organic production or to increasing on farm biodiversity or these other kind of practices that can go in tandem with greenhouse gas emission reduction.” – Technical Assistance Provider

Interviewees also suggested managing water through CSA policies. For example,

“Looking at improving increased water holding capacity or reducing erosion runoff, etc., there’s a lot there that could be dug into potentially even tying it to bigger efforts around water conservation efforts like SIGMA. Is there a tie there? Could the government take a more proactive stance and try to make ties between the benefits of climate smart agricultural practices that could impact groundwater? And the planning that groundwater sustainability agencies are the plans they’re coming up with could factor that into those efforts.” – Technical Assistance Provider/Advocacy Group

Some interviewees also discussed the need for CSA to be more holistic in considering the interconnectedness of climate and natural resources. One emphasized this need along with the siloed nature of policy solutions addressing different structural problems related to climate change mitigation. For example,

“Traditionally a lot of these programs and policies have been developed in these silos that do focus on these singular issues, whether it’s emissions reduction or water efficiency or farm worker safety even. But I think we’re starting to finally acknowledge how interconnected all of these topics are, and I think finally, the state is starting to talk about regenerative ag, figuring out how to define it, how to potentially quantify it... But I think we’re finally starting to even move beyond just emissions reduction, which I see is a really good outcome because we definitely can’t solve our climate crisis if we’re not focusing on water efficiency or, ... allowing for biodiverse, environmental communities to thrive.” – Technical Assistance Provider

In addition to perspectives about introducing new or emphasizing current CSA foci, some interviewees perceived the CSA approach as fine as is. One interviewee explained this perspective and described how climate change mitigation should be addressed in the short-term, while other structural issues on the agriculture landscape will require a much longer time frame to address. For example,

“I think it’s important not to try to solve or not to define success as solving every problem affecting agriculture and trying to lump that all under one bucket. Because I think that just sets us up for failure. I agree with the goal of [a] long-term goal of getting to a point where we stop having consolidation and make farming less of a survivalist occupation, but I anticipate that that journey is at least another century. We have 20 years to solve the climate part of that... If we lose any more small farmers, that has been happening for 100 years and is going to continue to happen. It’s really hard and it’s like there’s should be grief with that. But if we don’t solve the 20-year crisis, that part of saving family farms is going to become impossible.”  
– Advocacy Group

### Discussion

Our findings generally demonstrated that our interviewees felt that California’s CSA approach should address broader social and environmental conditions that exist on the agricultural landscape. In addition to identifying a variety of social priorities – farm and community viability, public health and poor working conditions for farm workers, and general constraints to accessing critical resources among farmers – our findings highlighted a need for CSA to further prioritize natural resource conservation related to biodiversity and water. More broadly, our findings called for approaching CSA more holistically – as illustrated by interviewees who explicitly discussed siloed policy approaches to CSA in California and interviewees who discussed a need to address social and economic structural conditions on the agricultural landscape. This perspective is also highlighted in other qualitative research, which

emphasized the potential for USDA-NRCS CSA strategies (i.e., conservation programs that incentivize CSA practice and technology adoption) to increase the vulnerability of farmers by not holistically addressing the agricultural conditions that drive and indirectly drive GHG emissions (Lalande, 2024). These direct and indirect drivers of GHG emissions include monoculture crop farming operations that use GHG-emitting fertilizers and fuel-based technologies and livestock operations (Hatfield et al., 2013; Rojas-Downing et al., 2017). Lalande's (2024) study, which examined CSA professionals' understanding of the CSA framework and its limitations, highlighted the limitations of USDA's approach to CSA in addressing equity concerns in agriculture. The research specifically discussed the limitations of under-resourced farmers in accessing USDA-NRCS resources as constraints, as well as Tribal perspectives about climate and natural resource management, that are not considered under the CSA framework (Lalande, 2024). Our findings add to these concerns by emphasizing the need to address inequities among farm workers and farmers and the need to consider the vitality of rural communities under CSA.

Structural conditions (i.e., resulting from interacting policies, their decision-making organizations, social relationships, and connections) such as those mentioned in our findings (see Chapter 4; e.g., limited access to key agricultural resources like labor and government resources; limited access to land and financial resources) relate to the social factors presented above, and are well documented by research. Limited access to land and labor are persistent issues in agriculture, with labor being limited by impacts from climate change that contribute to poor working conditions (Castillo et al., 2021; Pfeffer, 1992) and immigration policy that fluctuates and at times constrains travel for migrant workers (Farnsworth, 2020; Neef, 2020; Schnepf & Monke, 2020; Zahniser et al., 2018). Access to land has also been severely limited among family

farmers and under-resourced farmers (Ayazi & Elsheikh, 2015; Callahan & Hellerstein, 2022; Figueroa et al., 2020; Gilbert et al., 2002; Horst & Marion, 2019; M. K. Johnson et al., 2018), with generally 40% of farmland in the US being rented and over 80% of farmland being operated by only 4% of all farmers in the US (Bigelow et al., 2016; USDA-NASS, 2019).

The average farm and under-resourced farmers' limited access to financial resources have persisted on the landscape, fluctuating especially since the Dust Bowl and Great Depression (Browne & Paik, 1994; Graddy-Lovelace & Diamond, 2017) and in more recent years, since the market crash of 2008 and the Coronavirus Pandemic of 2020 (Hart et al., 2020; Schnepf & Monke, 2020; Schulz & Hart, 2020). A majority of Farm Bill resources for farmers, including federal crop insurance, commodity subsidy loans, conservation programs, and farmland ownership programs are not accessed by the average family-farmer or under-resourced farmers due to the aforementioned structural constraints in addition to incompatibilities between farmers' operations, timelines, and finances with the structures, timing, and eligibility requirements for the programs that distribute the resources (Asare-Baah et al., 2018; Ayazi & Elsheikh, 2015; Fagundes et al., 2020; Jablonski et al., 2022; M. K. Johnson et al., 2018; A. P. Reimer & Prokopy, 2014b; Young, 2023). Rather, these resources are heavily concentrated towards larger family farms and agribusinesses (Belasco & Smith, 2022; McFadden & Hoppe, 2017). Our results demonstrate a need for resources to be more equitably dispersed among farmers to better address GHG mitigation from farming operations across the landscape, as opposed to focusing on large farming operations.

Our findings show that the general trends in limited access to land, labor, economic, and government resources among family farmers and under-resourced farmers are concerning, given

that the very CSA resources being discussed are provided by the government and the former structural conditions constrain farmer access to government resources. Our findings call for the CSA approach in California to include addressing these structural conditions. Together with other research on this topic, our findings beg the question: *how is the state of California's approach to CSA supposed to effectively address structural challenges when they also feed into constraining farmer access to government resources?* This is an apparent paradox that necessitates policy reform to support farmers' access to government resources, including CSA resources.

#### Realistic Timelines: Climate Change vs. Social Change

Much of our interviewee results suggest a need for the CSA approach used in California to be more holistic, both in terms of social and environmental conditions related to climate change. However, some interviewees emphasized the short timeline needed to address climate change, which juxtaposes the longer timeline that would be needed to address challenging structural conditions like limited access to land among farmers. Indeed, climate change impacts in California are increasingly intense and frequent and causing harm not just to the agriculture sector and rural communities as noted by our interviewees, but also to the general public (e.g., urban areas in California are experiencing increasing heat indexes under climate change) (Vahmani et al., 2019). It is imperative to address climate change in an urgent manner (Zurek et al., 2022); however, as a structural issue, climate change is driven by complex interacting structural and institutional conditions (i.e., policies, their processes, and the formal and informal organizations that administer and/or make decisions about these policies/processes) (Brownstein et al., 2022; Jacobson et al., 2017). For example, federal crop insurance, which has historically only supported commodity crops or livestock, incentivizes monoculture systems (Traldi et al.,

2024) on which many farmers have used GHG-emitting fertilizers that feed into climate change and natural resource degradation (Hatfield et al., 2013; Kelley & Lodoen, 1995). As aforementioned, access to economic resources, land, and labor impacts farmers' abilities to access government resources, including CSA resources. The complexity of climate change necessitates a complex solution (Jacobson et al., 2017). Time is likewise a critical factor, and unfortunately, institutional decision-making, particularly at the federal level, is slow and cumbersome. Moreover, the decisions of policymakers in agricultural policy have continued to reflect siloed approaches to addressing agricultural problems that encourage solutions that do not fully disrupt the root causes of agricultural problems (Czarnecki & Fiedler, 2016; Graddy-Lovelace & Diamond, 2017; Leland, 2003).

### Policy and Grassroots Opportunities

Despite the constraints of current policy solutions, there is still potential for holistic policies to address climate change. As aforementioned, the complexity of climate change as a problem necessitates a complex solution. In particular, a holistic policy approach with coordinated agricultural, environmental, economic, and other relevant policies could address the challenging structural conditions under which farmers need to address climate change (Lipper et al., 2014). Policies targeting average family farmers, farm workers, and under-resourced farmers could more explicitly address access to land, labor, and economic resources among farmers by providing direct incentives for these resources. Policies could also further target rural communities with resources that support rural vitality. Although not discussed in the findings of this research, other research points to fluctuating market dynamics as challenging for farmer financial flexibility (Graddy-Lovelace & Diamond, 2017; Leland, 2003) and also drive farm

bankruptcies and farmland consolidation on the agricultural landscape. Fluctuating market dynamics, which in-part drove farmer hardships during the Great Depression in the 1930s and the coronavirus pandemic of 2020 (Graddy-Lovelace & Diamond, 2017; Schnepf & Monke, 2020), ultimately need some government intervention that would mitigate harmful impacts on farmers.

State and federal governments are increasingly engaging with the structural and institutional problems faced by farmers. For example, California recently passed a bill that established a cooperative farming equipment-sharing program hosted by CDFA, which attempts to address farmer issues related to farming equipment access (Larson, 2023). California additionally established an Agricultural Land Equity Task Force to assess farmland access issues among farmers and provide recommendations for addressing these issues through public policy (Kennedy & Frazier, 2024). At the federal level of government, the USDA Equity Commission was also recently established to assess USDA policy, practices, and institutional structures that may contribute to unintended racial, ethnic, gender, class, and other types of social discrimination (USDA, 2024). These opportunities, while new, are promising for potentially identifying new strategies for holistically addressing structural problems faced by farmers.

Given the challenges associated with climate change timescales and government decision-making, in addition to a history of policymakers supporting policy agendas that better serve agribusiness, retailer, and processor agendas than family farmers (Gawande & Hoekman, 2006; Grant, 2024; Leland, 2003), grassroots efforts for addressing climate change are necessary. These efforts should emphasize the perspectives and needs of family farmers, farm workers, under-resourced farmers, and associated rural communities, as the needs of these groups could be

better represented in policies, especially the middle two of the groups. Given the limited representation in policies, the relationships of advocacy groups with these particular actor groups likely need to be examined to understand how advocacy groups are able to represent farmers and rural communities and if farmers and rural communities desire different representation. For researchers to engage with farmers and rural communities in determining what grassroots efforts should be, a participatory action research (PAR) approach could be used. PAR as an approach emphasizes the involvement of disempowered communities in research pertaining to advocacy and change for those communities, such that communities are equal partners with researchers on the project and play a significant role in designing the action-oriented goals of the research (Cornish et al., 2023; Swantz, 2008). This necessitates communities and researchers defining research objectives, questions, methods, analytical frameworks, and action-oriented outputs together, such that the research being done serves to meaningfully benefit the community through social action (Ozanne & Saatcioglu, 2008). As a type of informal community, farmers and farm workers should be involved in research that is meant to address the conditions they are living under. Rural communities, as places where agriculture takes place and thus, as places that are affected by agriculture, should be included as a community in this research. Given this need, research in future grassroots efforts to address climate change mitigation should take a PAR approach. Researchers should anticipate challenges with implementing this research, as under-resourced farmers already face a plethora of barriers to participating in key government programs for farmers. Thus, all potential research partners should consider developing strategies to enhance participation among the most marginalized of farmers and rural community members

in potential PAR projects (e.g., bringing research activities directly to farming operations of under-resourced farmers).

### Conclusion

Our research used the case of California in the US to examine perceptions of CSA professionals related to potential additional priorities within the state's CSA that go beyond or emphasize the current priorities (GHG mitigation, agricultural adaptations and resilience, and agricultural productivity for equitable incomes and food security). We analyzed semi-structured interviews with 16 professionals who engaged with CDFA CSA incentive program for farmers to answer this question. Our findings included interviewee discussions that point to a need for California's CSA approach to address community vitality, public health, poor working conditions for farm workers, access to labor and general resources, and broad social inequities on the agricultural landscape. In terms of environmental needs, our findings included specific calls for biodiversity and water to be more central priorities, with a more general call for CSA priorities to be more holistic in addressing climate and natural resources together. Although some findings drew critical attention to the urgency of climate change in contrast to the slowness of addressing social issues such as farmland access and consolidation, the complex nature of climate change as a structural problem necessitates a complex approach that considers the direct and indirect drivers of climate change (Brownstein et al., 2022; Jacobson et al., 2017). Overall, these findings demonstrated a need for a more socially and environmentally holistic approach to CSA that centers the needs of farmers and rural communities in addressing climate change.

To achieve a more holistic approach, we recommend research on the coordination of multiple policies relevant to agriculture and climate change to more explicitly target agricultural

drivers of and constraints to addressing climate change (Lipper et al., 2014). Future policy approaches could specifically target family farmers, farm workers, under-resourced farmers, and rural communities, all of whom are vulnerable to the impacts of climate change. Likewise, the role of markets in contributing to agricultural conditions that constrain addressing climate change needs to be considered in future research (Graddy-Lovelace & Diamond, 2017), as well as potential opportunities for market change that would support farmers continuing to farm while mitigating GHG emissions. Given the slowness of bureaucracy and the overarching power of politicians in deciding the nature of policy solutions, grassroots efforts among farmers, farm workers, and rural communities to address climate change mitigation need to happen simultaneously with policy change. To understand the nature of these movements, researchers should consider answering these questions with farmers, farm workers, and rural communities using a PAR approach that centers these groups as equal partners in the research (Mulrennan et al., 2012). A PAR approach to understanding how these groups could collectively take an initiative in addressing climate change requires that these groups define their problems and needs and decide how they want to address the two (Ozanne & Saatcioglu, 2008). Research partners will need to co-develop key strategies for engaging farmers and rural community members who are under-resourced or marginalized in any PAR projects. These strategies might include meeting with under-resourced farmers on their farming operations (i.e., bringing the research activities to the farmers rather than expecting farmers to come to the research activities [Biggs, 1989; Jackson-Smith & Veisi, 2023]).

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## CHAPTER SIX

## CONCLUSION

Dissertation Recap

This dissertation sought to understand how power dynamics among actors and broader structural and institutional conditions affect how farmers can access California Department of Food and Agriculture (CDFA) climate-smart agriculture incentive programs based in the state of California, United States (US), which aim to reduce greenhouse gas (GHG) emissions contributing to climate change from farming operations. This examination focused primarily on power dynamics in the implementation stage of the CSA programs and secondarily focused on decision-making in the agenda-setting stage. Farmer access (or lack thereof) to government programs critically impacts the overall outcomes of government programs; thus, farmer access to CSA programs is relevant for assessing program outcomes. Farmers who access and participate in programs are able to mitigate GHG emissions through CSA practices and technologies from their farming operations whereas farmers who cannot access programs may not adopt these mitigative practices and technologies, thus constraining program outcomes. Furthermore, the state of farmers' access to government resources holds equity implications. In contrast to farmers who cannot access CSA programs, farmers who participate in CSA programs receive financial benefits and environmental co-benefits for their operations. To contextualize trends in access to government resources among farmers, this dissertation also sought to understand how agricultural policy solutions for agricultural problems historically emerged through a neoliberal political-economic approach to policymaking in the US.

As a structural and complex problem, climate change stemming from agricultural activities, inputs, and technologies necessitates a complex approach to address it. Through using the lens of power dynamics and considering the complex influences of structural and institutional conditions in determining farmer access to programs, this dissertation further sought to critically understand gaps and opportunities in CSA programs' ability to address GHG mitigation related to climate change. Finally, within these gaps and opportunities, this dissertation sought to identify future foci for the California CSA approach to consider that would more holistically address GHG mitigation on farming operations.

In this conclusion chapter, I synthesize findings from Chapters 2-5 to broadly understand how the administration process of CSA programs enables or constrains program access among farmers, how other structural and institutional conditions enable and constrain farm access and the broader GHG mitigation goals of the programs, and if and what foci should be included or further emphasized in the CSA approach used by the state of California. I discuss how the results of these chapters suggest a need for new policy approaches and incorporating farmer perspectives into policy solutions to address climate change mitigation and adaptation on farming operations. I then describe various future considerations related to policy approaches, decision-making, and research. I emphasize how research results necessitate participatory action research (PAR) approaches with farmers, farm workers, and rural communities to direct future solutions for climate change mitigation and adaptation on farming operations. I also use the findings of this dissertation to discuss the potential implications associated with emerging policy solutions for managing climate change mitigation and adaptation in California.

### Findings Overview

Chapter 2 explored the role of policymakers in shaping agricultural policy solutions through a neoliberal political-economic approach during the agenda-setting stages of the Farm Bill policy process. This chapter reviewed peer-reviewed scholarship and grey literature documenting the creation and adaptation of the Farm Bill to correct the negative effects of market dynamics on farm viability as well as policymakers' rationales for upholding Farm Bill solutions despite continued declines in farm viability. Chapter 3, the first research chapter, examined the role of power dynamics in shaping CDFA CSA program access among farmers, with a focus on how institutional conditions directly related to the CSA programs and CDFA enable or constrain program access according to my research data. This chapter utilized a qualitative approach to address these research objectives, using first semi-structured interviews with a variety of CSA program actors. Chapter 3 answered the following research questions:

1. Who is enabled and constrained to participate in CDFA CSA programs, and by what mechanisms of power?
2. What are the social outcomes of these enabling and constraining dynamics?

Chapter 4, the second research chapter, examined how CDFA CSA programs enable or constrain farmers' abilities to address climate change in the context of other structural and institutional conditions. This chapter used semi-structured interviews with professionals who engaged with the CDFA CSA programs. This chapter answered the following questions:

1. How do CSA programs interact with structural and institutional conditions to enable GHG mitigation?

- a. How do CSA programs enable or constrain structural and institutional conditions to mitigate GHGs through program participation?
- b. How do these structural and institutional conditions enable or constrain farmers' access to CSA programs and the programs' ability to mitigate GHGs?

Chapter 5, the final research chapter, utilized the same methods as Chapter 4 to identify emerging foci for the California CSA approach to addressing climate change mitigation in the agriculture sector. The following research question was asked in this chapter:

1. Should additional priorities be included in California's CSA policy approach beyond the foci of GHG mitigation, adaptation, and agricultural productivity; if so, what should be (more) prioritized?

In Chapter 3, I found that due to the instability of the funding source that supports the CSA programs and their administration, CDFA is constrained from enhancing their human resources and thus, constrained in how they can administer the CSA programs. As a result of these constraints, CDFA adjusted elements of program administration to meet their limited capacity, including establishing application deadlines for the program that gives out the highest number of grants on a first-come-first-serve basis, limiting program materials produced to only in written English language, and generally being unable to adapt to changes requested by technical assistance providers and farmers. The results furthermore demonstrated that external structural (e.g., limited land access) conditions contribute to farmer constraints in accessing CSA programs. Moreover, certain public policies make it difficult for farmers to access the CSA programs. In this chapter, I discussed the critical need for empowering farmers in order to

enhance access to CSA programs, with a specific call for research that would examine how to foster power among farmers.

The specific needs of Chapter 3 fed into the objectives of Chapter 4. Based on the accessibility constraints posed by the administration of the CSA programs and how broader structural and institutional conditions affect program access, the second research chapter examined interactions of external structural and institutional conditions that contribute to climate change within the context of CSA programs. The research objectives for this study included examining; 1) how CSA programs enable or constrain structural and institutional conditions to mitigate GHGs through program participation, and 2) how structural and institutional conditions enable or constrain program access among farmers and CSA programs in addressing climate change.

The results of Chapter 3 demonstrated how CDFA CSA programs attempt to address the structural problem of climate change by focusing on mitigating GHGs from farming operations. The CSA programs enable farmers to adopt CSA practices and technologies that capture or mitigate emissions via carbon sequestration, methane capture, and solar-powered irrigation systems by having farmers adapt agricultural activities, inputs, and technologies that emit GHGs. The incentive structure of the program attempts to enable change to economically challenging situations that farmers face (i.e., a constraining structural condition) that would otherwise prevent them from adopting CSA practices. However, within this social-ecological system that contributes to climate change, I identified a plethora of structural and institutional conditions that indirectly and directly contribute to the challenge of addressing agriculture climate change and are not directly addressed by the CSA programs. Furthermore, these structural and institutional

conditions, which both interact with each other to feed into the climate change challenge, constrain the intended outcomes of the CSA programs by preventing program access by some farmers or constraining GHG mitigation on farming operations. For example, CSA programs attempt to address agricultural inputs like fertilizers that produce GHG emissions but do not directly address monoculture crop farming operations, which often require the same inputs the programs are trying to reduce (Hatfield et al., 2013). Monoculture systems are enabled by various agricultural policies, trade policies, and market dynamics, as demonstrated by this research's findings and other research about the barriers and opportunities to diversification in the Midwest (Traldi et al., 2024).

Within this social-ecological system of structural and institutional conditions that contribute to climate change, two cruxes of structural conditions exist that seem to overarchingly drive the state of institutional and structural conditions: 1) market dynamics, or changes to supply, demand, pricing, and other aspects of markets for agricultural commodities and resources, and 2) associated decision-making and broader policy processes and associated decision-making power. Market dynamics highly enable (and constrain) the types of crops and livestock produced by California farmers, and feed into the policy process to inform agricultural and trade policies (Graddy-Lovelace & Diamond, 2017; Leland, 2003). The types of crops and livestock enabled by market dynamics include those that are water-intensive or produced on monoculture farming operations and align with consumer demands, as described by Chapter 4 interview findings. Opportunities for addressing the markets' role in climate change included a need for some type of regulation on farmland markets and incorporating farmers into decision-making related to relevant markets for agricultural commodities and resources. Furthermore,

findings from Chapter 4 also highlighted how individual and group power over decision-making in the policy process informs institutional solutions to climate change mitigation (i.e., environmental regulations, agricultural policy, water policy, etc.). However, my data point to a few structural and institutional conditions that enable or constrain policy processes and associated power dynamics. Like with markets, my data suggested that farmers and their perspectives need to be better integrated into policy processes, suggesting a need for research on these solutions based in the policy process through the lens of power to understand how policy processes and competing actors shape policy agendas to address climate change mitigation (Calo, 2020).

The findings of Chapter 5 emphasized a need for more foci included in the California CSA approach to holistically address climate change mitigation and adaptation in California agriculture. Emerging foci to potentially incorporate into an adapted CSA approach included social foci, such as farm and community viability, public health and poor working conditions for farm workers, and general constraints to accessing critical resources among farmers, and environmental foci like enhanced soil biodiversity and water management. The integration of more social foci into CSA foci aligns with research findings suggesting that the original CSA foci – enhancing GHG mitigation, agricultural adaptations and resilience, and agricultural productivity and incomes – are not adequate enough in considering the needs of smaller-scale farmers, as they are not the primary drivers of GHG emissions in agriculture (Azadi et al., 2021).

Together, the findings and synthesis of the research chapters highlight how CDFR CSA programs serve as a siloed approach to addressing GHG mitigation on farming operations, which are defined in this research as a structural condition that contributes to the structural problem of

climate change. Due to the structural nature of climate change that results directly and indirectly from a variety of structural and institutional conditions on the agricultural landscape, the CDFA CSA programs are unlikely to address climate change holistically. These structural and institutional conditions interact to more broadly constrain farmers' abilities, or power, to address climate change. If pursuing a goal of mitigating GHGs contributing to climate change from farming operations, the California approach to CSA should consider further engaging with structural and institutional conditions that constrain the ability of farmers to mitigate and adapt to climate change as potential new foci in addition to current priorities (i.e., enhancing GHG mitigation, agricultural adaptation and resilience, and agricultural productivity and incomes).

#### Power Dynamics, Policy Process, and Market Dynamics

In particular, Chapters 3 and 4 emphasized power dynamics relative to different stages of the policy process. Chapter 3 demonstrated how power dynamics in the implementation stage of the policy process for CDFA CSA programs play a critical role in shaping the broader outcomes of the programs. The chapter emphasized how the top-down administration process of government programs overarchingly holds power over their targeted audiences and how the manner of administration can enable or constrain these audiences from accessing the resources of these programs. Other institutional and structural conditions outside of the process can also enable or constrain these audiences' abilities to access government programs. In the case of CDFA CSA programs, under-resourced farmers are likely constrained from accessing the programs due to a lack of key resources (and thus, a lack of power), while farmers with larger operations are likely to be enabled to access the programs due to having adequate resources (and thus, enough power). Although not explicitly focused on power dynamics as an analytical lens,

Chapter 2 briefly discussed how power dynamics that overarch decision-making related to policy creation and adaptation – i.e., the agenda-setting and adaptation stages of the policy process – drive which agendas get incorporated into policy. Specifically, findings suggested that agricultural lobbying interests – which tend to represent conventional, agribusinesses (Grant, 2024) – compete against farmers who may be interested in adapting to climate change, implying that these lobbying interests constrain farmers’ abilities to adapt to climate change by enabling the agendas of agricultural policies to favor conventional agriculture interests.

As demonstrated by Chapter 2, which discussed the agenda-setting and adaptation stages of the policy process, the very act of defining a problem requires competition between actors of competing interests, such that actors who hold the most power are more likely to influence the agendas of policies (Birkland, 2019b; Hilgartner & Bosk, 1988). Furthermore, how problems are defined feeds into 1) how problems are addressed and 2) who benefits from the solutions to the problems (Hilgartner & Bosk, 1988). The continued emphasis on neoliberal approaches to managing agricultural solutions, as documented in Chapter 2, highlighted how policymakers chose not to regulate market dynamics that underly farmers’ access to farmland ownership and associated financial constraints. These decisions were highly influenced by agribusinesses – large, business farming operations that compose a minority of farmers but represent immense labor and wealth in the agricultural sector (Gawande & Hoekman, 2006; Grant, 2024) – retailers, and processors. In California, agribusinesses juxtapose most farmers, who are family farmers working on small to medium-sized operations and tend to be represented by farmer-led or farmer-participating advocacy groups in the agenda-setting stage of the policy process (Pahnke, 2024; USDA-NASS, 2022b). Despite the presence and role of farmer advocacy groups in

lobbying activities, research suggests that advocacy groups with less power over agenda-setting (i.e., groups with fewer resources) tend to have fewer of their agenda items incorporated into policy agendas (McCullum et al., 2003). It is critical to recognize that within agriculture, not all advocacy groups are equal in terms of who holds the power to affect policy agendas. Given the persisting emphasis on agribusiness, retailer, and processor agendas in agricultural policy, declines in the numbers of family farms in the US (Callahan & Hellerstein, 2022; USDA-NASS, 2019), and general trends of limited farmer access to government resources, it is likely that the market-based policy approach utilized in the CSA programs may not best serve family farmers in California.

Although research chapters 3-5 did not explicitly examine the agenda-setting stage of the CDFA CSA programs, the context of Farm Bill agenda-setting described in Chapter 2 provided critical implications for these CSA programs. The utilization of market-based approaches by CDFA and the broader state of California to address climate change mitigation and adaptation on farming operations akin to Farm Bill programs, rather than taking more direct interventions in market dynamics, mimics historical Farm Bill policy decisions by policymakers to uphold economic activities and processes over adequately addressing systemic agricultural problems related to inequity and climate change. As such, the institutional and structural constraints to program access among under-resourced farmers, as described in Chapters 3 and 4, are likely symptoms of favoring economic presence over farmer and farm viability. However, more research on this subject is necessary to draw this conclusion. Given these institutional and structural constraints to program access among farmers found in my research, the potential

outcomes of these CSA programs thus may be constrained from adequately mitigating GHG emissions from farming operations.

Future Approaches and Research: Complexity, Policy Solutions,  
and Power

Given the complex nature of how structural and institutional conditions interact to enable climate change (Giddens 1999; Jacobs, Van Witteloostuijn, and Christe-Zeyse 2013), a complex approach must be used to address the root causes of climate change (Hirsch et al., 2011; Morath, 2014; Pastor et al., 2020). CSA, as a transformational approach to addressing climate change in agriculture (FAO, 2010), points to a variety of activities to address climate change. These activities include research that builds evidence and assessment tools, activities that strengthen national and local institutional adaptive capacity, coordination of agricultural, climate change, environmental, and food system policies, and increases and improvements to the financial resources that support CSA. Ultimately, these activities are supposed to support the three foci of CSA: 1) mitigating GHG emissions from agricultural activities, 2) adapting agricultural activities for resilience in light of climate change, and 3) enhancing agricultural productivity to support food security and equitable farmer incomes (Lipper et al., 2014).

Research activities I recommend are based on the findings of the current dissertation research and relate to farmers' abilities to influence policy agendas. The agenda-setting stage of the policy process is where problems are defined and associated solutions are determined. Prior research stresses the dominance of powerful agribusinesses, food retailers, processes, and other agricultural actors in setting the agendas of agricultural policy (Grant, 2024; Leland, 2003). Research also emphasizes the personal agendas of policymakers, noting that while lobbying

efforts do impact the agendas of public policy, policymakers are primarily concerned with how their decisions impact their future electability, and vote accordingly with that risk assessment (Gawande & Hoekman, 2006). Likewise, numerous examples of presidents, their administrations, and congresspeople approaching agricultural policymaking through a neoliberal lens demonstrate the value-laden nature of decision-making in the policy process (Czarnezki & Fiedler, 2016; Graddy-Lovelace & Diamond, 2017; Leland, 2003; A. Reimer, 2015). Thus, future research should examine how farmers and rural communities in which agriculture is based can influence the policy process beyond (or in addition to) current advocacy group efforts.

This objective suggests a participatory action research (PAR) approach, which approaches research with communities by giving communities equal partnership in all phases of the research, from the defining of research objectives and questions to the production of action-oriented research outputs (Ozanne & Saatcioglu, 2008). I suggest that PAR is an ideal approach to research with disempowered communities, such as general family farmers and especially under-resourced farmers, as the approach attempts to mitigate researcher bias and missing context from traditional, western-based research methods and is centered on producing social action from the research (Swantz, 2008). These biases and missing context have historically downplayed and further exacerbated constraining situations for disempowered communities, and by giving communities more agency and power over the research process, communities can help researchers avoid making these biases or missing important context to inform meaningful interventions (Wallerstein & Duran, 2010). PAR requires time for trust-building and reciprocity between researchers and communities as research subjects (Cornish et al., 2023; Swantz, 2008), and more understanding is needed about how to include already resource-strapped farmers in

PAR processes. A carefully co-designed PAR approach to understanding how to better include farmers and their perspectives in the agenda-setting stage of the policy process could also include opportunities to quantify the enabling and constraining dynamics of the various structural and institutional conditions that drive climate change, especially significant conditions such as defined by farmers and rural communities. Ultimately, just as my dissertation findings emphasize the need for farmers to be more included in decision-making related to the policy process and market management, research should also reflect the inclusion of farmers and rural communities beyond consultants and as partners who can and should define their own problems and how research and policies should benefit them (Baldwin, 2012; Pastor et al., 2020).

Regarding enhancing institutional adaptive capacity, findings from Chapter 3 imply the need to ensure government agencies are adequately supported to then enable farmers' access to critical government resources that support climate change adaptations. Likewise, supporting other institutional organizations' – such as technical assistance providers – adaptive capacity to aid farmers in connecting to key resources is crucial (D. Johnson et al., 2023). The findings of the overall dissertation and the recent evaluation of the CDFR CSA programs demonstrate the critical nature of technical assistance providers in supporting farmer access to the program by helping them overcome the bureaucratic hurdles of the application process, implement CSA practices, and complete monitoring and other activities required of the programs (Babin et al., 2024). However, my dissertation research also implicates technical assistance providers, much like CDFR and the farmers, as lacking adequate financial resources to support expanding their own human capacities. Without adequate financial and human resources, technical assistance providers are constrained in the quality and quantity of support they can provide for farmers (D.

Johnson et al., 2023). Thus, enhancing institutional adaptive capacity in the case of California applies to CDFA and technical assistance organizations.

In particular, the findings of this dissertation research emphasize the needed coordination of a variety of policies to address climate change mitigation. Siloed approaches to mitigating GHGs from farming operations may fall short of fully addressing the structural and institutional conditions that directly and indirectly contribute to climate change (Morath, 2014), such as in the case of CSA programs. For example, the particular emphasis on agricultural conservation or climate change policies to address natural resource degradation and GHG emissions from farming activities, inputs, and technologies, and limited economic resources among farmers falls short of fully addressing the high prevalence of monoculture crop and livestock farming operations that require inputs and technologies that emit GHGs (Daniels, 2022; Hatfield et al., 2013). Rather, identifying the key structural and institutional conditions that enable agricultural problems like climate change and quantifying the extent to which these conditions impact farmers could feed into informing a coordinated policy approach (Hilgartner & Bosk, 1988; Pastor et al., 2020). This potential research could then feed into the improved targeting of financial resources to farmers and associated rural communities, particularly under-resourced farmers and communities, with limited resources that constrain their ability to address climate change mitigation.

#### Current and Upcoming California Institutional Opportunities

While producing this research, CDFA has made critical changes to the administration of the CSA programs reflecting needed program changes identified in this research. The most salient change has been the removal of the first-come-first-serve application deadline for the

Healthy Soils Program. Both this program and the State Water Efficiency and Enhancement Program are now administered as block grant programs, which essentially allow eligible technical assistance organizations to apply for funds and then disperse funds to farmers interested in the Healthy Soils and State Water Efficiency and Enhancement Programs. This change in program administration is meant to accelerate the administration process and provide opportunities for technical assistance organizations to coordinate aiding farmers with adopting CSA practices (National Nut Grower, 2023). It is possible that the block grant administration of the programs will enable better adaptive capacity among technical assistance providers, although this potential outcome is also a matter of whether technical assistance providers are being properly compensated to administer the programs. Prior research demonstrates that organizations with less human resources may face greater challenges in accessing government block grant opportunities than those with more human resources (Collins et al., 2016), implying the potential for inequitable access among technical assistance organizations to these programs.

Outside of the recommendations from the findings of this research, a variety of institutional opportunities in California addressing some of the constraining structural conditions on farmers' abilities to address climate change mitigation have recently been or are in the process of being established. Unfortunately, many of these opportunities approach addressing these structural conditions through a siloed lens that ignores key structural drivers of these problems (Daniels, 2022; Hatfield et al., 2013; Morath, 2014). A recent policy opportunity that attempts to address limited farmer access to agricultural equipment is AB-552, which requires the creation of an agricultural equipment-sharing program through the Farmer Equity Act of 2017. The program would include CDFA providing equipment to farmers who lack access to equipment, which is an

important effort to help farmers overcome access to equipment barriers (Larson, 2023). Future research on this program will be necessary to evaluate its impact on limited access to agricultural equipment among farmers. Ultimately however, this new program does not address the market dynamics, such as prices and their inflation, of agricultural equipment as one of the drivers of limited equipment access (Bramwell & Brouwer, 2019). As such, the program approaches addressing equipment access problems through a siloed lens, and future evaluation of this program will be necessary to understand who benefits from this program.

During the 2024 election cycle, California voters approved a climate resilience bond (SB 867) that aims to protect natural resources and communities from the impacts of climate change. The bond will allocate \$10 billion worth of state funds to projects that reduce community wildfire risk, enhance forest resilience in light of wildfire, reduce flooding, improve groundwater infiltration, protect communities from sea-level rise, and reduce heat island effects in urban communities (The Nature Conservancy, 2024). The broad approach of this bond in addressing climate change impacts utilized nature-based solutions (i.e., solutions that do not directly disrupt the agricultural farming systems that contribute to GHG emissions in agriculture [Daniels, 2022]) to achieve desired environmental outcomes. As such, this bond will allocate \$300 million to CDFA CSA programs. The underlying agenda of the bond could facilitate a more holistic approach to managing not just climate but also natural resources, although the emphasis on nature-based solutions poses shortcomings in the ability to fully mitigate climate change and manage climate change impacts.

California also established the California Agricultural Land Equity Task Force to assess land tenure status and needs among farmers and develop recommendations for equitably

increasing farmers, especially Tribal farmers, access to farmland. The Task Force comprises land trust representatives, professionals engaging with under-resourced farmers, Tribal liaisons, individuals with experience in farmland finances and purchase, and various staff from CDFA who engage with equity and under-resourced farmers. Although the diverse representation in the Task Force includes individuals who work with, or who actually are, under-resourced farmers, the Task Force exists to advise policy solutions to farmland access, not vote on the decisions in state congress (Kennedy & Frazier, 2024). This method of influencing policy solutions will not necessarily guarantee that solutions identified by the Task Force will be integrated into policy agendas but represents a needed contribution to knowledge for future institutional change.

The 2022 scoping plan for California Air Resources Board emphasizes nature-based solutions for meeting state of California GHG mitigation targets. Regarding agriculture, the recent scoping plan outlines the future pathway for addressing GHG emissions from farming operations, and specifically calls for an increase in the number of farmland acres enrolled in CSA practices and organic farming. These increases include 30% of current cropland becoming organic by 2045 and over 100,000 cropland acres in California being enrolled under a variety of nature-based practices (California Air Resources Board, 2022). Again, while the emphasis on massive increases in using nature-based solutions to mitigate GHG emissions from farming operations is necessary, the approach to addressing GHG mitigation fails to address underlying characteristics of farming operations that drive the usage of inputs, activities, and technologies that enable GHG emissions ((Daniels, 2022; Hatfield et al., 2013; Kelley & Lodoen, 1995). Fortunately, agency scoping plans are updated over time to reflect changes in societal needs,

meaning there will be future opportunities to adapt plans to emerging knowledge and more holistically address societal issues such as GHG emissions from agriculture.

### Final Conclusion

This dissertation broadly examined how farmer access to CDFA CSA programs and the efficacy of the programs in enabling GHG mitigation from farming operations is shaped by institutional conditions directly related to the CDFA CSA programs, and other structural and institutional conditions on the agricultural landscape. Chapter 2 broadly examined how, historically, policymakers and their neoliberal approach to policymaking shaped the agenda-setting stage of Farm Bill policy processes to poorly address agricultural problems in favor of liberated markets. Chapter 3 showed that institutional conditions related to CDFA, their limited economic and human resources, and their associated decisions for structuring the administration of the programs ultimately constrain under-resourced farmers and those with smaller-size farming operations, as do a variety of external structural and institutional conditions. Constraints faced by CDFA to enhance their economic and human resources are caused primarily by the funding structure of the programs. Chapter 4 additionally found that broader structural and institutional conditions on the agricultural landscape in California that enable agriculture climate change ultimately constrain farmers' access to the CSA programs and, thus, the programs' ability to address climate change mitigation. Likewise, this research found that CSA programs do not holistically address GHG mitigation from farming operations, as the programs do not address the structural and institutional conditions on the landscape that drive GHG mitigation. This point is emphasized in Chapter 5, which found that California's CSA approach could incorporate more social and environmental foci to more holistically address climate change mitigation and

adaptation of farming operations. Together, these research findings implied that the CSA programs' siloed approach to mitigating GHG emissions from agricultural inputs, technologies, and some activities also ignores the role of agricultural policies, limited land, labor, and economic resources, and broader market dynamics that enable unsustainable, GHG-emitting, monoculture crop and livestock farming operations and constrain farmer access to the programs. This implication is contradictory to the CSA programs and the other policies in California that aim to mitigate GHGs from the agriculture sector.

These research findings also stressed the critical role of policy processes, market dynamics, and power dynamics, especially related to the former topic, in shaping these structural and institutional constraints to the CSA programs' goals. Market dynamics are major structural constraints to farmers accessing CSA programs as indicated in Chapter 4 findings, and research findings imply the need to regulate some relevant markets to agriculture and include farmers in market-related decision-making. Additionally, as demonstrated in Chapter 2, powerful actors shape the agenda-setting and administration stages of the CSA programs and other agricultural policies' policy processes. These actors include powerful agricultural lobbies representing a minority of farmers but a majority of productivity and conventional agriculture interests (Grant, 2024) and policymakers who, in the later 20<sup>th</sup> century leading up to the current decade, have largely made agricultural policy decisions reflecting neoliberal values and in the interest of the electoral valor (Czarnezki & Fiedler, 2016; Gawande & Hoekman, 2006; Graddy-Lovelace & Diamond, 2017; Leland, 2003). Historically, these decisions did not fully address the underlying market dynamics and other structural conditions that contribute to how agriculture presents on the landscape and the economic resources land, and labor access crises among farmers. The

current research findings suggest increasing farmer inclusion in decision-making during the agenda-setting stage of CSA programs and other agricultural policy processes to address their limited perspective in policy agendas. However, I caution using the assumption that merely putting farmers and policymakers in the same room to discuss farmer needs will sway policy agendas. Rather, approaches to elevating farmer perspectives in policy agendas should necessitate PAR projects with farmers and rural communities to decide with farmers what agricultural conditions need to be addressed and how farmers and rural communities should play a role in addressing those conditions.

Recommendations for future institutional changes in California to support institutions in addressing climate change mitigation include increasing adaptive capacities for CDFA and technical assistance providers, the latter of whom directly aid farmers with accessing CSA programs and other government resources. More broadly, I recommend a re-coordination of policies relevant to California and broader US agriculture sectors to systemically address climate change mitigation. These policies should be re-coordinated with consideration to the structural and institutional conditions that enable GHG emissions in agriculture that contribute to climate change. Thus, research related to quantifying current conditions and synthesizing current research on these conditions will also be necessary and can broadly inform how to target financial resources that support addressing climate change to farmers based on need.

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APPENDICES

APPENDIX A

CHAPTER 3 INTERVIEW GUIDE – AGENCY STAFF AND  
NGO

1. What is your current position? How long have you worked in your current position? How long have you worked at this agency?
2. What is your history of involvement/ interest in the CDFA climate-smart incentive programs? Which program(s) in particular have you been most involved with?
3. *Ask questions (a-h) for programs (i-v) in which the interviewee has experience:*
  - a. Can you please explain the goals of the program, as you understand them?
  - b. How is the program structured to interact with growers and other stakeholders? What kinds of activities are involved?
  - c. Do you believe the program is achieving its goals? Why/why not?
  - d. What challenges has the program faced?
  - e. What kinds of program evaluation have been conducted?
  - f. How has this program changed since inception in response to evaluation/ issues/ challenges/ opportunities?
  - g. What, if anything, should change about these programs in the future?
  - h. Any relevant records, reports or datasets to share?
    - i. State Water Efficiency and Enhancement Program
    - ii. Healthy Soils Program
    - iii. Manure Management Program
    - iv. Dairy Digester Research and Development
    - v. Technical Assistance Program.
4. Are some programs having more success/ challenges than others? Why/ why not?
5. What are your perceptions of the effectiveness/ challenges of CDFA program administration:

- a. application process
  - b. grant administration
  - c. project implementation and monitoring
  - d. reporting
6. What specific challenges have arisen during program administration?
  7. How are award decisions made? E.g. first come first served, minimum qualifications, ranking? How, if at all, could the decision process be improved?
  8. What are the main reasons why applicants are rejected?
  9. What specific challenges related to participating in CDFA climate-smart incentive programs have been faced by grower participants?
  10. What barriers have been encountered in implementing program practices?
  11. Could you tell me about how the process works for underrepresented growers? Do you think they have advantages or disadvantages through this process? Why/why not?
  12. What do you perceive as the key grower benefits of program participation?
  13. We are interested in documenting potential co-benefits of these programs like broader economic, environmental and social impacts of participation in program activities. *E.g. increased market access, change in grower or public attitudes towards climate change and GHG monitoring, non-carbon/ non-climate related ecosystem services.*
    - a. What, if any, examples of co-benefits come to mind that have been seen in specific programs?

- b. What about impacts on non-agricultural audiences of this program? *E.g. Changed understating of agriculture's role in conservation? Improved relationship between ag and non-ag constituencies?*
  - c. Were any of the co-benefits you mentioned intended during program design? How did they emerge?
- 14. We are also interested in your organization's efforts towards promoting landscape level biodiversity conservation. *E.g. connectivity for migrating wildlife.*
  - a. Where does biodiversity conservation rank as an outcome in the work you do, compared with carbon sequestration/water conservation/soil health?
  - b. Is this an intended or un-intended outcome of the climate-smart incentive programs?
- 15. What are the key risks for the growers you work with? Do you think climate-smart practices reduce or increase vulnerabilities/ resilience to these risks?
- 16. How likely do you think it is that practices will be maintained after funded project lifespan?
- 17. How might the structure and activities of the programs be improved to support long-term implementation of practices?
- 18. Do you think these programs have led to the expansion of climate-smart agriculture practices outside of those funded by these programs? What supports/ limits the potential to do this?
- 19. Are there any other challenges that have impacted the success of the programs? *E.g. organizational structure, politics, financial support.*
- 20. What aspect (s) of program design or administration could most benefit from changes?

21. What is most important to consider in evaluating the effectiveness of these programs? Any metrics/ outputs/ indicators that your organization is tracking that are especially important to include?
22. How do you think CDFA climate-smart incentives programs will move forward in the future?
23. What actions would you like to see the state of California take related to climate-smart agriculture?
24. Can you share reports/ related documents/ datasets?
25. Who else should we talk to at this phase of research?
26. What is your most favorite thing, and the most challenging thing about your job?

APPENDIX B

CHAPTER 3 INTERVIEW GUIDE – GRANT RECIPIENT

FARMERS

1. How long have you worked in your current position?
2. Can you describe the farmers you advise/ your farm: farm-sizes, types of crops, livestock?
3. What geographic region do you operate in?
4. How did you hear about/ become involved in the CDFA incentive programs?
5. What are your perceptions of the effectiveness of the CDFA climate-smart incentive program administration: application process, grant administration, project implementation and monitoring, reporting?
6. What are the perceived benefits of program participation?
7. What types of metrics should be used to evaluate the effectiveness of the program?
8. What ecological and economic co-benefits are associated with specific program practices?
9. What barriers have been encountered in implementing program practices?
10. What are the barriers and opportunities for the maintenance and long-term implementation of practices after funded project lifespan?
11. What is the potential for expansion of climate-smart agriculture practices?
12. What has been the impact of program incentives and demonstration projects on attitudes and awareness of climate smart agricultural practices?
13. What are the key risks for you/ the farmers you advise? Do climate smart practices reduce vulnerabilities or increase resilience to these risks.
14. What has been the impact and potential of demonstration projects in diffusing climate smart practices
15. What is your most favorite thing, and the most challenging thing about your job?

16. Just so I can get an overall picture of the demographics of the people who participated in this program, could you tell me your:

- Age (year born)
- Highest grade in school you have completed? (If college, what coursework/degree?)

Thank you for taking the time to talk with me today.

APPENDIX C

CHAPTER 3 CODING FRAMEWORK

**Housekeeping codes (who we talked to; what programs interviewees had experience****with)**

1. Type of interviewee - code the whole interview
  - a. CDFA
  - b. TA providers
  - c. Grantee
  - d. NGO (generally includes advocacy groups like CalCAN)
  - e. EFA-SAP
  - f. State/federal agency (outside of CDFA)
  - g. Application reviewer
  - h. Other
2. Primary program – primary program(s) being discussed by the interviewee (i.e., interviewee spends relatively similar amounts of time discussing each program that is mentioned); code the whole interview with this code
  - a. AMMP
  - b. DDRDP
  - c. HSP
  - d. SWEEP
  - e. TAP
  - f. All/general
3. Secondary program – other programs mentioned briefly by interviewee; only code at the sentence/paragraph level where other programs are being discussed

- a. AMMP
- b. DDRDP
- c. HSP
- d. SWEEP
- e. TAP
- f. All/general

**Codes relating more to program eval requirements – code at paragraph level unless otherwise indicated**

- 4. Program goals – what are the goals of each program? Code only subcodes (e.g., 4a, 4b)
  - a. Environmental/ecological (e.g., reduce greenhouse gas emissions)
  - b. Agronomic/economics (e.g., increase crop yield, get money to growers/dairies)
  - c. Social/cultural/political (e.g., change grower attitudes towards sustainable agriculture)
  - d. Other
- 5. Program achievements and successes – historic and current achievements and successes of programs; code parent code
- 6. Challenges – challenges and/or limitations related to programs; code only subcodes (e.g., 6a, 6b)
  - a. Program practices – challenges related to climate-smart agricultural practices (e.g., cover crops, hedgerows, digesters, etc.) implemented under programs

- b. Application process – challenges related to the application process for programs, including application tools/materials and requirements, funding selection process, type of funding competition (first come first serve vs. one deadline for everyone)
  - c. Grant administration – challenges related to the administration of program funds and oversight of program project implementation including invoicing and reimbursements, individual project changes, project monitoring/reporting, etc.
  - d. Program outcomes – challenges related to outcomes of programs, including assessing/measuring, enhancing (intended)/limiting (unintended) outcomes
  - e. Technical assistance and outreach – challenges specifically related to the technical assistance that growers/dairies receive and outreach to growers/dairies
  - f. Persistence – challenges related to maintenance/ongoing usage of program climate-smart agricultural practices (e.g., cover crops, hedgerows, digesters, etc.)
  - g. SDFR/ Environmental justice – challenges related to SDFR access to and participation in programs and environmental justice issues related to programs
  - h. Biodiversity – challenges related to biodiversity management under programs
  - i. Other
7. Opportunities/recommendations – improvements and/or recommendations for the future related to programs; code only subcodes (e.g., 7a, 7b)
- a. Program practices – improvements related to the climate-smart agricultural practices (e.g., cover crops, hedgerows, digesters, etc.) growers/dairies can use under the programs
  - b. Application process – improvements related to applying to programs

- c. Grant administration – improvements related to the administration of program funds and oversight of program project implementation including invoicing and reimbursements, individual project changes, project monitoring/reporting, etc.
  - d. Program outcomes – improvements related to outcomes of programs, including assessing/measuring, enhancing (intended)/limiting (unintended) outcomes
  - e. Technical assistance and outreach – improvements specifically related to the technical assistance that growers/dairies receive and outreach to growers/dairies
  - f. Persistence – improvements related to post-grant maintenance/usage of program practices on grower/dairy operations
  - g. SDFR/environmental justice – improvements related to SDFR access to and participation in programs and other environmental justice issues
  - h. Biodiversity – improvements related to biodiversity management under programs
  - i. Other
8. Co-benefits – what are the other benefits from the programs besides greenhouse gas emissions reductions; code only subcodes
- a. Environmental/ecological (e.g., enhance water quality, more pollinators)
  - b. Agronomic/ economic (e.g., increased yield, decreased on-farm labor)
  - c. Social/cultural/political (e.g., changing attitudes towards climate-smart agriculture)
  - d. Other
9. Biodiversity – how is biodiversity discussed by interviewees; code only subcodes unless otherwise indicated

- a. Conceptualization – what do people think about when they hear “biodiversity,” including broad/loose interpretations of biodiversity
  - b. Management – when discussed, how is biodiversity managed; code sub-sub-codes only (e.g., 9ai)
    - i. Integrative – biodiversity is considered in the management of all aspects of a farm system and alongside other management issues (e.g., climate change)
    - ii. Siloed – biodiversity is not considered in the management of all aspects of farm system and not considered alongside other management issues (e.g., climate change); includes biodiversity management being limited to a few aspects of farm system and biodiversity management not happening on farm system
10. Metrics, indicators, survey question, or research topic recommendations – what metrics/indicators are interviewees/organizations tracking that we should also track, and what survey questions or research topics did they recommend or are thinking about? Code anywhere this is mentioned; code only subcodes
- a. Environmental/ecological (e.g., on-farm water efficiency)
  - b. Agronomic/economic (e.g., labor savings, time savings)
  - c. Social/cultural/political (e.g., changing attitudes about climate-smart agriculture)
  - d. Other

**Codes getting more at program history; collaboration; power**

11. Actors – track which actors are using power; code only subcodes and must be coded with 13a or 13b
  - a. Human
  - b. Non-human
  
12. Program history – track different aspects of the programs over time to understand the history and future trajectories of programs; code only subcodes
  - a. Creation – anytime the creation of programs is mentioned in interviews
  - b. Adaptations – changes to programs
  - c. Controversy– contestations over program purpose/function/outcomes (e.g., environmental justice concerns related to air and water quality from DDRDP digesters on dairies)
  - d. Other
  
13. Enablement – is someone or something using their power to constrain or enable human and non-human actors’ abilities to influence/be involved in programs? Can be both explicitly and implicitly discussed. Code only subcodes and code with actors (11a and/or 11b)
  - a. Enabling – catalyzing or making it more possible to do something (e.g., the annual allocation of funds through legislation enables CDFA to make annual adaptations to programs); interviewee might use words like enabling/enables, empowers, improvements, benefits/benefiting to describe how power is being used

- b. Constraining – preventing or limiting the possibility to do something (e.g., the type of funding allocated through legislation constrains CDFA from being able to fund certain sustainable agricultural practices); interviewee might use words like constrains/constraining, barriers, limits/limitations, disempowers

APPENDIX D

CHAPTERS 4 AND 5 INTERVIEW GUIDE

**Introduction**

1. What is your [current/previous] role/expertise within your [current/prior] organization?
2. In your opinion, in your role as xxx, what are the most important environmental and social challenges faced by the CA agriculture sector in light of climate change?
3. In your opinion, in your role as xxx, what changes need to be made within California's agriculture sector to address these environmental and social challenges stemming from climate change?

**Climate Smart Agriculture**

I study California CSA efforts, including the California Department of Food and Agriculture programs. To myself and other researchers working in this space, we've noticed that climate-smart agriculture in California largely prioritizes greenhouse gas mitigation, but also focuses on enhancing agricultural productivity and adaptations to climate change.

4. Does your understanding of CSA differ from ours? If yes, how so?
5. How does/did your work connect to CSA efforts in CA?
6. Please describe your general understanding of current CSA policy, including their:
  - a. Purpose [what problems do they intend to address]
  - b. Goals
  - c. Activities (prompt: programs)

7. How do CSA programs and policies enable (positive/negative) changes in current social and environmental conditions? What conditions are changing/will change and why? Prompt aspects of programs/policies:
  - a. Design
  - b. Practices
  - c. Implementation
  - d. Funding
  - e. Other
  
8. How do CSA programs and policies constrain changes in current and social environmental conditions? What conditions are staying/will stay the same and why? Prompt aspects of programs/policies:
  - a. Design
  - b. Practices
  - c. Implementation
  - d. Funding
  - e. Other
  
9. What changes, if any, are necessary to CSA programs and policies to enable necessary environmental and social changes for agriculture?
  - a. Design
  - b. Practices
  - c. Implementation
  - d. Funding

e. Other

10. Are there other factors or influences beyond CSA policies and programs that need to be considered for bolstering social and environmental change in the agriculture sector amidst climate change?
  - a. Prompts: e.g., global trade, federal agriculture policy, inflation

**Wrap-Up**

11. CSA activities have largely focused on mitigating greenhouse gas emissions from farms or adapting farms to be more resilient in the face of climate change. In your opinion, is that enough, or are there other focuses that should be incorporated into CSA policies and programs?
12. Is there anything else that you'd like to share with me today based on what we talked about?
13. Finally, based on our conversation and the questions I asked, is there anyone else you think we should interview who might be able to comment on these issues with the programs and future outcomes?

APPENDIX E

CHAPTERS 4 AND 5 CODING FRAMEWORK

Table 4: Chapters 4 and 5 Coding Framework

CODE	DEFINITION
01. Role or organization	References of interviewees' job roles, organization, and experience in CSA
01.a Agency	Includes individuals from state and federal agencies
01.b Advocacy group	Individuals from NGOs, usually non-profits, not including university or TAPs
01.c Technical assistance provider	Individuals from organizations that provide technical assistance to farmers (include TAPs from university extension and advocacy groups)
01.d University	Individuals from universities (exclude TAPs and advocacy groups)
01.e Other	Individuals who are not from agencies, advocacy groups, TAPs, or universities
02. Enabling	References to enabling effects. Code along with other relevant codes.
03. Constraining	References to constraining effects. Code along with other relevant codes.
04. Policies or programs	References to specific and general CSA policies (at any scale) and programs mentioned by interviewees - code the first time a policy/program is mentioned and don't code for same policy/program twice
05. Climate change challenges	References to explicit challenges to agriculture in light of climate change
06. Climate change opportunities	References to explicit changes, solutions, or opportunities for alleviating climate change challenges in agriculture
07. Internalized conditions	References to internal conditions among individuals or groups of people, including references to attitudes, beliefs, perceptions, ideas, cultural norms, and knowledge, e.g., climate change attitudes
08. Interpersonal conditions	References to interpersonal conditions between individuals or groups of people, including relationships and social connections, e.g., TAP relations with farmers
09. Institutional conditions	References to institutional conditions, including their institutional structure, rules and public policies that are administered, decisions, and processes, e.g., CDFA workforce capacity
10. Systemic or structural conditions	References to structural/systemic conditions that culminate from interaction institutions, their policies and activities, governance structures, and cultural norms, e.g., land tenure, state of natural resources, rural community vitality, general economic policies

CODE	DEFINITION
11. Other conditions	References to conditions that don't fit neatly into Internalized, Institutional, Systemic/Structural, Other conditions
12. Causal-impact relationship	References to the source causes of impacts between the environment and humans
12.a Environment-Human	References to impacts on humans caused by environmental conditions
12.b Human-Environment	References to impacts on the environment caused by human activities/conditions
12.c Both	References to both or multiple series of impacts on environment/humans caused by humans/environment