

**Addressing the Intersection of Climate Change and Social Inequities through Food System
Planning**

by

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Abbreviations and Acronyms

AAFN	Alternative Agrifood Network
CFS	Community Food System
CSA	Community Supported Agriculture
FAO	Food and Agriculture Organization of the United Nations
FDA	Food and Drug Administration
FSA	Food System Assessment
FPC	Food Policy Council
GHG	Greenhouse Gas
IFAD	International Fund for Agricultural Development
NRC	National Research Council
NSAC	National Sustainable Agriculture Coalition
SNAP	Supplemental Nutrition Assistance Program
UN	United Nations
UNICEF	United Nations Children's Fund
US	United States
USDA	United States Department of Agriculture
WFP	World Food Programme
WHO	World Health Organization
WIC	Women, Infants, and Children

This thesis is dedicated to my departed father, Kimsey Eller, who left us too young but did not waste the time he had. His lessons in compassion have not escaped me and continue to shape the way that I approach the world. He taught me to think critically, pursue knowledge endlessly, and he taught by example to take personal responsibility for improving our communities and the world. He never failed to do the humble, unnoticed work of stewarding the environment and offering recognition and strength to those who need it most. His fierce love, laughter, patience, humility, dedication, and feminism have not been lost on me, and I hope they are reflected in this work.

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Abstract

Climate change poses significant threats to our food system and resource stability and has the potential to aggravate existing social inequities in the agrifood system. This research addresses how issues and approaches in food system equity can be applied to food system planning to address the aggravation of social inequities by climate change. To do this, this thesis asks, how can interventions to advance food system equity be applied to planning initiatives so that inequities are not reproduced or exacerbated in the face of climate change? Key issues and approaches in food system equity are identified through a review of literature and examined through critical inquiry to evaluate their capacity to mitigate the aggravation or reproduction of inequities by climate change. Based on this analysis, a series of recommendations are made to food system planners for improving equity among producers and consumers in the food system. These recommendations are systematically reviewed through a food security framework in order to assess how mitigating inequities in the face of climate change may also improve food security. This research concludes that while there are significant opportunities for planners to promote equity in the face of climate change, food system and climate change planning fields remain largely disconnected and neither adequately address climate-driven threats to social equity.

Keywords: Food System Planning, Climate Change, Food Systems, Social Equity, Food Security

Chapter One

Introduction

Climate change impacts everyone around the globe by disrupting social, environmental, and economic systems. The development and consequences of climate change are inextricably linked to high-polluting, energy-intensive industries and are influenced in several ways by practices in the globalized agrifood systems. Food systems are both a significant contributor to climate change, accounting for more than 13 percent of United States (US) greenhouse gas (GHG) emissions (Canning et al. 2017, 21), and a victim of climate change impacts. For instance, weather and environmental events will cause significant changes to agricultural producing regions, which will be detrimental to the stability of commodity food availability, supply chains, and food prices (Nierenberg 2018, 26-28; Schulte and Chun 2009, 542-543; Thornton et al. 2014, 3319-3321). These consequences, along with increased political and economic instability, will increase uncertainty for low-income and marginalized communities to be able to consistently access affordable foods.

Social inequities and food insecurity are social problems in the food system that may be aggravated by the socio-economic and environmental impacts of climate instability. Climate change threatens to produce far-reaching and unprecedented impacts on small-scale food producers, including impacts from environmental disruptions, crop loss, and increasing prevalence of pests (Campbell et al. 2016, 34; Thornton et al. 2014, 3313). While these environmental changes are known to pose major threats to the food system, a different set of inequities pertain to consumers in the food system. Consumers will face added risks to food safety, food cost volatility, infrastructure and transportation barriers, and economic barriers to food access (Campbell et al. 2016, 37-38). The link between climate change and social inequities

is one that raises substantial concern for communities around the globe and parallels the impacts of climate change on the food system.

As the unprecedented threats of climate change aggravate social inequities, vulnerable populations will be negatively impacted first and most severely. A United Nations working document, produced by the Department of Economic and Social Affairs, states that “the relationship between climate change and social inequality is characterized by a vicious cycle, whereby initial inequality makes disadvantaged groups suffer disproportionately from the adverse effects of climate change, resulting in greater subsequent inequality (Islam and Winkel 2017, 2). The aggravation or reproduction of social inequities by climate change will have severe impacts for social groups marginalized along race, class, and gender lines who already experience inequities at alarming rates. For this reason, climate change underscores the need to address the inequities that underlie food insecurity and related social problems apparent in the food system to prevent the aggravation of these inequities, which are likely to worsen due to climate change.

The social and economic outcomes of climate change could lead to political instability and pose challenges to maintaining a stable economy. These issues are further complicated by the consideration that populations all over the country and world will be displaced due to the increased occurrences of extreme weather events, putting pressure on food systems to respond. Despite the severe threat to livelihoods by climate change, the culture of research has emphasized solutions to enhance agricultural productivity and reduced GHG emissions but reflects a gap in implementation and action-oriented deliverables for food system-wide planning (Campbell et al. 2016, 38). In fact, there is limited evidence of any region across the US

producing a food system resilience plan that would consider the complex impacts of climate change on social inequity.

Despite the alarming potential for climate change to aggravate existing inequities in the food system, there is little evidence of US cities engaging food systems in planning to address climate change impacts. By preparing and responding to the threats of climate change, planning could support communities and governments by outlining strategies and interventions to stabilize social and economic systems in times of disturbance. In addition, socially-oriented food system planning can ensure that the experience of social inequities is not reproduced or worsened by climate threats.

Planning efforts to address climate, inequity, and food systems remain largely disconnected and require a comprehensive approach to mitigate inequities. While planning for resilience, natural disasters, and taking action against climate change are increasingly popular topics across planning fields, the food system has taken a backseat when it comes to these efforts. Given the influence of the food system in producing climate change and social inequities, food system planning should be an integral component of any region's response to the growing threats of climate and environmental instability. This research aims to fill that gap by addressing how food system planning initiatives can engage with the issues and interventions relating to social equity in the food system to improve food system equity and protecting against the aggravation of inequities by climate change.

Summary and Roadmap

This research addresses social and climate change-related inequities in the food system because I want to learn how interventions can be applied to planning initiatives so that social inequities are not reproduced or exacerbated in the face of climate change. The experience and

exacerbation of social inequities by climate change will be conditioned by the specific socio-economic, cultural, and regional threats to the agrifood system, which are not yet being addressed in food system planning. It has become increasingly important to acknowledge that changes in our food and agricultural industries are a significant contributor to the progression of climate change and that immediate action must be taken to lessen the impact on communities and their food systems around the globe.

Chapter 2 presents the background and significance of foundational problems and concepts in this research. It first explains the problem of social inequities in the food system and how they express across race, class, and gender differences. This is followed by an explanation of food insecurity and its connection to these social inequities. The chapter then describes the relationship between the food system and climate change describing how the food system is both a leading cause of global environmental change and a victim of climate impacts. This overview will also explain how these impacts are experienced differently among producers and consumers in the food system. Various models of food system planning used in the US today are then explained to provide context for recommendations on how planning might better address the climate-related threats to social equity. Finally, this chapter introduces my overall and constitutive research questions and their significance.

Chapter 3 explains the methodology and methods used to answer the overall and constitutive research questions. I first explain the methodology, along with an introduction to critical analysis and literature review, and discuss why they are appropriate methodologies to answer the research questions. I then explain my positionality in regard to my overall research question and explain the methods for answering each constitutive research question.

In Chapter 4: Results, Analysis, and Contribution, I answer my research questions through a presentation of results and an analysis for each question. To answer the first two constitutive questions, I develop a list of issues and approaches related to food systems equity that address challenges for producers and consumers in the food system. I then provide an analysis for each constitutive research question that considers the applications of these concepts to food system planning in order to address social inequities in the context of climate change. To answer the third constitutive research question, the results for the first and second constitutive questions are examined for their potential to increase food security. Chapter 5 then concludes the thesis, reprising key findings and offering recommendations for future research.

Chapter Two

Background and Significance: Social Equity, Climate Change, and Food System Planning

Introduction

In this chapter, I introduce the social problem and research problem that this research addresses, as well as the key concepts needed to explore them. After introducing key concepts relevant to social inequity in the food system, climate change impacts, and food system planning, I identify the overall and constitutive questions that guide this research. First, I introduce social inequities as a social problem and explain the roles they play in the food system in terms of race, class, gender, and food security. I then explain my central research problem, which focuses on the ways that food system planning can address social inequities and climate change impacts in the food system. After this overview, I introduce food system planning and the range of strategies available to food system practitioners for enacting change and engaging in regional planning through the food system. I then state my overall and constitutive research questions and offer a chapter summary.

Social Problem: Social Inequity in the Food System

Social equity in the food system refers to a system of fair and just distribution of wealth, power, and opportunity—such as the power to make decisions over one’s own food choices, as well as participate in local food systems planning and governance. Structural relations of power uphold social inequities through systems of control over race, class, and gender privileges (Slocum and Cadieux 2015, 8-14). These systemic power imbalances can lead to social inequities across the agrifood system, which result in foundational disadvantages among marginalized groups and systemically position them to experience economic hardship and vulnerability to food insecurity, among other food-related injustices. A long history of social

disenfranchisement has occurred in agrifood systems through, for example, unjust land use policies, labor and social control tactics, and control over food access and marketplaces. Social, political, and economic forms of oppression have upheld systemic disadvantages that are uniquely defined across social dimensions of race, class, and gender.

The next sections explain how social inequities materialize along lines of race, class, and gender differences to describe the unique barriers experienced by each in achieving equity in the food system. Within each of these categories, I explain the historical context and contemporary implications for the social inequities experienced by these groups. Finally, this section concludes with an explanation of how social inequities determine food security, which will be essential for answering my final research question.

Race

Racial inequities have persisted across agrifood sectors and have been rooted in long-standing ideologies and outcomes associated with human rights, agrarianism, immigration, land and labor laws, and health and geospatial disparities, among other forms of oppression. The roots of these injustices in the food system are an example of the lasting implications of exploitation, marginalization, and oppression, ingrained in our society and the agricultural labor force, in particular. In regard to the food system, this section focuses on land ownership and access, and health-related outcomes in the food system. Land ownership for Black, Latino, and Native Americans has been challenged by decades of racialized social and economic policies, most notably through a deep-seated history of racialized land policies and unjust land acquisition actions against disadvantaged communities. In urban areas, the practice of red-lining, a racialized zoning tactic, has resulted in lasting geographic segregation. As a result of institutionalized

racism in the US, social, economic, and political injustices experienced across race have led to the persistence of health, nutritional, and lifestyle inequities.

The racialization of land access in America has disenfranchised minority populations, favoring White Americans who have benefited for several decades from the economic and generational advantages of land ownership. Since the colonization of America, Native Americans have been victims of a series of early discriminatory land policies. These early policies first favored the US “right of discovery” ruling by the Supreme Court over the rights of indigenous peoples. In the late 1800s, the Indian Appropriation Act and the General Allotment Act removed recognition of Native Americans as independent nations and bribed them to accept a deal of government apportioned land and citizenship, ultimately losing more than 100 million acres to the US government. Similarly, Latino families were driven off of community farmlands, as the result of an 1848 treaty allowing American pioneers to claim land rights (Giancattarino and Noor 2014, 14). These barriers have also had devastating outcomes for Black farmers and farmworkers who have been subject to a history of slavery, labor injustice, land dispossession, and economic discrimination.

Black Americans have faced a multitude of barriers to accessing socio-economic resources, including access to land and capital, as well as other social services. Beginning in the post-Civil War era, Black Americans were able to own land, though shortly after this period, a movement toward racialized state policies forced many Black landowners to lose their land and contract as sharecroppers on White-owned properties (Giancattarino and Noor 2014, 14). During this era, policies such as the Homestead and Land Grant Act were introduced, which widely distributed land to White people and broadened the disparities between Black and White land ownership (NRC 2015, 46). Additionally, early practices of the USDA allowed county-

controlled regulatory bodies, mainly consisting of wealthy White landowners, to preside over the regional decision-making of USDA practices and credit programs. This allocation of power allowed White farmers and landowners to intentionally discriminate against Black farmers, particularly in the South, by denying loans, controlling interest rates, and manipulating information (Giancattarino and Noor 2014, 14). Due to systemic discrimination and exploitation in US agriculture, Black farmers and sharecroppers have experienced a massive decline of 98 percent since the 1920s (NRC 2015, 177), which has only recently started to recover. Lastly, Black and minority landowners in the US are more likely to lose rights to property over generations as land is parceled into smaller and smaller plots, and property heirs often lack the appropriate documentation such as a will, title, or deed (Giancattarino and Noor 2014, 14). These systemic injustices faced by Black Americans paint a picture of their experiences, not only in agriculture but the injustices faced by socio-political systems more broadly.

In addition to agricultural land rights and ownership, another glaring injustice in America's policy history is using race as a means of producing and maintaining unequal economic status, thus controlling access to and ownership of other resources, including access to food. In the 1930s, the American government-sponsored the Homeowner Loan Corporation, which drastically shaped the social landscape of American neighborhoods (Bilal 2016). This program adopted a systematic way of building racialized zoning laws into American politics and economics. The process, called red-lining, was presented as a method of displaying financial investment risks. However, the areas designated as risky or "red-lined" were predominantly African American and minority neighborhoods (Bilal 2016). This tactic provided a system that allowed bankers to limit lending and increase interest rates for minority populations, which ultimately led to barriers to equitable resource ownership and systemically under-resourced

communities. The history of these practices has resulted in the rise of food deserts across America, which has jeopardized access to healthful food choices for minority populations and ultimately led to the escalation of nutritional and health-related inequities.

Racist zoning policies in America have had lasting effects on economic mobility and resource access for minority populations. Bilal's (2016) investigation of these areas in Baltimore city showed that in 2016 red-lined neighborhoods still reflect stark inequities through the presence of food deserts, environmental hazards, and rates of diet-related chronic disease. There are several ways that the history of racialized residential segregation in the US perpetuates the range of inequities experienced through racial discrimination. Communities of color are more likely to live in areas with limited transportation, under-resourced schools, low access to affordable and healthy food choices, and increased exposure to environmental hazards (Giancattarino and Noor 2014, 7; NRC 2015, 207). These outcomes also impact access to income opportunities, safe occupational working conditions, and clearly link to the health and economic disparities experienced by minority populations (NRC 2015, 207). The history of racial injustices across the US has been embedded in social, economic, political, and institutional systems.

Racial inequities in the food system also manifest in terms of public health outcomes reflecting disparities across healthful food access and ultimately leading to a prevalence of diet-related preventable disease. Notably, diet-related chronic disease, Type 2 diabetes, and micronutrient deficiencies are more likely to be pervasive among Hispanic populations and African Americans (NRC 2015, 98-101). The uneven presentation of these health conditions, despite at least three decades of consistent dietary recommendations to address them, results from the reality that many Americans continue to lack access to unprocessed fresh foods such as whole grains, fruits, and vegetables (NRC 2015, 99). There are a multitude of barriers for

marginalized communities in the US to choosing healthful and nutritious food options. As explained in this section, minority populations often lack access to fresh produce at reasonable prices based on their distance to supermarkets or alternative market options and are often inhibited by limited transportation. Foods that are more readily available to these communities in terms of proximity and financial access often consist of low-nutrient processed foods, which are high in fat and sugar (Anderson 2008, 596). The persistence of these racial disparities, in addition to other injustices, are rooted in a long history of social and economic marginalization.

While the categories of race, class, and gender aim to differentiate among the breadth of inequities experienced by different social identities, it is also important to note that many social inequities present across more than one category. For example, inequities relating to labor injustice and poverty, which have strong links to racialized oppression, will be explained in the following section pertaining to class where they also strongly materialize. The next section shifts to exploring social inequities in the food system as they are experienced across economic class systems. Although the prevalence of diet-related, preventable diseases and food insecurity remain highest among minority populations, these are also experienced at alarming rates among households at and near the poverty threshold.

Class

The consequences of the class system in America have infiltrated the US agrifood system in a number of ways, leading to significant economic disparity. This section explains that corporate control tactics and the influx of large agri-businesses have dominated the food system and jeopardized the livelihoods of farmers, workers, and rural residents. Class-based social inequities are reflected in the food system through uneven development of infrastructure for healthy food access, unfair wage and working conditions, and impaired access to socio-political

systems such as adequate healthcare, public resources, and opportunities to pursue valuable educational opportunities and economic mobility.

Through the rise of globalization and corporate influence, the food system, along with the rest of America, has driven economic inequality to unprecedented levels, which can be seen starkly across rural and farming regions. The impact of large-scale agriculture has had devastating effects on small-share farming operations and rural areas, in general. As large-scale farming operations continue to infiltrate rural areas, the surrounding populations decrease due to added barriers to income opportunities and land access, among other resources, further exacerbating social inequities experienced by these communities (Anderson 2008, 598). Agricultural job opportunities across rural communities in the US have generally declined with this trend as public policies and technological advancements consistently opt for chemical inputs and machines, in place of human labor (Anderson 2008, 598). Corporate interests impact all players in the food system with the greatest consequences imposed on those most vulnerable, including low-income populations, rural residents, and small-share farmers.

Despite a recent surge in support for local small-scale food production over the past decade, farmers and farmworkers struggle to uphold a decent standard of living from wages and farm income alone (Anderson 2008, 593). While the number of diversified farm owners has risen in recent years, many of these farms produce annual sales of less than \$50,000, signifying that they primarily represent small-share farm operations (NRC 2015, 177). This annual sales figure is alarmingly low, given that small-share farmers often neglect to account for their own salaries when configuring operational incomes and that family farms relying on agriculture as a principal occupation require sales of \$250,000 or more to live above the poverty threshold, without additional income (Anderson 2008, 597). Farm operations at this scale experience significant

injustices relating to labor rights, land and resource access, economic opportunity, and access to socio-economic systems such as improved technology and educational tools, financial assistance, and adequate health insurance and care.

Like small-share farmers, many of the inequities experienced by low-income populations are a result of decades of policy driven by capitalist ideologies and a corporate food regime that jeopardizes the livelihoods of these communities in the interest of corporate profiteering. The US food system employs over 10 million people through food processing, preparing, service work, and related positions (Anderson 2008, 599). Despite the impressive size of its labor force, the US agrifood system has largely failed to provide adequate protection and compensation to farmers, farmworkers, and wage workers appropriate to uphold an adequate standard of living and provide sufficient access to health care and social security (Anderson 2008, 597). Women, African Americans, and Latinos working within the food system are more frequently subject to minimum and sub-minimum wages, highlighting the income disparities for these groups (Giancattarino and Noor 2014, 4). These wage inequities lead many food system workers to face the added stressors and repercussions of poverty in America, such as high-stress loads, decreased opportunity, and other adverse social and biological outcomes.

Underscoring this impact, such wage inequities likely have a larger marginal impact on household dietary behavior than any other factor. This impact explains why low-earning households spend less money on food and buy more generic brands of lesser quality. They also, however, spend more of their total income on food costs and spend more time preparing foods at home (NRC 2015, 196). Low income residents, including food system workers, experience unstable or unfair working conditions and contracts, inadequate access to opportunities for civic engagement and economic mobility, increased risks of unsafe living and conditions, and

incidents with crime, as well as poor health outcomes associated with chronic stress that stems from the conditions of poverty (Hoefler and Curry 2012, 62; Reece 2018, 213). The infiltration of corporate control in agriculture and the food system at large imposes sweeping control over the rights of laborers in order to keep food production and wage costs low at the cost of the health and livelihood of workers and consumers living on low-wages.

Modern American food choices are kept cheap for several reasons, including to give the perception that we have solved the right to food by shifting to an abundance of *cheap* food. The idea that the food system must produce cheap, unhealthful food choices in order to feed undernourished populations has been largely disproven. It neglects to recognize the amount of food that ends up as waste or crops that end up as non-food commodities, as well as the problems of poverty and financial inaccessibility of food (Holt-Giménez 2019, 27-28). In the US, for example, millions of low-income and Black residents live in neighborhoods that lack grocery stores or adequate access to fresh and nutritious food options. Hoefler and Curry (2012) conclude that while poverty does not guarantee hunger and hunger does not guarantee poverty, they are overlapping social conditions with potentially intersecting traits and root causes (74). These realities identified at the intersection of social inequities, poverty, and hunger, offer a foundational argument that food insecurity and hunger cannot be addressed without consideration to the economic influences that are inextricably tied to them. For these reasons, as well as the unique ways that social identities intersect with food security, food security is discussed as its own category at the end of this section on social inequities. Next, I will explain the unique inequities faced by women that materialize in the food system.

Gender

Women have experienced inequities and disparities across the food system pertaining to their role as primary food providers, injustices faced in agricultural and food service labor forces, as well as socio-economic conditions and civic participation more broadly. Just as with the issues of race and class, inequities experienced by women are rooted in long-standing perceptions and historical ideologies. Women carry greater burdens of the food system through the socio-cultural ideologies surrounding women's role to prepare and provide food, as well as contribute unpaid labor in the production and processing of food items (Allen and Sachs 2007, 3-4). Despite the significant contributions made by women in the agrifood system historically and across the globe, women have remained marginalized players in the food system.

Women's marginalization is reflected in food insecurity, health and nutrition inequities, and labor exploitation rooted in regressive ideologies about women's societal roles. Women experience food insecurity at disproportionately higher rates than men, and women participants in food assistance programs are more likely to be long-term recipients of the program (DeBono, Ross, and Berrang-Ford 2012, 753). Notably, women are among the minority groups who are more likely to be subject to minimum and subminimum wages (Giancattarino and Noor 2014, 4), which negatively impacts the dietary behavior in their households since fresh food purchases, including fruits and vegetables, are increased at every income level (NRC 2015, 196). This experience widens the nutritional gap experienced by low-income women, single mothers, and those without adequate maternity leave. This reality experienced by women widens the inequities they experience across wealth and health issues, along with those of the children they care for.

Women are also more likely to be affected by unstable household incomes that influence how food is acquired and allocated, and when instability of food access exists, women are faced

with allocating more food to their children at times of low food security. This significantly impacts the nutritional stability of women facing threats to food access and food cost instability from climate change. In addition, low-income women and single mothers may also be more likely to use food as a coping mechanism for psychosocial hardships related to poverty and socio-economic conditions (DeBono, Ross, and Berrang-Ford 2012, 573). It is clear that women experience disproportionate impacts to their ability to access and utilize adequate nutrition, even when experiencing similar socio-economic conditions to male counterparts.

Women, who have increasingly joined the US labor force, particularly in the food system since the 1950s have been significantly under-recognized for their contributions to food production. The US Census of Agriculture has consistently underrepresented women, in part, based on the practice of tracking only primary farm operators which are more likely to be listed as a man, even when a woman partner contributes equally to farm work. A recent change to census practices, which recognizes secondary and tertiary operators, now reflects women as 30 percent of total farm operators, compared to the previous statistic of just 14 percent. This new guideline identified nearly 1 million women (of all races) in the US as farming operators in 2012. However, 91 percent of women-owned farms earn less than \$50,000 per year (NRC 2015, 177). Women have traditionally been positioned with disadvantages in their ability to obtain fair land rights and access to necessary resources as a sole business operator.

Men have primarily been the dominant image of farmers while women have concurrently been subjected to male choices in the conduct of farming operations. Women, who are not traditionally represented as primary farmers or farm owners, become underrepresented among leadership and decision-making roles. In a similar fashion, the voices of all agricultural workers have been historically represented by farmer owners, who's interests overshadow the needs of

farmworkers and laborers. Women in rural areas also earn significantly less than their male counterparts. In some regions as little as 63 percent of male wages, despite the fact that the women are often working full-time year-round positions (Allen 2004, 155). Since 1982, the percentage of women as principle farm operators has risen from about 5 percent to nearly 15 percent, according to the 2012 Census of Agriculture (NRC 2015, 177). The persistent barriers to farm ownership, land access, and economic opportunity along gender lines underscores the inequities that women have faced beyond the agrifood system and across social, economic, and political systems.

As I have described in terms of gender, class, and race, social groups are affected by inequities which present differently across socio-economic identities and their intersections. Food insecurity is a key indicator of social inequity in the food system, in general, and is also reflective of these different experiences across social groups. Lack of access to resources and unequal socio-economic opportunities leads to an increased risk of food insecurity for women, minorities, and low-income communities. The next section explores food insecurity and its relationship to these social categories as determinants of food accessibility. I also provide a brief overview of the conceptual framework adopted by this thesis to analyze food security in the context of climate change and social equity.

Food Security

Food security is a term that reflects a community or individuals' ability to acquire sufficient amounts of nutritiously adequate, safe and readily available food that meets dietary needs and food preferences, without dipping into emergency food reserves. Food insecurity and hunger are related terms with strong connections to poverty, as has been established above. Food insecurity, however, is a measure of social and economic conditions that result in inadequate

nutrition for a healthy lifestyle. Food insecurity can be further defined to reflect the degree to which food is absent or inaccessible, i.e., low-food security or very low-food security (Hoefer and Curry 2012, 61). While hunger denotes a similar experience, it is not necessarily the same; hunger is determined by an individual's physiological state in the absence of sufficient food or calories and is not classified by the degree to which it is experienced (Hoefer and Curry 2012, 64). When I refer to food insecurity it is intended to represent a broader set of experiences, which include hunger, as well as being vulnerable to hunger.

Food security denotes the root causes and range of complex and interconnecting inequities that lead to a lack of adequate nutrition prior to the experience of hunger. Poppendieck (1998) argues that by defining the problem as hunger, we systemically neglect to acknowledge that hunger is the symptom (132). Furthermore, the prevalence of poverty among affluent societies, such as the United States, is fundamentally a problem of inequality. Centering hunger as the primary social issue disregards the array of issues and inequities faced by households living within range of the poverty threshold. The hyper-focus on hunger suggests that food insecurity can be solved by itself, without consideration of the needs for housing, transportation, medical care, and improved opportunities in work, education, and civic participation (Poppendieck 1998, 132). Food insecurity is experienced at disproportionately high rates among those experiencing various forms of social inequity, which is oftentimes a leading cause for low food access.

Incidences of food insecurity across African American, Latino, and White households highlight an alarmingly uneven distribution of food across demographic lines. Black and Latino households in the US are presumed to be 150 to 200 percent more likely to experience food insecurity than White households (Hoefer and Curry 2012, 64). Other discrepancies are found to

correlate with higher rates of food insecurity among the elderly, women, minority groups, and individuals raised in low-earning households, or households with children (DeBono, Ross, and Berrang-Ford 2012, 750). Symptoms of food insecurity can have devastating effects on the livelihoods of those who experience it, often imposing greater threats to socio-economic opportunities providing added complications to economic mobility and alleviation of poverty. These outcomes are underscored by the impacts of hunger and low-nutrient intake for food insecure individuals, such as adverse health conditions, impeding childhood growth rates, negative psychological impacts, and decreased productivity, among others (Hoefler and Curry 2012, 67; Yu, Lombe and Nebbitt 2010, 768). The negative socio-economic outcomes that are experienced as a result of food insecurity span psychological and biological impacts, often resulting in lifelong cognitive impairment for children of food insecure households.

Due to the severe and lasting impacts of food insecurity, it is important to note the breadth of this experience among children in America. Households with dependent children are more likely to experience food insecurity, and a household with a child under the age of six is twice as likely to be food insecure than a household with no children (Yu, Lombe and Nebbitt 2010, 767). Consistently, about one-third of food insecure individuals are children and about half of the people benefited by public food assistance programs are children. Additionally, 80 percent of households participating in food assistance programs are households with dependent children (Yu, Lombe and Nebbitt 2010, 767-768). As is explained above, female-headed households notably represent disproportionately high rates of food insecurity and food assistance participation. This disparity is exacerbated when the household includes dependent children. It is clear that social and cultural indicators position certain populations to experience disproportionately high rates of hunger and food insecurity, based on disparities across age,

gender, race and ethnicity, as well as individuals or households with a disability or dependent children. Responding to the lasting impacts of food insecurity and realities of poverty, require vastly different provisions than the short-sighted solutions to alleviate hunger through food assistance which has become the leading solution for anti-hunger efforts.

Four Dimensions of Food Security

In order to assess the social and climate-related impacts on food security, this research adopts a leading analytical framework from food security literature for addressing the multi-dimensional interactions of social inequity and food security. The United Nations Food and Agriculture Organization (FAO) proposes four dimensions of food security that reflect the complex circumstances that determine food security for a region or household (FAO 2008, 1-3). These are food availability (having sufficient amounts of food regionally available at acceptable market prices), food access (the ability to access sufficient healthful food choices based on financial means, transportation, etc.), utilization (cultural foods, cooking, storage, nutritional knowledge), and stability (that each of these dimensions are consistent and reliable) (Ericksen 2008, 239-240; FAO 2008, 1). Each of these dimensions reflect a unique set of injustices and systemic inequalities.

Through these dimensions of food security, contributing social inequities can be identified systematically in order to better understand how the threats of climate change may impact both social inequities and specific dimensions of food security. For instance, food availability is marked by the availability of food in one's environment, which is impacted by global food system trends and the local production of food, as well as by histories of red-lining, rurality, and proximity to food deserts. Access to food is differentiated from food availability by its emphasis on the ability to access available foods through economic means. This dimension

also reflects the uneven development of infrastructure and transportation, as well as considerations of price stability and healthful food choices. Food utilization, however, considers issues of food safety and nutrition. Appropriate utilization depends on the knowledge and ability to safely, efficiently, and nutritionally utilize foods through culturally appropriate means with consideration to safe water, cooking and preparation methods, and storage capacity. Stability of food security is concerned with the stability and resilience of all other systems—including social, economic, and political structures—that impact the food supply chain and determine the volatility of the other dimensions of food security.

The most popularly discussed dimensions of food security are food access by those interested in food justice; and food availability by those interested in the environment, agricultural production, and supply chain stability. Authors and researchers, such as Lawrence (2017), recognize that the inability to access food based on economic means must be addressed through efforts to alleviate poverty (783). However, despite increasing recognition of the social determinants of food insecurity, research has overwhelmingly focused on the genetic ability to maximize crop production to increase food availability (Biehl et al. 2018, 40). This approach largely ignores the capacity to solve for gaps in food security by improving social equity, economic opportunity, and food system planning that focuses on equitable infrastructure and market stability (Biehl et al. 2018, 41). Lack of consideration for all dimensions of food security (access, availability, utilization, and stability) in literature suggests that research has not adequately uncovered the complicated and broad scope of structural injustices that reaffirm systemic vulnerabilities to food insecurity, which will be impacted by the effects of climate change.

Each dimension of food security defined by the FAO framework is important to uncovering the complexities surrounding systemic inequities and the vulnerabilities imposed by climate change. For this reason, I use this food security framework to structure analyses of equity and climate-related impacts on food security in order to inform planning strategies. In the next section, I explain the relationship of climate change to the food system and discuss the impacts of climate change on producers and consumers in the food system. After this, I transition to the topic of food system planning to introduce the range of approaches to planning for food system practitioners. Finally, I introduce the research problem addressed by this thesis, which is how to conduct food system planning that addresses the social dimensions of climate change without aggravating or reproducing existing social inequities, and ultimately food insecurity.

Climate Impacts on Social Equity in the Food System

In the sections that follow I provide context for the cause-and-effect relationships between the food system and climate change. I first introduce the food system as a leading contributor to climate change. Then, describe the adverse consequences of climate change on the food system and how social inequities may be produced or reproduced by climate change across producers and consumers. In order to consider the distinct inequities experienced by these groups, the producer and consumer categories outlined in this chapter are reflected in the constitutive research questions that guide this thesis, which are introduced at the end of this chapter.

The development and consequences of climate change are inextricably linked to high-polluting, energy-intensive industries, which are influenced in several ways by globalization and corporate practices within agrifood systems. The food system contributes to the progression of climate change through GHGs, deforestation, soil degradation, food waste, and pollution from

transportation and processing (Schulte and Chun 2009, 853-856; Schipanski et al. 2016, 600-601; Tendall et al. 2015, 17). These impacts on the environment and climate change are driven by corporate practices in the agrifood system, which are in part driven by demand for commodity crops for biofuels and cheap food processing. In fact, the agrifood system is recognized as a leading cause of climate change, contributing more than 13 percent of the US economies GHG emissions (Canning et al. 2017, 21). Despite this impact, food systems locally and globally are severely impacted by the negative consequences of climate instability.

While natural disasters are unpredictable and non-discriminatory of who they harm, there is a clear disparity in the ability to recover from such events for both producers and consumers in the food system. The greatest impacts of climate change are consistently experienced by those least responsible but most vulnerable to social, economic, and environmental instability, such as the social groups described at the beginning of this chapter. This is important because weather and environmental events will cause significant changes to food producing regions, which will be detrimental to the stability of commodity food staples and food prices. This, along with increased marketplace and economic instability will increase uncertainty for low-income and rural regions to be able to consistently access affordable foods (Islam and Winkel 2017, 2). The social and economic outcomes of these activities could lead to political instability and pose challenges to managing a stable economy. In the following sections I describe the ways that climate and environmental change may impact or aggravate the experience of inequities for people across the food system.

Climate Impacts on Social Equity for Producers

Social inequities present in the food system for small-share farmers and marginalized farmworkers who experience higher-rates of environmental hazards at work, are more vulnerable

to financial loss or wage exploitation, and have fewer legal protections. These inequities are aggravated by several climate-related events including the occurrence of natural disasters, unsafe working environments, and increased exposure to pests, pesticides, and vector-borne diseases. All of which reflect the disproportionate access to financial security and protections experienced by large agrifood corporations, compared to family-sized farm operations.

These challenges are compounded by the effects of soil degradation as well as resource constraints and competition making it more difficult to access land and adequate water for crops. In North America, agricultural lands are losing on average 5-tons of topsoil per acre every year, which has the resulting impact of losing 300-400 gallons of water per acre due to water-holding sediment loss from soil degradation (Nierenberg 2018, 5). This is worrisome when you consider that soil erosion in many parts of the world is happening faster than it can be regenerated and that droughts are increasingly prevalent in agricultural regions. This can have devastating impacts on small-share farmers who depend on rainfall and reliable local water sources. According to Nierenberg (2018), soil degradation in the US cost \$37.6 billion every year (5). While nearly 40 percent of land globally is used for agriculture and food production, over the last 40 years, 30 percent of arable land across the globe has become unproductive (Nierenberg 2018, 5). These statistics are particularly worrisome for small-share farmers who are routinely pushed off of thriving farmlands by corporate land grabs. Land degradation and the associated corporate farming practices has undeniable repercussions on the food security and socio-economic stability of rural and farming populations. Small-share farmers also unjustly face the risks of climate change through financial hardship from crop loss or damage due to increasing environmental crises, compared to the risks faced by agribusinesses.

Large agrifood companies in a globalized economy do not share the risk with farmers, even when their business models depend on farm productivity, because these industry leaders (especially those operating across transnational boundaries) choose which farmers and regions to work with and how prices are set. This means that as climate events worsen and impose greater threats to agriculture and farmers, agribusiness will follow wherever the crop production is strongest and will not bear the burden of the regions who experience crop failures and impacts of environmental and natural disasters (Anderson 2008, 598). These symptoms are further exacerbated by the influx of commodity items over the past several years, increasing corporate profits, while the costs of agricultural inputs to farmers have increasingly cut into farm profits (Anderson 2008, 597). In fact, as food prices have continued to go down in recent decades, profits for farmers and farmworkers have consistently declined, highlighting a major failure of US policy-making to upholding social equity in the food system.

Additionally, environmental threats that are posed to food producers, such as fire, drought, pests, and other natural disasters become social issues as the globalization of the food system and US policy makers favor the interests of corporate agrifood leaders in place of the outnumbering diversity of small-share farmers or the interests of consumers. Unprecedented rises in agricultural pests, food borne illness, and vector-borne diseases will all directly impact the health and well-being of producers and consumers in the food system. In addition, prevalence of heat stress, risk of natural disasters, and reduced access to safe water and natural resources will impact livelihoods and pose significant public health threats, particularly for food system workers (Campbell et al. 2016, 37). Furthermore, these events pose major risks to farmworkers who lack labor protections and may be exposed to increasingly hazardous working conditions (Anderson 2008, 597). Unsafe and unhealthy working conditions, especially those related to

agriculture risk becoming severely hazardous, toxic, and deadly—due to increased risks of poor air quality from pollution, and wildfire smoke, as well as exposure to other natural threats.

Despite the increasing threat of these risks, agricultural workers continue to bear the costs of producing low food prices through unjust labor conditions and exploitative agribusiness contracts. Small-share and peasant farmers are continually under-valued in the corporatized food system which aims to take over and capitalize on resources at the expense of rural communities. A food system interested in feeding communities while upholding social and environmental justice would recognize their capacity to feed more people, protect biodiversity, and support local communities (Lawrence 2017, 788-789). A food system with these values has potential to improve social equity for both producers and consumers in the food system by improving access to wholesome nutritional food items at stable prices, thus potentially alleviating the alarming rates of obesity and food insecurity across the country. The following section describes the impacts of climate change on social equity for consumers at greater length.

Climate Impacts on Social Equity for Consumers

Climate change poses significant threats to our food system and resource stability, which has the potential to exacerbate existing inequities among consumers across the agrifood system. For instance, disturbances to the food system impact consumers through food cost volatility, instability of supply chains, increased exposure to pollutants and environmental threats, among other socioeconomic disruptions. Across the food system the greatest consequences of climate change are experienced in marginalized communities, already lacking in fresh, accessible food choices, burdening the health of global populations by effecting those most vulnerable to and least responsible for progressing climate changes.

There are a multitude of ways that social inequities will be impacted by unprecedented weather events and disruptions in the food system relating to climate change. For example, the systemic disadvantages experienced by impoverished communities, position them to be more vulnerable to the negative impacts of climate threats socio-economically and environmentally. Literature suggests that this will be one way that climate change exacerbates food system inequities. In fact, Stone and Rahimifard (2018) state that all forms of supply chains will face increasing volatility across their business operations, “from energy cost, to raw material availability, and currency exchange rates (207).” Thus, supply chain parameters within the agrifood system from production and manufacturing, to distribution, may become increasingly vulnerable to volatility as extreme weather events impact the quality and quantity of raw ingredients (207). As the effects of climate change disrupt supply chains and food prices in the US due to local and global disturbances, marginalized populations will be on the front-lines to experience the greatest impact of these consequences.

Dietary choices in western civilizations are increasingly dependent on cheap production of commodity items and long-distance, energy-intensive transportation routes. This pattern is increasing environmental stress, abuse of natural resources, loss of nutrient-dense topsoil, and depletion of ecosystems, which are paramount to the filtration of waste and pollution in the food system. Along with these concerns, we are seeing a global crisis of food insecurity, matched with over-consumption, food waste, and loss of biodiversity (Campbell et al. 2016, 37). These agrifood contributions to climate change have severe social implications pertaining to the abuse of land and misallocation of food resources for consumers around the globe.

In addition to land-grabbing, financial investors along with corporations in the food system have capitalized on other sectors across food commodity chains. Notably, these

businesses have consolidated corporate power across food processing and derivative industries, which profit off of transforming cheap commodity crops into processed food items. This practice impacts consumer health by increasing consumption of harmful ingredients, also known as “empty calories” (i.e., salts, fats, and sugars) associated with diet-related preventable diseases (Lawrence 2017, 785). Since processed food items are stable, abundant, and cheap to produce, low-income and marginalized communities may be forced by supply chain disruptions or food cost volatility to rely on these food choices more heavily. Although some research emphasizes increasing crop yields as a solution to global food crises, the large majority of food supply in the western world ends up as waste rather than caloric intake (Campbell et al. 2016, 36). The narratives upholding the demand for cheap food and increased food production pose a major challenge to developing and navigating effective solutions to hunger for the most marginalized consumers.

Several articles suggest that there is one foundational misunderstanding about the cause of hunger and food insecurity in the world. This widespread myth is that there is not enough food being grown to feed the world's vast and growing population (Holt-Giménez 2019, 25; Poppendieck 1998, 1-2; Wakefield et al. 2012, 429). This point is even upheld by leading national and international agencies, such as the USDA and FAO, which publicize the idea that food production capacities need to increase to keep up with global demand (Holt-Giménez 2019, 27). Holt-Giménez (2019) refers to this as the scarcity narrative. This narrative navigates several issues about hunger and food production. Firstly, it upholds the perception that agribusinesses are necessary in order to produce food at the scale necessary to feed our communities. And, it provides an avenue for cognitive dissonance and supports the idea that hunger cannot be resolved thus relieving the expectation that a right to food be fulfilled. It also upholds the socio-economic

systems that are important for producing cheap food and keeping wages low. Finally, it builds a natural pathway to the food aid sector which allocates food surplus and waste to charity.

The impacts of climate change on the stability of local supply chains and the resulting food cost volatility is expected to increase health disparities and food insecurity by compounding the obstacles of low-income and minority groups to access healthful food choices. Climate events may also contribute to the lack of access to healthful food choices for marginalized communities and people living in food deserts, which may create added barriers to transportation or food safety (Biehl et al. 2018, 40-42). This occurrence could result in subsequent impacts to micronutrient intake, and increased stress to biological processes. These projections are underscored by the impacts of hunger and low-nutrient intake for food insecure individuals. As explained above, such adverse health conditions, impede childhood growth rates and cause psychological impacts, among other concerns (Hoefler and Curry 2012, 67; Yu, Lombe and Nebbitt 2010, 768). Relating to food security, food utilization, nutritional outcomes, and food safety are major considerations to the health implications for managing and mitigating climate effects (Campbell et al. 2016, 37). The experience of poverty drives health disparities across the food system due to low access to healthy food choices, healthcare and insurance, and the added stressors of living near or below the poverty threshold.

Health and lifestyle inequities in the food system risk being aggravated by the uneven threats faced by minority and low-income populations, based on proximity, exposure, and lack of protections to the public health risks produced by climate change. In both urban and rural areas, low-income residents are more likely to be impacted by environmental detriments such as pollution and water scarcity, based on a history of zoning policies that position them closer to environmental hazards. Climate change will impose greater effects on public health and

livelihoods outcomes in a multitude of ways that impact impoverished communities who lack protective measures or adequate health care access. The experience of these hardships on low-income populations are likely to be more severe and longer lasting impacts due to their inability to quickly recover from extreme weather events as quickly as higher earning residents. Such marginalized communities who lack social capital and access to systems of financial support are less protected against climate impacts and weather extremes, which produce socio-economic barriers through market volatility, price shocks, and transportation issues, among other challenges.

It is clear that the food system plays a significant role in the progression of climate change and that climate-related threats to the food system materialize differently across producers and consumers. I now shift to look at models of food system planning and engagement available to food system practitioners. The following section provides an overview of popular methods of food system planning, including the concepts of climate action and resilience planning, which notably lack substantial evidence of coordination with food system planning in literature or practice. These strategies are important to this research because they address how food system planning can engage with issues and approaches to inform food system planning so that social inequities are adequately addressed to account for the present and future implications of climate change.

Strategies for Food System Planning

This research addresses social and climate change-related inequities in the food system because I want to learn how issues and approaches relevant to food systems equity can be applied to planning so that inequities are not reproduced or exacerbated in the face of climate change. Given the social problems that this research addresses—of race-, class-, and gender-

based inequities in the food system and food insecurity—and that these may be aggravated by climate change—food system planning should seek solutions that address the problems of social inequity *and* climate change in conjunction. In order to support this effort, this research considers how contemporary food system planning efforts might do so. This section reviews common approaches to food system planning in order to better understand their engagements or potential engagements with social equity and climate change responses.

Food system planning is generally perceived to be an up and coming field of scholarship originating in the last two decades. Despite the increasing recognition of its role among planning fields, food system planning has deep roots in North American planning practices where agriculture has been central to urban development and building the international food economy (Vitiello and Brinkley 2014, 91). In this regard, food system planning involved links to land use, environment, and issues of regional planning. In addition to these planning sectors, public health officials and planners involved in the economy have found that planning throughout the late nineteenth and early twentieth centuries also presented major concerns for food production, distribution, and safety (Vitiello and Brinkley 2014, 91-92). Along with the emergence of food system planning, the mid-twentieth century was marked by increased control by the corporate food industry.

During this time, food processors, supermarket chains, agricultural economists, and public health leaders overtook the management of planning in the food sector, resulting in diminished roles in food system planning among city planners (Vitiello and Brinkley 2014, 92). The new developments in this field are characterized by increased attention to the social dimensions of food system planning, and less emphasis on broader economic and trade systems. However, food and agriculture have remained important elements of strategies to address

poverty and inequality through regional planning and economic development (Vitiello and Brinkley 2014, 92). There are several ways that food system planning has aimed to address issues of inequity in the food system, however, the more recent addition of climate and environmental threats to communities and the food system impose an added obstacle to the challenges of food system planning. It is increasingly popular in developed countries for local and national branches of government to develop departments devoted to food system planning and addressing food system policies.

The modern era of food system planning is more concerned with the social and environmental implications of policies and programs compared to its historical focus on centralized commodity markets and economic development. This is marked by the increasingly popular topics of sustainability, resilience, equity, and food justice. In 2010 the American Dietetic Association, the American Nurses Association, the American Planning Association, and the American Public Health Association collaborated to produce a set of shared principles called the Principles of a Healthy Sustainable Food System which were designed to orient practitioners in transformative work to improve community and regional food systems (Day-Farnsworth and Morales 2011, 228). This set of principles deemed important for transformative food system planning is comprised of health-promoting; sustainable; resilient; diverse in scale, geography, culture, and food choice; fair for farmers, workers, and eaters; economically balanced; and, transparent (Day-Farnsworth and Morales 2011, 228). These concepts are evidence of the evolution in the scope of food system planning to consider the broader social and environmental influences of food system dynamics.

The varied and interdisciplinary nature of the food system planning field suggests that there is ample opportunity for food system planners to address the social issues behind climate

change and food system inequities. Freedgood, Pierce-Quiñonez, and Meter (2011) emphasize the practice of planning as a method to promote social, economic, and racial equity, along with ensuring that communities are healthy and safe places to live through improved economic opportunity, quality of education, affordable housing and transportation options, recreational and cultural opportunities, and protection from environmental hazards (97). While government planning has increasingly integrated various models for addressing food systems issues in policy, programming, and planning, these efforts are also commonly supported by community programs, non-profits, institutional collaboration, or other ad hoc models.

While planning scholars and city planning departments are experiencing a resurgence in their contributions to food system planning, there are several sectors involved in food system planning and decision-making processes. In the section that follows I first explain two methods for informing food system planning, which have contributed significantly to the field in recent decades. These are food system assessments (FSA) and food system mapping, which can improve knowledge of regional gaps and barriers to local food systems, engage cross-sector collaboration, and have been considered important precursors to the planning field (Freedgood, Pierce-Quiñonez, and Meter 2011, 97). I follow this with an explanation of the leading models of food system planning that occur in the US including community food system (CFS) planning, and food policy councils (FPCs). These strategies of engaging with food system planning provide significant opportunities to planning officials and food system practitioners for better addressing the perpetuation of social inequities and problematic threats of climate change to social justice. Finally, this section concludes with an introduction to resilience and climate action plans and explains the need for greater integration of these models into food system planning where they are notably absent.

Food System Assessments (FSA) to Inform Planning

FSA's are an increasingly popular tool to assess the complex and collaborative dimensions within the agrifood system, which are primarily conducted on a community, county, city, or state level. Such assessments can be an important tool for identifying the gaps and barriers to regional food security and equity in the food system in order to make informed recommendations for planning and programming. Assessments can be used to collect and interpret regional data or to provide stakeholders with decision-making power through engagement and planning processes (Freedgood, Pierce-Quiñonez, and Meter 2011, 90). There are a broad range of FSA's, which assess a variety of components in the food system and can illuminate inequities across many sectors. While FSA's take many forms, the most common are Comprehensive Food System Assessments and Community Food Security Assessments. These types of FSA's strongly incorporate food security and access as objectives to understanding a regional food system.

Other assessment models, however, such as Foodshed or Land Inventory assessments more strongly focus on elements of regional production capacity and may overlook the social considerations involved in food access through processing, storage, and distribution capacities (Freedgood, Pierce-Quiñonez, and Meter 2011, 89). Additionally, assessments that emphasize economic capacities and industries, may also neglect to identify key elements of social issues in the food system they are assessing. Despite the inconsistencies across FSA's, they may offer a link for connecting different elements of the food system. FSA's may also offer an important step towards addressing the gaps in food system planning by connecting knowledge of regional food systems across socioeconomic impacts and the bio-regional environmental ones. While the intention of FSA's may vary based on scope, methodology, and objective, they are primarily

conducted to inform planning within agrifood systems—from production to consumption and waste.

Due to the diverse array of focus areas available to FSAs, they may prove to be a useful tool for food system planners and practitioners concerned with the complex interactions of climate change, social equity, and food systems. While there is evidence of FSAs across the US that have emphasized goals of resiliency, sustainability, environmental responsibility, or social justice, I am not aware of one that has explicitly assessed the impacts of climate change on social equity. Because climate change will have multi-dimensional impacts on social equity and the agrifood system, FSAs may be most impactful at assessing this intersection by employing strategies from the various types of assessment models. This type of mixed assessment may require collaboration across sectors concerned with economics, environment, community development, public health, or transportation among others in order to comprehensively assess the social implications of climate change on the food system.

Food System Mapping

Food system mapping offers a comprehensive visual analysis of regional food system statistics, research, and project development. Food system mapping is another tool to inform policy and planning through the investigation and analysis of regional food systems. Since 2008 there have been a growing number of publications and web-based mapping methodologies that aim to depict the intricate relations of food accessibility to public health concerns, social and economic components, and environmental impacts, among other factors (Sweeney et al. 2015, 123). This approach intends to provide a new analysis of the components within a local, regional, or state food system plan and offer an improved method of understanding the bio-regional food system and barriers to food security.

Food system maps can also serve as a public archive of the organizations involved in food system stakeholder, planning, and advocacy. This information allows for advancements of food-related educational delivery, informed research and planning, and offers knowledge of local resources and beneficial analyses for collaboration and expansion among food system producers and practitioners (Sweeney et al. 2015, 140). GIS maps allow for visual customization and manipulation of selected data sets that can help to depict the strengths and barriers of a food system and inform an array of food system players from agricultural and livestock farmers, seafood producers, and food processors, to stakeholders, policy makers, and consumers (Sweeney et al. 2015, 212; 123). These mapping technologies could serve as important tools for informing food system planning with specific regional data and bring important awareness to disruptions in food security, particularly in response to climate change. Food system mapping offers a unique strategy for establishing a connection between climate change and food system planning by applying specific information about landscapes, environments, and weather information. These mapping features may be particularly useful when overlaid with geo-spatial information about demographics, food retailers, food production and transportation, or poverty statistics.

Community Food Systems

CFS practitioners encompass a range of ways that community-driven efforts can influence and advocate for policy change in the food system, as well as enacting their own planning and programming. The acronym CFS is often used interchangeably in food systems literature to mean Community Food Systems or Community Food Security. Although they are related concepts, this research adopts CFS to mean Community Food Systems as it encompasses the larger model of community-driven action in the agrifood system, which sometimes engages

in food security work. Specifically, the CFS movement has been increasingly discussed within academic literature and has developed a network of non-profits in the food sector, who often participate in food system planning, research, or advocacy.

Institutions and community-based non-profits are also increasingly involved in the planning processes in the food system by influencing awareness of social justice issues and participating in research and advocacy for local food system issues that could be addressed through planning at local and regional scales. CFSs reflect one aspect where significant institutional participation has occurred through modern planning models. CFSs can address tensions that arise across political, institutional, or organizational levels including those from conflicting stakeholders or lack of establishing common language and agendas (Campbell 2004, 341). CFS practitioners, as well as, several University departments leading food movement organizations across the US have contributed to documents and research relating to food system planning, FSAs, and food system mapping. In this regard, CFS planning holds the potential to encourage dynamic engagement across social, ecological, and economic health within communities and resolve tensions across food system agendas.

CFS planners working in policy or academia have the potential to drive change by promoting creative and equitable solutions to food system problems. Wakefield et al. (2013) suggest that the connection between community food movements and food security relief efforts has contributed to the expansion and entrenchment of food aid programs, which ultimately distract from efforts that would respond to the root causes of food insecurity by alleviating poverty (428). However, the strategies developed by these leaders can be useful for producing effective climate change action when they are rooted in social equity and community livelihoods. Practitioners might do this by facilitating, advocating, researching, or communicating needs

across their food system (Campbell 2004, 349). Other work in this field that may improve equitable responses to climate change might involve supporting local food system projects and initiatives or advocating for improved policy reform that supports equitable solutions for producers and consumers.

Food Policy Councils

Since the 1980s FPCs have spread across the US as a way to address the food system gaps across the policy and planning fields. These councils often serve as a link between the local, grassroots, CFS efforts and those of the larger government. In fact, many FPCs were first created based on needs from community organizations that have identified policy opportunities and barriers within their work (Harper et al. 2009, 2). FPCs are often interdisciplinary entities that aim to comprehensively address the array of policy areas that affect food systems. By improving coordination across these related government agencies, FPCs are able to better advocate for food system issues and encourage stakeholder voice and democratization in this process. This can call for engagement with environmental, public health, small-business, housing, transportation, and energy sectors, among others. FPCs have called for systemic and comprehensive transformations to the way that food system planning occurs by demanding holistic solutions to problems that used to be addressed in isolation (Harper et al. 2009, 16-17). By serving as a tool to coordinate across sectors, FPCs also promote collaboration across sectors within the food system such as family farms, local restaurant and retail businesses, and worker unions (Campbell 2004, 350; Harper et al. 2009, 19). FPCs can take many roles by acting as independent community organizations, advisory bodies, or government agencies. Through these various models FPCs have proven to be an effective tool over recent decades for advocating food system issues, particularly across local barriers, environmental concerns, and social injustices.

In the face of climate change, FPCs can provide an important interdisciplinary role that is able to respond to the disturbances faced by the diverse positions of participants and stakeholders across the food system. FPCs can represent an array of socio-economic roles when they contain a group of diverse and collaborative stakeholders. Additionally, FPCs may be effective at communicating and advocating in their communities by reaching a broader audience than CFSs practitioners may have access to, for instance. Campbell (2004) suggests that they can be made up of “farmers, food processors, wholesalers or distributors, retailers, institutional purchasers, school food-service staff, nutritionists and dieticians, antihunger advocates, food-related and other nonprofits, cooperative extension service faculty and staff, religious groups, academic researchers, concerned citizens, and representatives from local, county, and state government agencies or departments (350).” Multi-disciplinary FPCs can improve equitable responses to climate change by bridging efforts and sharing resources. For instance, coordination across these sectors may provide opportunities and creative solutions for food system practitioners, climate change leaders, and policy makers to collaborate in planning efforts.

Resilience and Climate Action Plans

Resilience and climate action planning are increasingly popular approaches to prepare and implement strategies for protecting communities and socio-economic systems from disturbances, such as those imposed by climate instability. However, there is very little evidence of food system-focused resilience planning or climate action planning in academic and planning literature. Biehl et al. (2018) state that few US cities have considered food systems in disaster preparedness or resilience planning (39). In fact, Baltimore, MD with the guidance of Johns Hopkins University is the only US city that has produced substantial evidence of food system resilience planning. And, in a paper discussing the process of producing the Baltimore Food

System Resilience Advisory Report (2017), it is stated that to the knowledge of the authors “no urban food system resilience planning processes are documented in the academic literature (Biehl et al. 2018, 40).” Despite the popularity of resilience planning, in light of recent attention to the climate crisis, the application of resilience plans remains disconnected from food system planning practice and discourse.

This gap should concern food system practitioners due to the severity of climate change impacts on the food system socially, economically, and environmentally. Several authors who have investigated the social dimensions of climate change on the food system have expressed that the research emphasis on agricultural productivity has overshadowed our attention to socially-oriented solutions (Biehl et al. 2018, 42-44; Campbell et al. 2016, 38; Lang and Barling 2012, 315). Campbell et al. (2016) also suggests that the research culture of food system resilience requires a substantial shift toward an action-oriented agenda. He argues that the field should be focused on addressing the urgent challenges of climate change but has notably lacked relevance to policy-makers and practitioners, creating an “implementation-gap (315).” While food system resilience is an increasingly popular topic, it is a complex field, which has not coalesced around a set of established indicators for measuring and assessing resilience in the food system (Biehl et al. 2018, 50). These challenges to food system resilience planning requires the engagement of food system practitioners to facilitate bridging these gaps and advocating for food systems to be incorporated in planning for climate change.

Research Problem and Questions

The experience and aggravation of social inequities from climate change will be conditioned by the socio-economic, cultural and regionally-specific threats to the agrifood systems, which have not been adequately addressed at the local and regional planning levels. For

this reason, understanding how to improve food system planning through a framework of relevant concepts is an important step to addressing the social problems compounded by climate issues. This research addresses social and climate change-related inequities in the food system because I want to learn how interventions can be applied to planning initiatives so that social inequities are not reproduced or exacerbated in the face of climate change. This section states the overall and constitutive research questions used to address this research focused on the application of relevant concepts to food system planning that addresses the intersection of climate and social inequities. These questions have been developed through the preliminary research provided in this chapter, which has uncovered a gap in available literature pertaining to the relationship of climate change and social inequities as they relate to planning in the food system. To address this gap, this thesis asks critical questions about the impacts of climate change on social equity across the food system, in order to inform policy and advance knowledge for equitable and inclusive practices.

Overall Research Question

This research asks, how can interventions to advance food system equity be applied to planning initiatives so that inequities are not reproduced or exacerbated in the face of climate change? To answer this question, I collect, organize, and critically analyze literature on food systems issues and approaches that address the intersection of climate-related and social inequities in order to understand how these concepts can be applied to food system planning. In order to adequately answer this question, I ask three constitutive questions, which together ensure my conclusions are comprehensive and critically appraise the ability of these food system concepts to address equity in planning practice for both producers and consumers.

Constitutive Research Questions

Constitutive Research Question 1: What food system interventions can be applied to planning initiatives so that solutions address the intersections of climate change and social inequity among food *producers*?

This question explores one component of the overall research question, which is how food system planning can mitigate the aggravation from climate change on social inequities for producers—for instance, small-share and minority farmers, or marginalized farmworkers. This question was important to ask because previous research on climate change in the food system has emphasized agricultural efficiency and productivity but has paid less attention to the social equity and livelihood impacts for small-share farmers who are faced with unique challenges and inequities through added barriers to productivity and adaptability, as well as socio-economic and health-related impacts in the face of climate change.

Constitutive Research Question 2: What food system interventions can be applied to planning initiatives so that solutions address the intersections of climate change and social inequity among food *consumers*?

Similar to the first constitutive research question, this question explores the application of concepts from food systems discourse relating to climate change and social inequities to food system planning, in order to address issues for a specific population—consumers. I found this to be important to ask because while a quick search of academic databases and web sources will return extensive results of efforts to address and promote resilience in agricultural sectors, the socio-economic impacts to US food consumers from climate change have received less attention. This question addresses how to improve food system planning through the application of prominent issues and approaches, to ensure that consumer-based inequities are addressed in

planning efforts and are not reproduced by policies, planning, or the experience of climate hardships. Answering this question will also allow me to make inferences about what kinds of climate impacts on social equity are not being addressed through the available concepts and strategies that are leading academic discourse.

Constitutive Research Question 3: How can results identified in Constitutive Research Questions 1 and 2 be applied to improve food security?

While food security is an issue for both producers and consumers that could be discussed in both of the questions above, because it so clearly connects social equity, climate change, food systems, and planning discourses warrants a deeper analysis of the issue. Scholars, for example, have identified that “reducing risks to food security from climate change is one of the major challenges of the 21st century (Campbell et al. 2016, 34).” Food insecurity is inextricably linked with social inequities in the food system and is threatened in a multitude of ways by climate-instability and hazards. In order to understand how issues of food insecurity can be explicitly identified and addressed in food system planning, this question situates the findings of the previous two constitutive questions within the dimensions of food security described above.

Summary

This chapter introduced the social problem and research problem that this research addresses, as well as several guiding concepts that will help to answer my overall and constitutive research questions. I have introduced a set of social inequities which will be underscored throughout the subsequent chapters in order to analyze the findings of my constitutive research questions. I also introduced the most alarming ways that climate is anticipated to impact social equity in the food system and what that might mean for producers and consumers. Additionally, several strategies of food system planning were introduced in order

to establish the need for food system planning to more carefully consider social and climate-related inequities. In the following chapter, I discuss my positionality, methods, and methodological approach to applying these concepts in the context of my proposed questions.

Chapter Three

Methodology and Methods

Introduction

The purpose of this chapter is to provide a detailed explanation of the methodologies and methods used by this research. I first introduce critical inquiry as the predominant methodology in this research. I go on to explain how I use literature review and an inductive approach to collect and analyze data. I then explain my positionality relative to this research and its significance in conducting this research. Finally, I describe the specific methods used to answer each constitutive research questions, explaining the units of analysis and observation, scope of research, and the data collection, organization, and analysis strategies for each research question.

Methodology

The overall question this research aims to answer is, how can interventions to advance food system equity be applied to planning initiatives so that inequities are not reproduced or exacerbated in the face of climate change? In order to answer this overall research question, I asked three constitutive research questions. My first question examined the leading concepts that drive the academic discourses surrounding climate change and social equity issues as they relate to producers in the food system by asking, what food system interventions can be applied to planning initiatives so that solutions address the intersections of climate change and social inequity among food producers? Then, I asked, what food system interventions can be applied to planning initiatives so that solutions address the intersections of climate change and social inequity among food consumers? This leads to my final question, how can results identified in Constitutive Research Questions 1 and 2 be applied to improve food security?

As noted, in order to answer these questions, I used the methodologies of critical inquiry and literature review. In the subsequent sections I describe each of those methodologies, explaining why they were chosen and how they are applied, followed by an explanation of my positionality. Then, I describe the specific methods used in this research to answer each of the constitutive research questions.

Critical Inquiry

This research required the use of critical inquiry in order to situate findings from the data within a social science lens and provide an analysis that critically assesses the indicators and impacts of social inequity within food systems literature. Critical inquiry is a research process that aims to question and improve social circumstances and the human condition, particularly among the vulnerable and oppressed (Comstock 1994, 629; Jesson, Matheson, and Lacey 2011, 66). The constitutive research questions developed by this research were designed to address the differing experiences of social inequities and climate impacts among producers and consumers. Their purpose was to ask how food system planning interventions might address the social impacts of climate change on the food system, including food insecurity, without reproducing social inequities or unintended consequences.

Literature Review

A review of literature was conducted to analyze the available bodies of literature and discourses pertaining to the issues and approaches for addressing climate change and related social inequities in the food system. Literature review is the written product of systematically reviewing available materials or bodies of work that have been written on a particular topic of interest (Jesson, Matheson, and Lacey 2011, 9-10). In the context of this research, review and analysis of literature was needed to better understand the available concepts and frameworks that

exist across planning, social justice, and climate change literature in order to determine how they may be applied to the food system. By producing a review of the literature, I examined the discourse surrounding relevant issues in and approaches to climate change and related social inequities in the food system, ensuring a comprehensive understanding of the available knowledge. This analysis allows me to answer the constitutive research questions by determining the leading concepts and strategies across discourse, in order assess their effectiveness to be applied to food system planning.

Positionality

Given that I grew up in a state with many rural communities, who are exposed to the greatest impacts of climate change, it makes sense that I would see climate change and social inequity as leading threats in the food system and that I want to increase my understanding of methodologies that address the barriers to equity and prepare communities for climate instability. This research is important to me because having grown up in a state with high rates of food insecurity and that is largely dependent on outside agricultural producing regions, I have a personal interest in further understanding the capacities to mitigate and respond to the threats of climate instability for the most vulnerable populations. These experiences drive me to want to contribute to a greater understanding of the practical ways we can evaluate, understand, and respond to social inequities that face being aggravated by climate change, particularly those leading to food insecurity, based on a communities' unique regional needs.

Methods

This section will explain the methods used to answer the three constitutive questions. For each of these questions, I explain the methods, data needed, unit of analysis and observation, scale and scope of research, and strategies for data collection and analysis.

Research Question One

Research Question 1: What food system interventions can be applied to planning initiatives so that solutions address the intersections of climate change and social inequity among food producers?

In order to answer this question, this research investigated and reviewed available literature relating to social equity in the food system and climate-related impacts to social inequities for producers in the food system. The data needed to answer this question were evidence of concepts relating to social equity and climate change impacts in the food system. The units of analysis were the issues and approaches relating to social equity, climate change, and the food system. And, the unit of observation was academic literature and available planning documents relevant to food system planning, social equity, and climate change impacts. This question was primarily assessed at the local and regional planning levels, though some relevant information was drawn from literature focused on a global scale.

In order to acquire the appropriate data, I reviewed available documents related to food system planning and programming to determine which issues and approaches were relevant to the inequities faced by food system producers. These data came from academic literature and planning documents collected from academic databases and government or institutional planning websites. These data were collected by conducting academic literature searches and internet searches for independently or institutionally produced documents. I determined data sets by critically analyzing literature and planning documents to identify dominant themes that address issues relating to social equity and climate change in the food system among producers. To organize these data, I provided an overview of the issues and approaches that were uncovered in the literature review. This was followed by a critical analysis which assesses the social equity

implications of these concepts and examines their capacity to be applied to food system planning in order to address the impacts of climate change relevant to producers. This analysis aimed at elaborating the issues and approaches in relevant literature to determine how they can be applied by food system planners and offer an analysis of their effectiveness to address inequities for producers in the food system while responding to the impacts of climate change. The second constitutive research question replicates the methods and methodologies of this question but emphasizes the social inequities that are experienced by consumers across the food system.

Research Question Two

Research Question 2: What food system interventions can be applied to planning initiatives so that solutions address the intersections of climate change and social inequity among food consumers?

As was explained through the first constitutive research question, this question was answered through a review of the literature relating to concepts in the fields of planning, social equity, and climate change. The data needed, unit of observation, unit of analysis, and scale of research were the same as the first constitutive research question. Consistent with the first research question, data was collected through academic literature searches and internet searches for independently or institutionally-produced documents. In order to find the relevant data, I examined academic literature and planning documents. To answer this question, however, data were selected for their capacity to address or influence social inequities among consumers, rather than producers, in the agrifood systems. Issues and approaches in food system equity related to climate change were identified through literature review, presented as results and contextualized in Chapter 4, and then critically analyzed to conclude their implications for social equity and applications to the planning field.

Research Question Three

Research Question 3: How can results identified in Constitutive Research Questions 1 and 2 be applied to improve food security?

To answer this question, the data needed were evidence of key concepts related to social equity and climate change impacts in the food system, which were adopted from the previous constitutive questions in order to determine their influence on the dimensions of food security. For this reason, the source of data was determined by the sourcing strategies of the previous constitutive questions, which was academic literature and planning documents. The unit of analysis for this question was relationship between food security interventions and frameworks and the results from the previous constitutive questions. Reflecting the previous questions, the unit of observation for Question 3 was academic articles and official documents relevant to social equity in food system literature, particularly relating to food access and security. Also aligning with the previous questions, this question was primarily assessed at the local and regional planning levels, however some global perspectives of food security have broadened the scale. The data used for this question was organized within a framework of food security dimensions outlined by the FAO (FAO 2008, 1). By sorting key concepts within a food security framework, I was able to deduce how leading concepts of social and climate-related inequities might influence food security across each of the dimensions—food access, availability, stability, utilization.

The third, and final, constitutive research question adopted the results from the previous constitutive research questions and systematically considered the implications of these findings within a food security framework. This framework assisted with critical analysis by systematically presenting the interactions of climate impacts on social inequity and the resulting

outcomes on food security. Understanding the leading concepts for addressing social and climate inequities, as well as how gaps in literature fail to comprehensively address the dimensions of food security, can help to inform food system planners through the lenses of social and climate inequities. By understanding the concepts and actions available to food system planning this research has provided evidence as to how these concepts can be applied to inform strategies across the dimension of food security through an equity lens.

Summary

This research has aimed to discover how food system planning can engage with issues and approaches pertaining to food system equity to address the interactions of climate change and social inequities. To do this, it considers the complicated relationship of climate change, equity, and food security to ensure that planning initiatives respond these complex interactions without aggravating or reproducing systemic social inequities. The first two constitutive questions of this research pertain to the unique set of inequities experienced by producers and consumers, reflecting the distinct trends that vary across participants' roles in the food system. To answer the third constitutive question, this research considers how action and inaction to prevent the perpetuation and reproduction of inequities might influence the experience of food security.

Chapter Four

Results, Analysis, and Contribution: Key Concepts, Applications, and Recommendations for Food System Planners

Introduction

The primary social problem that this research responds to is social inequities in the food system among producers and consumers that may be exacerbated by climate instability and hazards. Thus, this research addresses social and climate change-related inequities in the food system because I want to learn how issues and approaches relevant to social equity can be applied to planning so that inequities are not reproduced or exacerbated in the face of climate change. To address this research problem, this research asks, how can interventions to advance food system equity be applied to planning initiatives so that inequities are not reproduced or exacerbated in the face of climate change? To answer this question, I ask three constitutive questions: 1. What food system interventions can be applied to planning initiatives so that solutions address the intersections of climate change and social inequity among food producers? 2. What food system interventions can be applied to planning initiatives so that solutions address the intersections of climate change and social inequity among food consumers? And, 3. How can results identified in Constitutive Research Questions 1 and 2 be applied to improve food security?

In this chapter, I answer these questions, providing results and analysis of the findings for each question. I then explain the contributions of this research to academic discourse and food system planning practice related to social equity in the food system, climate change, and the strategies for addressing them. Finally, I offer a reflection on the scope of the research and its limitations, as well as recommendations for future research and applications.

Research Question 1: Results and Analysis

This question addresses the social dimensions of climate-related threats for food producers emphasizing the inequities experienced by small-share, minority farmers, and farmworkers. To determine the threats to social equity caused by climate change and learn how they can be addressed through planning, I ask: what food system interventions can be applied to planning initiatives so that solutions address the intersections of climate change and social inequity among food producers? To answer this question, I first identified prominent issues and approaches in food system equity that pertain to the cause or alleviation of inequities for producers facing the threats of climate change. These are: land access, financialization, and corporate control; rural and mental health disparities; crop insurance; subsidies, and disaster relief; labor unions and coalitions; education, technology, and adaptation; food sovereignty; organic and sustainable agriculture; and, resilience and transformation. Next, I analyze how these concepts can inform food system planning to address the intersection of social and climate-related inequities. Finally, I produce a list of recommendations for planners when considering the impacts of climate change on social equity in the food systems.

Results: Issues and Approaches for Addressing Social Inequity Among Producers

In this section, I review eight concepts identified in food systems literature relevant to producing or addressing social inequities across producers in the food system. Together, these issues and approaches illustrate the concepts relevant to food system planners for intervening in social inequities in the food system. After introducing each concept, I move on to analyze their capacity to be applied to food system planning to effectively address the intersection of climate change and social inequity among food producers.

Land Access, Financialization, and Corporate Control

Land access, control, and inheritance are significant factors upholding inequities among small-share producers that will be reproduced and aggravated as climate instability causes added barriers to accessing land for small-share and beginning farm operations. As this research established in Chapter 2, competition over land and resources are not new challenges. The influx of corporate control and financial interests, as well as the policies that back them, have concentrated the control of resources further away from small-share producers. Despite this, small-share farmers are predominantly responsible for upholding diversity in the food system and production of healthful, local food items (Anderson 2008, 598). However, the corporate food regime seeks to transition agricultural lands away from small-share diversified farmers to those willing to produce commodity crops such as corn and other bio-fuels, jeopardizing diversity and healthful food access in our food system.

In recent decades, US agrifood policies have consistently advanced corporate interests to consolidate and capitalize on bio-regionally available resources while protecting their financial interests. This system jeopardizes the livelihoods of farmers who are increasingly pressured to adopt large-scale commodity crop production, ultimately leaving them with large debts, financial uncertainty, and vulnerability to losing their farmland. Increasing demand from western countries for biofuel production has driven farmers to produce commodity crops for the energy sector, in place of producing a diverse food supply. As an added obstacle, market access for small-share farmers can be difficult to achieve without contracting to grow large-scale commodity crops, which often requires them to take out substantial loans for startup costs (Lawrence 2017, 785-788). Meanwhile, diverting commodity crops away from the food supply chain has had the added benefit to agribusiness corporations of controlling food prices by not

over-saturating the market (Lawrence 2017, 781). This takeover of agribusiness has been achieved through numerous market-control tactics that have pushed small-share and peasant farmers out of business through large-scale land acquisitions, and financial speculation and hedging (Clapp and Isakson 2018, 439; Lawrence 2017, 780-784). These injustices impose a devastating barrier to entrance for farmers, despite the fact that small-share farmers are more likely to produce diverse and nutritious food items, and feed back into local economies.

The corporate control over land and resources is underscored by the prevalence of land inheritance and the rate at which land is being secured and financialized by the hands of the wealthy. In 2015, the National Sustainable Agriculture Coalition (NSAC) stated that while 91.5 million acres of farmland was positioned to transfer ownership over the next five years, only 21 million of those acres were expected to be sold to a non-relative (2015). The NSAC states that more than half of these landowners are over 65 years old, while only 18 percent of them are under 55 years old (NSAC 2015), forecasting the disparities that will arise in the following years as the majority of these farmlands are transferred to successors. These trends of land ownership, although they exist at many levels, reflect the shift toward financialization of farmlands and added financial constraints for food producers who lack the capital to compete for resources. This is made evident by the fact that 39 percent of farmland in the US is rented or leased amounting to \$1.1 trillion of farmland, 80 percent of which is owned by non-farming landlords (NSAC 2015). Based on these projections, it is likely that available farmland will become more limited in the coming years, restricting access to beginning farmers, as well as low-earning, minority, and women farmers at a time when resource scarcity, environmental instability, and economic disparity are major challenges.

Rural and Mental Health Disparities

Increased risks of unsafe working conditions reflect health disparities for producers in the food system. This occurs through decreased ability to access medical services, high rates of diet-related preventable diseases, and mental health issues, all of which are exacerbated by increasingly difficult working conditions and crop loss from climate instability. Small-share farmers, rural residents, and low-income Americans are among the most likely populations to lack appropriate and affordable healthcare access and health insurance. Among farmers in the US, only about 6% are able to acquire health insurance through their farm business, making off-farm income an important part of receiving adequate health care and medical services for farmers (Anderson 2008, 597). In addition to the barriers to health insurance, health disparities for farmers often reflect those of rural America, who have higher rates of age-adjusted mortality, disability, and chronic disease than urban populations (Jones 2009, 7-8). Farmers also risk higher rates of occupational accidents and disease than other rural residents and urban populations. Despite a lack of legal protections compared to other industries, agriculture ranks as one of the most hazardous industries by the National Institute of Occupation Safety and Health (Jones 2009, 10). This reality poses a significant threat to the agricultural labor force who face increasingly hazardous working conditions with limited legal protections.

Despite working in agriculture, food producers are also victim to the same structural inequities that prevent access to resources and healthful staple food items through geographic barriers, transportation issues, and lack of economic mobility and opportunity. Farmworkers, who are subject to low wages and exploitation, often cannot afford to purchase the foods they produce. Minkoff-Zern (2014) argues that food assistance programs for agricultural workers ultimately benefit agribusinesses who can ensure that workers are fed through charity and

surplus food supply, without raising wages (91-92). Farmers and farmworkers in rural areas are significantly impacted by the lack of rural healthcare resources, due to their exposure to work and environmental stressors. An obvious solution to address rural health disparities is to improve access to healthcare services for rural populations and improve opportunities to acquire acceptable health insurance.

In addition to other public health services, resources to provide mental health support are particularly challenged in rural areas. Rising rates of suicide across the United States are particularly worrisome for farming communities, which along with forestry and fishing industries, exhibits some of the highest suicide rates (Reed and Claunch 2020, 1). This is in part due to major financial hardships that come from crop loss and unexpected operational costs—all of which may worsen in the face of extreme weather events driven by climate change. While the suicide rate of farmers and ranchers is 3.5 times that of the general public, it is also suggested that the social stigma of suicide in rural areas may lead to underreporting of suicide statistics for farmers (Reed and Claunch 2020, 2). As farmers and farmworkers face greater socio-economic and environmental instability, these mental health concerns are likely to be exacerbated. This is increasingly worrisome when considering that lack of adequate medical services and access to health insurance is a major injustice faced by farmers and rural residents alike. These injustices require the attention of planning officials who aim to identify and address social issues in the food system, especially in the context of climate change, which will stress the already limited capacity of these services.

Crop Insurance, Subsidies, and Disaster Relief

This section discusses the issues of government funded crop insurance, subsidies, and disaster relief as strategies for supporting small-share producers in the context of climate change.

Crop insurance policies are typically sold through private insurance companies with the federal government subsidizing a portion of farmer premiums. US crop insurers have historically struggled with low participation from farmers and higher rates of participation among high-risk farmers (Goodwin and Rejesus 2008, 416; Dhanireddy and Frisvold 2012, 3-4). This may, in part, be driven by the fact that low-risk farmers are more likely to be impacted by yield losses that are widespread and more likely to result in disaster relief funds (Goodwin and Rejesus 2008, 416). Some critics argue that continual disaster relief provisions have undermined the incentives for farmers to participate in the federal crop insurance program (Goodwin and Rejesus 2008, 416). In contrast to crop insurance, congressional disaster relief is an ad hoc solution to a temporary event. Although crop insurance and disaster relief plans have changed over time reflecting political influence and changes to the farm bill, these two forms of government assistance remain the dominant programs available to farmers experiencing hardship.

Despite the potential for these programs to be implemented through equitable policies that offer the greatest support to the farmers most impacted and least able to recover from hardship, the history of these programs does not reflect those priorities. Anderson (2008) says that government payment to farmers allow them to keep producing when income is too low to cover household and operational expenses, but that “farmers simply serve as a conduit for crop subsidies to agri-business (589).” The concentration of US farm supports among a relatively small number of large producers is a common complaint of these programs (Goodwin and Rejesus 2008, 415). Between 2003 and 2005, 66 percent of government subsidies went to the top 10 percent of farmers with the top 1 percent of farmers receiving an average of almost \$126,000 (415). Additionally, large agri-business entities are more likely to receive subsidies through financed water and roads (Anderson 2008, 589), and energy subsidies for the production of grain

ethanol (NRC 2015, 69). Although disaster relief packages are increasingly important for the resilience of small farm operations adapting to climate change, there is not significant evidence in the literature of how these policies are changing (or should change) to adapt to these new risks.

Labor Unions and Coalitions

Agricultural labor workers in the US face an array of alarming labor injustices with few legal protections. This research has established that farmworkers face significant occupational and environmental hazards, which are underscored by the lack of appropriate avenues for organizing and upholding labor rights. Agricultural workers are exempt from the Fair Labor Standards Act and the National Labor Relations Act, which protect employees in other sectors across the US (Anderson 2008, 600; Bon Appetit 2012, 11). Exemption from these federal legal protections have made farmworkers vulnerable to sub-minimum wage pay, exploitative hours without restrictions for overtime and regulated work breaks; and disenfranchised them from having collective bargaining power. The Bureau of Labor Statistics estimates that only 1.2 percent of all private-sector employees in agricultural industries are represented by unions and 1.8 percent for workers employed in food service (NRC 2015, 177). This is significant when considering that unionization improves livelihood and working conditions among low-income workers, even for those workers who are not unionized. Unions are also explained to reduce work-place inequalities and increase the influence of workers over larger corporate decision-making (Rosenfeld 2019, 453- 454). This is because higher-waged workers have more influence over executive decision-making power. These injustices to agricultural workers have lasting implications on the food industry and livelihood of all food producers and laborers.

The inability to organize for improved wages and working conditions jeopardizes the livelihood of farmers, particularly those who are minority, women, and immigrant farmworkers. This has major implications for the 9.3 million estimated undocumented workers in the US (Anderson 2008, 600). The lack of bargaining power among food production workers has led to growing economic disparity across the food system allowing profits of major agrifood companies to rise drastically over the previous decades, while prices paid to farmers for commodity crops has dropped over the same time period (Anderson 2008, 597). The severe hazards and unjust working conditions of agricultural labor is underscored by the fact that farmworkers are not well represented in data.

Labor statistics and records of farmworker data are often misunderstood or underrepresented for a number of reasons. The nature of seasonal farm work does not present consistent annual data and workers may work for several different farms in a given season. And, migrant workers oftentimes lack a paper trail (legal documentation or employment records) or are hired through third party contractors. It is also possible that small farms or migrant workers opt out of official data counts (Bon Appetit 2012, 1). For these reasons, it is difficult to depict the circumstances of agricultural workers in order to respond to the labor injustices they face.

Climate change poses severe and unpredictable consequences for agricultural workers who already face some of the worst injustices of wage disparity and labor conditions. The history of disenfranchisement to these worker rights is an important consideration to any planning effort that aims to alleviate injustices for producers and encourage resilience from climate impacts in the food system. Specifically, the ability to organize around improvements to wage and working conditions will be paramount in the face of climate change, where these already unjust circumstances face being exacerbated in perceived and unperceivable ways.

Education, Technology and Adaptation

An important component of socio-economic systems that impact the ability of marginalized farming communities to adapt and be competitive in a changing environment is their capacity to benefit from and utilize improvements in science and adaptive technologies. Public money for agricultural research and technology has largely advantaged the interests of large-scale and well-capitalized farming operations with little focus on the much greater numbers of small-share farmers. This body of research largely emphasizes improvements in agricultural management and production of cheap commodity crops, which can be produced at mass scales through monoculture agriculture but has ignored the diversity of high-value crops and technologies that would improve output and profits for small-share farmers (Anderson 2008, 598). In the context of climate change, where technology and adaptation are central topics across the country and the globe, improved access to new knowledge and resources can have huge implications for farmers struggling to uphold a financially stable lifestyle. Anderson (2008) suggests that the inadequacy of the American Government and US food system to allow all farmers to benefit from scientific progress and its agricultural applications is an abuse of rights to this knowledge by US farmers (597). As climate change and increased prevalence of related natural disasters impact these areas, farmers and rural residents will experience the greatest impacts with the least opportunity to recover from these incidences. For these reasons, inequities across access to improved scientific knowledge and agricultural technologies has driven the disparity across small and large-scale agricultural producers.

Agricultural Cooperative Extensions are one type of institution that has been responsible for upholding access to resources, educational tools, and technology for rural farmers.

Extensions began just over a century ago as a means of supporting rural America with resources

for agricultural education, economics, professional skills and the establishment of land-grant universities (Wang 2014, 1). Extension services are usually established in partnership with federal departments, such as the USDA, and local or county institutions, such as local universities or regional governments. Throughout times of war and economic instability cooperative extensions have helped stabilize rural economies and support agricultural productivity (Wang 2014, 1), suggesting that they will be critical for the US food systems response to climate change. One fundamental role that cooperative extensions play for rural farmers is bridging new knowledge and technologies into applicable tools and systems to regional farmers. Despite widespread recognition of the role cooperative extensions play in supporting agricultural productivity funding at a federal level has dropped off significantly in recent decades (Wang 2014, 6). The financial threats faced by the extension system in the US comes at a critical time when farmers are beginning to urgently need their support.

Alternative Agrifood Networks (AAFN)

AAFNs have gained traction in recent decades as a means of challenging the increasingly global and corporatized food system by creating alternatives that elevate the role of small-share producers which is important for withstanding the effects of climate change. According to Holt-Giménez (2011), AAFNs strengthen localized markets for farmers and food producers, while supporting family farms, creation of local jobs and infrastructure, and reduce environmental degradation by protecting farmland and biodiversity (89-90). Some alternative agrifood models ranging from community supported agriculture (CSA), cooperatives, urban agriculture, farmers' markets, to food hubs, among others, provide new opportunities for market access among producers (Allen 2004, 65; Holt-Giménez 2011, 86). These models can encourage the success of small-share farmers when they are designed on regional and community scales that encourage

aggregation of local foods and new avenues for these farmers to compete in the marketplace. In fact, many alternative models foster or invent a niche local market, which can remove producers from competitive large-scale international markets (Allen 2004, 204). Additionally, AAFNs may provide other socio-economic benefits by diversifying food system infrastructure which improves food system resilience, eliminating high transportation costs of food and reducing food waste.

One model of AAFNs that may prove particularly useful for improving equity among small-share and marginalized farmers is food hubs and aggregates. Because they materialize in several forms, food hubs have been defined in a variety of ways across food system literature. However, they generally deal with aggregation and distribution of food from small to mid-sized producers within local and regional scales. Food hubs are perceived as an increasingly common response to the challenges of scale in local and alternative food systems (Berti and Mulligan 2016, 5), since they are able to fill supply chain gaps at various scales. Compared to other AAFNs, food hubs uphold the independence and control of individual farmers by acting collectively at various levels of integration. In this way, farmers are able to control their own operational systems, branding, and economic strategies, rather than integrating under larger organizational structures, which might dictate those choices (Berti and Mulligan 2016, 5). They are a response to the rise of social and environmental objectives in the food supply chain and offer an organizational strategy for seceding from the globalized and corporatized food system. Food hubs and other AAFNs are broadly seen as solutions to disengage from the global food supply chain and fulfill gaps in regional agrifood systems.

Food Sovereignty

Food sovereignty is a movement driven and established by peasant farmers, which is critical to their control over local resources and democratization of local food systems. Thus, the food sovereignty movement is paramount to the ability of small-share farmers to adapt to the challenges of climate change. Food sovereignty is a term that refers to the right of nations and peoples to control their own food system. It was first coined by the farmer network La Via Campesina in order to highlight the negative local effects of the neoliberal agrifood regime, particularly on the issues impacting small-scale producers (Slocum and Cadieux 2015, 3-5). This concept broadly encompasses democratic control over markets, environmental resources, modes of production, processing, distribution, and food culture. While food sovereignty shares some goals with these other movements, its particular emphasis is on issues of market control and property regimes on the basis of rights, as well as demand for systemic change (Holt-Giménez 2011, 115). Despite the food sovereignty origins of land and livelihood rights in the global south, it is an increasingly popular movement in the US, often accompanied by food justice, which has garnered wider recognition in urban areas and across consumer issues. Food sovereignty is underscored by on-the-ground work, which addresses the issues of food sovereignty by providing alternative models to advance human rights and local governance of in the food system.

The food sovereignty movement has developed into a coalition in response to these injustices and has produced a wave of global activism that challenges the corporate power structures that undermine indigenous food and farming economies. These economic injustices driven by corporate agribusiness have major implications for women working in agriculture, particularly in under-resourced economies. Women have played a central role in the

advancement of food sovereignty in concept and practice, likely because women have historically been the most marginalized groups in making decisions about the agrifood systems that they operate and live within.

Food sovereignty encompasses many layers of social, political, and economic justice particularly for the (peasant and indigenous) women who lead the movement. Food sovereignty has proven to be an important movement for grassroots organizing and coordination which has grown into a national network (Masson, Paulos, and Beaulieu Bastien 2017, 57). Masson, Paulos, and Beaulieu Bastien (2017) argue that the expansion of large-scale agribusiness has undermined women farmers through economic disruptions, discriminative trade deals, and wage injustices (59). These impacts influence the indigenous practices of land use and biodiversity among peasant farmers, who are increasingly women as men have migrated to urban centers. Across the globe food sovereignty, particularly for women, can have far-reaching effects for economic justice. One major way to encourage economic control for women is to support their capacities to access and own land, as well as other resources important for agricultural production. Other ways to enact food sovereignty in practice would be supporting marginalized farmers and farmworkers through improving access to capital investments, technology, natural resources, and market-places, as well as encouraging their involvement in leadership, decision-making roles, and ability to build and participate in worker coalitions.

Organic and Sustainable Agriculture

This section examines the concepts of organic and sustainable agriculture, both as a trend and agricultural practice to understand the influence of these concepts on socioeconomic conditions for small-share farmers. Sustainable agriculture exists to address a myriad of problems within agrifood systems, but it can also be seen as resulting from the environmental

movement, distinctly linking it to the modern issues of agricultural production and climate change. Alkon and Guthman (2017) notably mention that agroecological responsible farming systems significantly predate the rise of industrial farming systems and have long history among poor and peasant farms around the world (4). However, it was not until the 1990s that institutions spanning research, policy, and economics began to look more clearly at the environmental and economic benefits of sustainable farming practices (Allen 2004, 57; Alkon and Guthman 2017, 4). Along with food security, sustainability has become an incredibly persuasive motivator of human behavior and consumer trends. Particularly, the shift in commonplace understandings of environmentalist concerns has begun to provoke a resulting shift in consumer demand and trends, through individual and institutional efforts. For example, Allen (2004) suggests that with the rise of genetically modified organisms in the food supply chain, a resulting increase in social activism pertaining to “food safety, sustainability, equity, biodiversity, and democracy” has occurred (4). Increasing concern for environmental issues have a clear and indisputable link with agricultural industries, recognized by both consumers and scientists, as they inherently appropriate natural resources and systems.

Sustainable agriculture and food certifications, such as the organic label can become fetishized and financialized by corporate agri-businesses, contradicting the perceived benefits these labels provide to producer equity. While food certification and labeling may improve environmental transparency for consumers, it does not eliminate inequities or improve market access for many small-share farmers. In fact, these label trends can further marginalize minority and small-scale farmers who may not be able to afford the costs of certification and competing in the “organic” market. It is argued that local and organic food trends do not challenge the corporate food system. Instead, they offer an alternative to the system, which is being widely

incorporated into the corporatized food supply chain. Additionally, there is a lack of evidence that agrifood businesses operating up and down the organic supply chain makes more ethical decisions when it comes to worker rights and unionization (Alkon and Guthman 2017, 5). While some certifications aim to improve transparency in the marketplace, they do not necessarily improve wages for producers, since surplus value is distributed across the food supply chain, where retailers sometimes retain as much as 40 cents on the dollar (Day-Farnsworth and Morales 2011, 231), without consideration to distributional or other costs out of the producer's profits. Compared to these models direct to consumer AAFNs provide a much clearer system of transparency between producer and consumers and enforce accountability in the supply chain while eliminating outside influences and profiteering.

Despite questions about who benefits financially from organic agricultural practices, there are clear opportunities for sustainable and responsible agroecological systems to support food system resilience and social equity efforts. One of the leading occupational hazards faced by farmworkers is exposure to chemical inputs and toxic pesticides. It has also been found that increasingly warm temperatures increase the absorption and decrease the tolerance of these chemicals for workers routinely exposed to hot and humid environments (Schulte and Chun 2009, 544). Though demand for organic food and the practice of organic agriculture has risen in recent decades, it has not led to a significant downfall of pesticide use or highly processed foods. In fact, less than 1 percent of US farmland was used for organic agriculture in 2008, despite an increase in organic sales of more than \$15 billion since 1997 (Alkon and Guthman 2017, 4-5). The failure of the sustainable and organic food movements to challenge the industrial agrifood system is evidence that transformative changes need to take place in order to dismantle the systems that uphold social and environmental injustices in the food system.

Responsible agroecological practices spanning organic, sustainable, and regenerative models have played a central role in agricultural discourses that aim to reduce the environmental impact of farming and promote ecological resiliency in the face of global environmental change. Although these are important solutions for mitigating and responding to the threats of climate change, planners should pay particular attention to how they can be implemented in socially responsible ways that eliminate inequities for farmworkers rather than reproduce them. Finally, planners and researchers could collaborate with supply chain, land use, and economic practitioners to assess ways to challenge the corporate food regime.

Resilience and Transformation

While resilience planning and food system planning have not coordinated their efforts to reduce system disturbances, resilience has been highlighted by food system academics and leadership concerned with environmental conditions. Food system resilience is described as the capacity of a food system to provide sufficient, adequate, and accessible food to all people at multiple levels over time, regardless of varied and unpredictable disturbances (Tendall et al. 2015, 19). Within a food systems context resilience is also characterized by conditions that provide reliable sources of nutritious, safe, and accessible food despite disturbances (Biehl et al. 2018, 40; Candy et al. 2015, 723). Several sources discussing food system resilience suggest that most initial research on food resilience and climate impacts have over-emphasized agricultural resilience and crop yields, which have drawn attention away from other components of agrifood systems and neglected to consider the social dimensions of food security (Biehl et al. 2018, 40; Campbell et al. 2016, 34). This production-based focus has overlooked the other aspects of resilience in the food system, such as providing nutritious, safe, and accessible foods to communities, or what Quinlan et al. (2016) call social-ecological resilience (678). Resilience can

be used as a lens to call for greater action to be taken to address climate threats and natural events, but particular attention should be paid to whether this framework is inclusive and responsive to existing social inequities.

While the concept of resilience is used widely in academic literature, it is also challenged by the concept of transformation, which considers the barriers and shortcomings of the existing systems. Resilience, by definition, is fixed to the idea of maintaining a system, suggesting that the existing system is the ideal system worth maintaining. In contrast to resilience, transformation, which is often discussed alongside resilience, calls for sweeping changes to the existing food regime that upholds the systemic power imbalances that produce inequities. Transformation in the food system can be understood as a more radical step beyond resilience, involving fundamental changes to the structure, values, and patterns of social behavior, as well as multilevel governance and management regimes (Levkoe 2011, 689-690). Though they take on different roles, both resilience and transformation are increasingly popular frameworks across many sectors in response to the growing threat of climate change. Food system planning can look to these models to explore the barriers and capacities of existing food system dynamics, as well as identifying opportunities and calls for change.

Analysis of Equitable Planning Applications

The issues and approaches described in the above sections, which help to answer my first constitutive research question, address labor and economic injustices, access to technology, AAFNs, mental and rural health disparities, and the rising costs of environmental hazards and corporate control of the agrifood system, among others. These topics were revealed through a literature review of inequities among producers in the food system, as well as of planning and the

social dimensions of climate change. Each of the concepts covered above pertain to a cause, influence, or solution for addressing social or climate-related inequities in the food system.

As explained in Chapter 2, there are several types of food system planning which could engage these concepts in order to address the social inequities that may be exacerbated by the impacts of climate change. In this section, I consider how these concepts can be applied in food system planning to address the social inequities faced by producers with consideration to the ways that climate change may aggravate them or produce added barriers to overcoming them. This analysis considers the application of the issues and approaches relating to social equity for producers to food system planning.

In recent decades, US policy-makers have favored the financial interests of agricultural land investors over people and food. Financialization and corporate influence, particularly through the establishment of large agribusiness monopolies, drive social inequities for farmers and farmworkers in several ways. The concentration of power and wealth by these industry leaders produces economic and ecological vulnerabilities to producers and food system laborers, which ultimately has a negative effect on the resilience of the sectors they dominate. This power dynamic also poses significant barriers to achieving policy reform and responding to injustices and collective demands for change (Clapp and Isakson 2018, 438). Corporate influence is a clear indicator to the persistence of social inequities experienced by small-share farmers across issues of land access, financial assistance, and organizing power. This evidence provides a clear need for intervention by planners in the food system to demand equitable access to resources, opportunities, and the protection of rights for farmers and farmworkers. Upholding corporate responsibility in this regard also involves accountability to their social and environmental impacts.

As is explained in the categories above, there are several leading concepts that suggest that community or regionally-driven planning models can prove valuable in alleviating existing inequities and protecting against the reproduction of them by climate change. Food system policies to address inequities can be built around the key concepts and inequities identified in the previous categories, as well as in coordination with public planning across industries, such as health, environment, economic, and city planning. Anderson (2008) writes that “the failure of the US food system to remunerate farmers operating at diverse scales adequately for full-time farming is a failure of policy determining how profits are allocated, not inherent low profits in the food system (597).” This system adds to the inequities already experienced by small-share food producers who struggle to live on farm income alone, which only 8 percent of farmers in the US are able to achieve, even when it is their principal occupation (Anderson 2008, 597). This point highlights the fact that large agri-business corporations have capitalized on the profits made by the food system and US policies have failed to enforce restrictions on these business practices which are not distributing wealth back to the food producers and workers.

These popular criticisms of the global food system have led to significant attention being made by food system and environmental leaders to developing local food systems. Stevenson (2007) suggests that thriving local food systems challenge large agricultural establishments by supplying demand on regional levels rather than feeding into corporate trends (46). These solutions will require more ecological models of food production, such as those introduced by sustainable agriculture, and commitment from local food economies which expand their resources to secede from the global system through alternative models (Stevenson 2007, 54). However, consideration should be paid to the ways that sustainable agriculture and AAFNs may marginalize minority and women farmers.

Notably, AAFNs are increasingly taking a dominant role in planning and programming produced by CFS practitioners. Many alternative agrifood leaders are seeking to reduce the impact and power of big agrifood corporations in order to promote more sustainability in food production and business practices (Allen 2004, 179-180; Holt-Giménez 2011, 90). In addition to reducing environmental impacts across the food supply chain, AAFNs may play a significant role in achieving resilience in local food systems by diversifying the means of food access. These AAFNs also encourage integration of contributing industries and collaboration across grassroots movements and regional efforts to attain social justice across sectors (Stevenson 2007, 46). While some literature emphasizes localized solutions such as AAFNs to challenge the corporatized industrial food system, others criticize these solutions for reproducing economic exploitation and systems of oppression.

Women have played leading roles in the progression of AAFNs and the sustainable agriculture movement. Allen and Sachs (2007) recognize that women are involved in sustainable agriculture efforts at higher rates than conventional agriculture (12). However, they also find that men are disproportionately represented in leadership positions (14). Despite the fact that women have been leading these efforts through supporting roles, it is also noteworthy that women are more likely to be negatively impacted by increased workloads as a result of these new models. By taking on the additional work and organizing required for AAFNs, women report that their workloads had increased, even when the same effects were not experienced by their male counterparts. This impact can aggravate inequities experienced by women who are already overworked and underpaid or may be overburdened by added stressors to procuring and preparing meals at home (Allen and Sachs 2007, 14). It is important to recognize that despite the arguments for advancing equity through these alternative models and short food supply chains

they have also been deemed by some to be elitist, exclusive, and inequitable (Berti and Mulligan 2016, 4). Allen (2004) suggests that “If the alternative agrifood movements are to achieve their environmental and social justice goals, they must democratize the allocation of opportunities and resources in order to give all people equal voice and agency (158).” The attention to AAFNs is evidence of the recognition by food system practitioners that small-share farmers play a pertinent role to upholding social, economic, and environmental justice in the food system. And that, localization systemically alleviates a number of injustices created by the globalization of agrifood systems, which are subject to corporate-based interests.

Research trends that have over-emphasized agricultural productivity in order to ensure resilience and food security into the future, jeopardize the small-share farmers who are encouraged to over-produce leading to low profit margins and food waste. Without market controls, farmers are encouraged to over-produce crops leading to a saturated market and bringing the price of the crops down. This system means that farmers and farmworkers earn the same amount of money for selling more product because market prices are low. The practice of not adjusting costs means that there are no systems in place to ensure that farmer earnings are maintained at an adequate level to keep them in business, without dropping prices, and maintain the strength of the market. As the production of commodity items continues to be impacted by weather and climate hazards, this system exacerbates the inequities experienced by farmers who become more and more disadvantaged while agri-business corporations do not share in the risks and capital loss. This system of inequities is an example of social and economic systems which require major transformation in order to alleviate existing inequities, as well as avoid the aggravation of these inequities as a result of climate impacts.

Equitable food systems for farmers, which uphold their rights to adequate pay, working conditions, and resources have the added value of supporting the growth of local economies which can have positive effects on the alleviation of poverty. A 2016 report from the Food and Agriculture Organization of the United Nations suggests that further support for various methods of economic leverage for small-share farmers such as programs to enhance access to credit and markets, as well as promoting a system that breaks down barriers for socio-economic, cultural and equality issues, including strategies for mobilizing rural and women farmers are necessary steps to mitigate climate impacts on global communities. Several other authors have also made poignant arguments for improving equity among farmers as a means of improving community outcomes. According to Holt-Giménez (2011) developing local infrastructure is an important way for communities to promote an economically viable system that supports agricultural and sustainable innovation, small-scale farmers and food producers, and local access to healthful foods (90). Similarly, the World Bank published a report in 2008 revealing that any percentage increase in GDP generated by agriculture has twice the effect on reducing poverty and equivalent growth in other sectors (Nierenberg 2018, 20). Since small-share farmers significantly outnumber corporate agriculture entities this finding means that there should be significant actions taken to invest in diversified agriculture as a means of alleviating poverty at regional scales.

These arguments taken together make a case for food system planning to improve social equity among producers with particular attention to economic mobility at a local level. In fact, Schipanski et al. (2016) argue that targeted policies and programs produce more cost-effective and integrative approaches to improving measurable well-being outcomes (602). However, these regionally-catered solutions cannot take the place of larger-scale action. Programs such as labor unions, subsidies, and disaster relief that were described above are influenced by the government

at both national and regional scales. This means that calling for equitable change to these policies must also occur at several scales and may benefit from scalable solutions. Enacting change to these kinds of policies may be particularly benefited by the involvement of FPCs who are able to translate regional needs to policy-makers. Additionally, food system mapping and FSAs may provide a more systematic process for understanding regional needs and barriers in order to appropriately advocate with supporting evidence.

In addition to advocating for rights and equitable policy improvements, technology and education have proven to be important resources for improving equity among producers. Improved access to technology is a critical element to supporting the success of small-share farmers who are competing in a globalized and industrialized food system. It is Anderson's (2008) position that the lack of rights-based language in the fight to access these resources for farmers is a lost opportunity to hold government systems accountable when they fail to provide full access to such resources for the most disadvantaged farmers (597). Despite the dismissal of the failure to meet these human rights, recognition of injustices in the food system has led to campaigns to improve working conditions, address wage disparities, and encourage labor organizing and union activities, as well as "successfully press charges of farmworker slavery" (Anderson 2008, 595). However, it is also important to ensure that new technologies are not only equitably accessible to farmers, but that they are environmentally and socially responsible. As Freedgood, Pierce-Quinonez, and Meter (2011) note, technologies can also give rise to new concerns surrounding chemical residue on food; air, land, and water pollution; and increased working hazards (70). Like several of the concepts presented in this chapter, adaptation and technology resources can have positive impacts across the agrifood system, however, misguided or corrupt use of such technologies can impose unintended consequences across the food system.

The socio-economic programs and resources available for farmers to organize support surrounding the issues presented in this research highlight the need to improve organizational and coordination efforts for small-share farmers, particularly in order to advocate for human rights. These programs consist of labor unions, coalitions, educational and adaptation resources for farmers, and support systems for accessing financial capital for land and recovery from natural disasters, as well as access to adequate health insurance and healthcare including mental health resources. Each of these programs overlap with issues of social inequity that may be aggravated by climate change and call for action that impact both local and national policies. The unchecked influence of financialization and lack of government intervention on these programs has particular implications for the perpetuation of poverty among farmers and rural areas, which would benefit from the attention of planners and policy advocates.

Finally, food systems will need to adopt transformative pathways in order to maintain stability and resiliency in the face of climate change. In contrast to resilience, which may neglect to address whether there are existing barriers to efficiency or equity within existing structures, transformation calls for radical changes to be made to the food system that challenge the existing systems in favor of progressive models that aim at achieving greater equity. This requires shifting research and action to focus on highly context-specific solutions based on extensive involvement from stakeholders and community leaders, which focus on addressing the root of current challenges through the collaborative perspectives of social justice, ecological sustainability, community health, and democratic governance (Campbell et al. 2016, 40-41; Levkoe 2011, 687). Despite the emphasis on resilience in climate change and food systems literature, resilience does not account for the need to improve the current system and improve conditions for those who are left out.

Though resilience planning is a widely-accepted model for climate change preparation, it suggests that systems should bounce back from climate change events to an existing equilibrium. This research has established significant gaps and injustices in the existing food system and food economies, and thus calls for a transformative rather than resilient approaches to climate action. Climate action plans should consider the social and environmental injustices that persist in the existing agrifood system and should take lessons from food systems literature to improve equity in the food system alongside taking action against climate change.

Recommendations to Food System Planners

The following recommendations describe how interventions to social and climate-driven inequities among *producers* can be engaged through various types of food system planning:

1. Increase equitable market access for small-share producers through AAFNs while maintaining a strong and diverse distribution system which recognizes the importance of integrating the globalized food system.
2. Enforce corporate accountability to ensure that inequities are not being exacerbated or reproduced through the intersection of climate change and globalization.
3. Encourage collective bargaining power for farmers and farmworkers, including access to unions and other forms of organizing for improved labor and working conditions that account for the changing and increasingly dangerous conditions posed by climate change.
4. Improve access to education, technology, adaptation tools, and scientific knowledge; and encourage progress in these fields to address the specific issues and needs of small-share farmers.

5. Improve equitable land access by enforcing equal opportunities to access credit, secure long-term rental agreements, promote land-share opportunities, and expand agricultural land trusts and farmland protections.
6. Adopt policies that improve farmers' abilities to obtain adequate health insurance and healthcare access, including mental health support and suicide prevention resources.
7. Adopt "rights-based" language in planning and policy to reinforce government responsibility to upholding rights in the food system.
8. Prepare regionally-specific climate action plans which address existing inequities and responds to the specific threats faced by farmers in a given region—including supports before, during, and after a natural disaster.

Research Question 2: Results and Analysis

The second constitutive question that this research addresses is, what food system interventions can be applied to planning initiatives so that solutions address the intersections of climate change and social inequity among food consumers? To answer this question, I examine issues and approaches pertaining to equity among consumers in the food system and examine their intersection with the social impacts of climate change. Climate change will cause severe and devastating impacts to our food system and social landscapes. Increased climate disruptions and variability will cause price volatility across the food system and changes to resource allocation—both of which, will impact rural, low-income, and minority populations first and more drastically.

Results: Issues and Approaches for Addressing Social Inequity Among Consumers

The results below introduce the leading issues and approaches across academic discourse that highlight issues of social inequity among consumers in the food system, particularly as they

relate to the socioeconomic impacts of climate change. These are: local vs. global food systems; food safety; food waste; food deserts; food cost volatility; food and nutrition assistance programs; food justice and literacy; and, food cultures and indigenous foodways. In the following sections, I introduce these concepts and provide context for their applications to addressing the intersection of climate change and social inequities through food system planning. After these results, I will provide critical analysis of the capacity for these concepts to be applied and considered in food system planning. This analysis is followed by a list of recommendations for addressing and mitigating the aggravation of social inequities for consumers by climate change.

Local vs. Global Food Systems

Enhancing local food systems is a popular concept for addressing social and environmental injustices in the food system. These include addressing consumer relationships to food, reducing food miles, and environmental impact, as well as addressing consumer inequities by ensuring access to local, healthful food options, and improving infrastructure and community programming. By bridging the resources and opportunities within a region, communities will be better prepared to address the issues that are being faced in a largely disconnected and globalized food system (Holt-Giménez 2011, 88-89). Reducing the miles that food travels and reducing the scale of agricultural operations are both tactics to limit energy-intensive methods of food production and sourcing. Reducing the miles traveled for fresh food and reliance on outside economies could eliminate huge costs spent on food transportation and provide a system for keeping food expenses feeding back into a local economy (Holt-Giménez, 2011, 91). Processed food items which are transported across long-distance supply chains are vulnerable to high cost volatility in response to the cost of energy and oil price instability. Local food systems can

establish shorter supply chains which provide an alternative to the global environmental impacts of agrifood industries but should take caution not to overextend the capacity of local resources to resolve gaps and barriers within a foodshed.

Achieving effective solutions to the issues posed by a global system will take a combination of commitments. In most cases, however, local food production and processing is not sufficient enough to supply adequate food choices for a regional food system and so the development of local and regional infrastructure in conjunction with a local-global supply chain is an important step toward regional food security (Biehl et al. 2018, 50). While it is still largely presumed that local food systems are more sustainable, the findings of some studies caution against making a direct comparison of local and global, since they are essentially linked and produce trade-offs in the measurable dimensions of sustainability (Brunori et al. 2016, 26). This concept is an important consideration when discussing the resilience and effectiveness of CFSs and the social impact of food systems and food security on particular regions.

Food Safety

Food safety is a paramount issue to be addressed by food system planners in order to account for the new and changing challenges that this sector will face in response to climate changes and instability. National regulations to control and regulate the risks of pathogen contamination in our food system have existed since the early 1900s (NRC 2015, 68). Many of these regulations are now managed by the Food and Drug Administration (FDA) and USDA. However, state and local jurisdictions oversee food service and retail food safety regulations (NRC 2015, 68). Despite the long history of these programs, Anderson (2008) suggests that “negligence and failure of the government to fund adequate inspection of food products contributes to other food safety problems, such as contamination that has led to frequent meat

recalls (597).” This concern is one that severely impacts consumer equity in the food system and will become alarmingly difficult to control.

Climate change risks causing unprecedented rises in agricultural pests, food borne illness, and vector-borne diseases that will directly impact all participants in the food system. From production to transportation, processing and utilization, food safety is negatively impacted by unprecedented temperature rises, which affect food storage by fostering microbial growth (Campbell et al. 2016, 37). Concerns of food safety are most severe among populations with limited or inadequate cooking, storing, and food processing facilities at home. Particularly, low-income households who lack sufficient food storage, access to clean water, or safe and appropriate cooking supplies could be exposed to additional risks of food safety that are exacerbated by warm weather conditions, pollution, and resource scarcity. In addition, low-income households are more likely to risk consuming unsafe food items, particularly if they already experience food insecurity. Food safety measures will become stressed by the environmental detriments of food safety, demanding that regulations take appropriate precautions to account for these added risks, however, additional measures should also be addressed on a person-by-person basis among low-income populations.

Food Waste

Waste occurs at every level of the agrifood system—from field waste to processing inefficiencies, and from restaurant and institutional food waste to grocery store and household waste. Reductions of food waste and waste within the food system (i.e., food packaging) are important steps to alleviating social and environmental injustices produced by the food system. However, the US food system consistently wastes significant portions of the food it produces. The practice of producing processed foods and beverages results in roughly one-third of annual

US crop weight being lost in production after accounting for what is exported to other economies (NRC 2015, 36). Additionally, one-third of total US agricultural production typically goes to animal and livestock feed (excluding the calories they obtain from grazing) (34). And, as much as 40 percent of all commodity crop production, such as corn, is diverted away from the food supply chain for ethanol production (NRC 2015,106). According to US census data, Holt-Giménez and Shattuck (2011) conclude that population growth has slowed by 1.09 percent in recent decades, during the same time in which agricultural productivity has risen by more than two percent every year for over two decades (112). This is an alarming observation based on the results of a FAO report from 2009 that the world produced more than enough food to feed the entire planet in 2008 (FAO 2009). This evidence should reinforce to food system planners and practitioners that agricultural productivity and efficiency will not solve the global food insecurity issue, rather inequities in who has access to food is the crisis that needs to be addressed.

Climate change risks worsening the food waste problem from the field by threatening wide-spread crop loss from natural disasters and pests or by challenging quality assurance, safe storage capacities and disrupting supply chains. On a household level food storage and cooking capacities may be limited in the case of severe weather and power outages. Low-income neighborhoods may also experience slow responses to getting power turned back on and may lack financial resources or transportation to replace spoiled food (Biehl et al. 2017, 88). In addition, large and small retail stores may be affected by floods, storms, and power outages leading to large quantities of food waste. During these crises, an equitable and resilient food system will require a diverse and flexible food supply chain that is able to quickly adapt to new transportation and distribution models in order to get adequate food to communities impacted by disasters.

Food recovery is a valuable tool for addressing the social and environmental issue of food waste, particularly in times of food supply disruption. However, it should be cautioned that the institutionalization of this strategy during stable economic times does not address the root causes of food insecurity which are deeply rooted in systemic inequities. The diversion of food waste offers a temporary alleviation of hunger by utilizing undernourished populations to remove excess waste from the food system. Similar to other forms of food assistance, there is not adequate evidence that long-term food security is improved through these tactics. Reece (2018) also suggests that food waste recovery programs can lack empathy and understanding of the social, cultural, and health challenges faced by the populations they serve (213). Ultimately the solution to this problem would be one that prevents food waste before it is produced, by identifying the greatest producers of waste and calling for institutional change, rather than aiming for waste recovery. Additionally, the solutions to food security would strive for economic mobility and alleviation of poverty in order to produce true food security through economic means, rather than the temporary alleviation of hunger. Lastly, while food waste is perceived to be a consumer hunger issue, establishing a food waste industry could extend unintended consequences for food producers, such as demand for farmers to over-produce or sell crops below their market value.

Food Deserts

Food deserts are direct results of planning and policies in America that have disadvantaged certain populations and will require transformative measures in order to ensure equitable opportunities to access food into the future. The term food desert, also known as low-food access areas, have become a popular way to describe this phenomenon of urban and rural areas that lack healthful food purchasing options. The history of racialized zoning policies in the

US, paired with systemic economic disadvantages, have led to dramatic disparities across race and class structures in the food system, which negatively impacts the proximity for certain populations to food system infrastructure. Heynen, Kurtz, and Trauger (2012) argue that a history of uneven geographical development reflects stark disparities across racial, gendered, and class-based barriers to healthy food access (305). While unfair zoning policies in the US may be a leading cause for these initial disparities, they have been compounded in recent decades as supermarkets have left inner cities and fast food options have infiltrated. Soma and Wakefield (2011) explain that one issue that has led to the prevalence of food deserts is that planners have generalized grocery stores with the broader category of commercial retail development, which are typically designated around 550 yards away from residential areas (54). The mass processing of foods that occurs in the corporate food system has resulted in cheap processed food items being significantly cheaper and more readily available to low-income communities than healthy fresh food options.

Consumers in the food system will be impacted by the environmental conditions in their surroundings, which influence their access to transportation and food availability among other concerns. This reality in addition to the persisting racial segregation of US metropolis areas, results in a layer of barriers that prevent low-income and marginalized communities from readily accessing fresh, healthful food choices. The result of these complex injustices produces alarming rates of food insecurity, as well as obesity and chronic disease. Public health statistics of inner cities correlate these adverse health effects with Black and minority populations at disproportionate rates. For instance, the representation of overweight Black children in inner cities grew by 120 percent between 1980 and the early 2000s (Heynen, Kurtz, and Trauger 2012, 305). While these health disparities are alarming Walker, Keane, and Burke (2010) explain that it

is unclear to what extent the food desert is responsible for poor health indicators, which may also be a result of food preferences, lack of nutritional knowledge, or other socio-ecological considerations, such as limits on time, cooking/storage capacities, and transportation (881). Despite some debate surrounding the origins and outcomes of food deserts, their correlation to poor food access and nutrition outcomes is cause for greater attention to resolve geographic disparities.

Food system planners should be concerned with the elimination of food deserts in order to prevent the exacerbation of inequities faced by these communities from climate disturbances, which is almost certain happen. Walker, Keane, and Burke (2010) propose that policies to address food desert injustices should aim to reduce income disparities and attract supermarkets to economically disadvantaged neighborhoods (881-882). For planners concerned with addressing inequities for marginalized communities in the face of climate change it is also important to consider the diversity of food systems infrastructure to offer added dimensions of resilience in the face of disruptions.

Food Cost Volatility

Food cost volatility is a leading concern for the exacerbation of inequities relating to food security and food access. As food supply chains experience instability in the quality and quantity of raw ingredients, food prices are will increasingly fluctuate in response. Additionally, study by the USDA reports that “energy costs are a substantial and highly variable share of U.S. food costs” and suggests that agrifood industries are more sensitive to energy price changes than non-food industries (Canning et al. 2017, 1). Food costs are intrinsically linked to the energy sector through dependence on energy up and down the supply chain, as well as reliance on the energy sector to buy up commodity crops for biofuels. Government subsidies in the US

support the production of biofuel crops despite widespread evidence of negative effects on the environment and global food security (Ghosh 2010, 73). Food costs are a result of a complex system that is influenced by supply, demand, input and transportation costs, policy and crop subsidies, and financial speculation.

The role of government is another major influencer in US food prices. US governments have regulated food costs for many decades by incentivizing crop production and demand by certain industries. However, recent decades have proven that US and global trade policies have favored open market profitability to investments in agriculture. Overemphasis of profitability in policies and neglect of agricultural interests has led to a system that is highly controlled by agribusinesses and increasingly dependent on costly agricultural inputs (Ghosh 2010, 73-74). The increasing financial instability of farmers and lack of appropriate resources and improved knowledge has a negative effect on food prices. Financial speculation has also driven sharp price increases in commodity crops, likely because of their link to the oil industry. Food cost spikes are one of the many disruptions that are anticipated to occur more frequently in the near future (Biehl et al. 2018, 40). The impulsive nature of financial speculation could become a major concern for the stability of food prices and agriculture and energy sectors face disruptions, which may have devastating impacts on food prices in the US economy.

Unpredictable and fluctuating food prices threaten to make healthful food options further out of reach for low-income consumers. Health disparities are one way that climate change may aggravate existing inequities due to food cost volatility by compounding the obstacles of low income and minority groups to access healthful food choices. This occurrence could result in subsequent impacts to micronutrient intake, and increased stress to biological processes. The effects of poverty on food insecurity and the correlating diet-related health impacts risk being

aggravated as the food and energy sectors face disruptions from environmental threats and weather volatility. Food system planners should consider the severe impacts of food cost volatility on the livelihood of consumers, particularly those most vulnerable to food insecurity.

Food and Nutrition Assistance Programs

Food assistance faces many challenges due to the unpredictability of climate change on the food system and food security. Due to the social and environmental disruptions from climate change many more people across the US may be impacted by food insecurity, however these rates are very difficult to predict. The rising rates of food insecurity will undoubtedly increase the participation in food assistance programs which has already been on the rise for several decades. Food Stamps, the first national food assistance program, originated during the Great Depression to feed undernourished people but has ultimately failed to respond to the root causes of hunger and the underlying experiences of poverty. This is evidenced by the gradually rising rates of participation in the program over several decades. The Food Stamps Program, now referred to as the Supplemental Nutrition Assistance Program (SNAP), served between 9.3 and 12.8 million participants in the first half of the 1970s. However, the participation has now risen as high as 47 million in the years since 2008, with nearly half of those participants consistently being children (Debono, Ross, and Berrang-Ford 2012, 748). In fact, more than half of the USDA's budget now goes to food assistance programs including SNAP, Women, Infants, and Children (WIC), and, the National School Lunch Program (Anderson 2008, 596). Despite the broad impact of food assistance in responding to rates of hunger, the continued expansion of public food assistance and food aid programs are also argued to foster systemic dependence and fail at achieving financial independence and food security for low-income populations.

Long-standing stigmatization of food stamps users has been rooted in the misconceptions that the program is taken advantage of by fraudulent and dependence-based participation, or that low-income obese populations cannot be food insecure. However, more than 80 percent of eligible participants have worked within one year of receiving benefits and eligible recipients who are able to work and do not care for dependents are ineligible to receive more than three months of benefits annually (CBPP 2019, 9). Though perceptions widely vary on the outcomes of SNAP for its participants, as well as the effectiveness of SNAP to provide for them, it is widely determined that the benefits provide trackable results that improve the access of nutrition to food insecure and low-income households. Despite the history of controversy surrounding food stamps and food assistance programs, they remain the primary and necessary tactic for alleviating food insecurity. However, the short-sighted organization of these strategies may benefit from a transformational approach that recognizes the alleviation of poverty as an integral step to eliminating the root cause of hunger and food insecurity.

In addition to government led food assistance programs, the US food assistance network also consists of an impressive body of food banks, non-profits, and other anti-hunger organizations. These types of organizations may play a less clear role in promoting food security and hunger alleviation in times of natural disaster response. However, the fluid nature of these organizations may prove to be an asset to their ability to adapt and respond to new challenges. The Baltimore Food System Resilience Advisory Report (2017) states that “Despite barriers such as having limited staff, funding, and expertise to focus on emergency planning, the mission-driven nature of such organizations was cited as a reason for ensuring that they have preparedness plans in place (Biehl et al. 2017, 116).” To highlight the dedication in this sector, it is also notable to mention that the staff and volunteers dedicated to such efforts are more likely

to show up during times of hardship when local food retailers may face financial pressures to close. The diversity of food banks and non-profits may also be well-positioned to support each other and may be quicker to coordinate responses to community needs than governments and policy initiatives.

Food Justice and US Food Movements

Agrifood movements in the US span issues of environmental justice and sustainability, food access and security, food trends, labor issues, and social justice, among others. Food sovereignty was described above as a global agrifood movement concerned with social justice and democratic control of food systems by small-share and peasant farmers. In addition, to this leading movement, there are several food movements that impact consumer issues in the US. A significant one with roots in US urban centers that I have also described to take on roles in food system planning is CFS. This section provides a brief over of the food justice movement and other leading movements that are particularly relevant for upholding social equity for consumers.

Food justice and food literacy are increasingly popular topics for addressing social inequities in the food system, specifically in urban areas by CFS practitioners. In contrast to the related movement of food sovereignty, food justice has been associated with the urbanized food systems of North America and has taken a leading role in food movements across the United States. The food justice movement has been rooted in addressing race and class-based issues through the introduction of alternative markets and innovative urban food system projects (Slocum and Cadieux 2015, 4-5). One of the earliest and most prominent examples of the food justice movement is the Black Panther's "Free Breakfast for School Children Program" (Clendenning, Dressler, and Richards 2016, 170). This program, which spread across the US in the 1970s provided meals to underserved communities of color. Since this era, the food justice

movement has implemented a variety of urban-based models that aim to reform systems or produce alternatives to the corporate food regime and is primarily concerned with marginalized and low-income residents who lack adequate food access.

The food justice movement has gained traction alongside the rise of community food systems in urban areas, and practitioners of both have emphasized the need for increasing food literacy as an integral component to alleviating food insecurity. Food literacy programs include cooking and nutrition programs for children and adults, often focusing on minority populations, as well as gardening education and urban agriculture programs, along with other CFS initiatives. These programs are valuable components to food justice, which can influence household knowledge and nutritional choices, by educating parents and engaging children in food studies. Interest in community gardens has increased dramatically in the past decade, possibly because of a resurgence of interest in gardening by those concerned with the environment, health, and self-sufficiency. While urban agriculture, such as community gardens can offer mobility to food justice organizations and increased access to healthy food choices, it can also strongly resemble gentrification and reproduce the same system of inequities and displacement. As food justice activities increase food access in historically marginalized areas, interest in urban agriculture and food entrepreneurship surges, displacing the food insecure communities they were designed to serve. Additionally, new food retail signifies to investors an opportunity for redevelopment (Alkon, Cadii, and Moore 2019, 793-794). Food justice aims to improve justice in the food system focusing on minority and marginalized populations in urban areas. While food access and literacy are primary goals of this movement, food justice leaders should caution against how their programs reproduce inequities or exclude participation for the communities they aim to serve.

The terms coined in the establishment of agrifood movements, which intend to support their efforts for equitable and just achievements in the food system are subject to inconsistent definitions across the organizations that lead advocacy and policy initiatives. For example, while, Slocum and Cadieux (2015) primarily discussed food sovereignty in the context of rural areas, they have equated it to the similar movement of food justice or Community Food Systems (CFS) in urban areas. However, other authors do not create the same separation of sovereignty from urban America (Fairbairn 2012, 224; Alkon and Mares 2012, 350). In this context, Fairbairn (2012) refers to the “struggle over meaning,” as the difficulty to effectively frame movements with the global food system. However, Anderson’s (2013) approach to food movements takes on the progressive idea that the universal right to food should serve as the bedrock for all food justice agenda, and argues that the failure of US leaders and policymakers to accept the right to healthy food as a human right, obstructs our countries contributions to international hunger alleviation efforts.

Lang and Barling (2012) enlighten their readers about similar inconsistencies in defining food security. They introduce the origination of the term as far back as the 1930s and emphasize the agricultural research and development that spearheaded the movement for food security for several decades, however more recent attention to food security has highlighted uneven power structures and major inconsistencies in food distribution models (314). Through this complex analysis of food security, Lang and Barling (2012) conclude that the “food security” term, may lack usefulness within a policy context, underscored by the point that there is not one universal definition, leaving it exposed to multiple meanings and various interpretations (313). They propose that while food security is largely a policy term, it is subject to competing positions from similar policy-camps who have defined the term in differing ways (321). Evidence that aligns

across the board with Lang and Barling's (2012) conclusion suggests that the same lack of effectiveness in the policy realm may be true for other food movement terms which have proven to be subject to varying interpretations and applications. For this reason, food movement leaders may benefit from coordination to adopt blanket definitions of these terms.

Food Cultures and Indigenous Foodways

The food system in the US consists of a complex network of food cultures, consumer trends, and indigenous foodways, which require unique considerations in food system planning. Consumer trends can produce or reproduce social inequity for consumers and producers, alike, through fetishization and commodification, which drive the demand for popular food items beyond an ethical and sustainable threshold. Although commodity fetishism can take many forms, it is easily explained through the rise of popular food trends which surpass the threshold of ethically sustainable demand (i.e., palm oil, chocolate, coffee, avocados). In response to destructive food trends and corporate influence, ethical food choices have become part of progressive food movements and are oftentimes seen as a solution to the social and ecological threats of capitalism. Despite the rise of ethical food purchasing, Gunderson (2014) explains that ethical consumerism becomes a new layer of commodity fetishism unable to disengage or dismantle harmful capitalist systems (110). He argues, instead, that ethical consumerism and alternative markets fundamentally operate within the capitalist system, which results in them masking the pervasiveness and scale of capitalist appropriation in the food system rather than challenging it (Gunderson 2014, 110). This consumer dilemma is underscored by the experience of small-share farmers, described above, who often lack the resources to obtain and benefit from food labeling and certifications.

Low-income, minority, and women consumers may also be subject to greater marginalization by food trends that are only accessible to those of higher socioeconomic statuses. Certain food trends may instill social pressure among women and low-income households to comply with consumer social standards, such as how they are feeding their children. This experience can add to the stigmatization already experienced by food stamps recipients and may contribute to the decision for mothers to allocate less food to themselves, in order to provide more nutritious options to their children.

Women are also negatively impacted by food trends and food movements, even when they are perceived as leaders of these movements. For example, Allen and Sachs (2007) argue that the slow food movement reignites the domestic roles of women by promoting elaborate home cooked meals and ultimately adding to the burdens of unpaid labor (14-15). Similarly, Cairns, Johnston, and Baumann (2010) explains that a large difference between the gender roles of men and women in “foodie” culture is the social expectation of preparing, managing, and providing food in a household (610). In addition to gender and class issues, food system trends pose negative impacts on rural and indigenous communities. According to Anderson (2008) “...food system trends contribute to poor environmental quality and eradication of traditional foodways (595),” which may further disrupt gender equality for indigenous communities. The eradication of traditional indigenous foodways has significant impacts on the social roles within these societies, who already may experience greater risks and less protections to threats of climate change.

It is essential when analyzing rural and indigenous communities to recognize the importance of traditional food items for cultural reasons as well as viability. Traditional methods of sourcing and processing food uphold cultural values and preserves an important avenue of

food sovereignty, but for lack of knowledge are often overlooked in modern food security discussions (ICC 2015, 71-74). Understanding the specific undertones of social and ecological threats to rural populations and indigenous communities is necessary for taking action that is knowledgeable and appropriate to culturally specific needs. For example, the instability of climate and weather events will lead to an inevitable socioeconomic re-structuring of indigenous food systems as they adopt modern practices of producing and securing food. In a report produced by the Inuit Circumpolar Council (2015) which emphasizes rural and indigenous equity, the authors argue that food systems are strengthened through informed collaborative decision-making processes and by readily available access to regional knowledge and public resources (16). They suggest that supporting infrastructure development and educational goals are two perceived ways to provide lasting implications for the unmet demands of rural food systems, without compromising cultural values, and complementing existing dietary habits (ICC 2015, 16-18). The report also reinforces the necessities of cultural context and inclusive decision-making power in state policy-making as it affects subsistence lifestyles and livelihoods of rural populations (ICC 2015, 18). This approach could help to better identify the specific concerns pertaining to remote areas compared to urban centers, so that each region can create solutions that are implemented through culturally appropriate means.

Analysis of Equitable Planning Applications

The collection of these concepts described above highlight a range of opportunities or barriers for planning and food system practitioners to improve regional food systems at the intersection of social and climate-related inequities for consumers. Food system policies can be built around the issues and approaches related to inequities identified in the previous categories, as well as in coordination with public planning across industries such as health, environment,

economic, and city planning. There are several ways that policy and governments can influence the course of food systems and in conjunction effect the related dimensions of social equity. Poor and marginalized communities experience an array of difficulties and barriers that prevent them from achieving economic mobility and stability, or sufficiently benefiting from public programs and resources in the food system.

Since climate change will produce severe impacts that will materialize differently based on regional environments and socioeconomic conditions, it is important to consider the geographic threats to a region in addition to the socio-political capacities to address and recover from them. For this reason, solutions to address the aggravation of social inequities by climate change should address uneven exposure to climate hazards and enhance the abilities of under-resourced communities to cope with and recover from damages caused by climate change. In this context, solutions at the intersection of social and climate-related inequities should respond to the specific injustices experienced across food deserts, food safety and waste, food literacy and food culture, and access to social support programs. Many of these concepts are already integrated into national programs, such as food and drug safety, nutrition education, and food assistance programs. However, efforts to uphold social equity and the right to benefit from these services is not always clear. Additionally, climate change threatens to challenge the existing systems that are in place. Thus, food system planning interventions may benefit the long-term impact of these programs for enhancing social equity in times of climate disturbance.

The leading national response to address consumer injustice is the establishment of food assistance programs. Food aid, beginning with the Food Stamps Program, began as an emergency response intended to temporarily alleviate food insecurity created by a national crisis. However, the institutionalization of food aid programs has turned a short-sighted solution into a

long-term systemic approach. As responses to hunger have been institutionalized, so has the issue of hunger and the lack of response to poverty. This has resulted in an outcome that relies on the allocation of resources to a system of programs that foundationally cannot resolve the underlying problems of hunger, while reinforcing both the stigma of and dependence on public and private assistance (Fisher 2017, 5-8). Thus, the culture of emergency food aid in the US has fostered institutionalization and financialization, which work against the best interests of alleviating hunger by instilling a sense of permanence in the system.

In some cases, authors have argued that food assistance functionally assists capitalism by feeding workers through public assistance so that wages can remain low, or by removing food surplus from the market (Holt-Giménez 2019; 24-26). However, other authors have made the case that SNAP is an important program, consistently offering mobilization out of poverty (CBPP 2018, 13). The food aid sector in its very nature is incapable of alleviating the root causes of hunger however they remain important for addressing it in the short term. While this paradox is not easy to navigate, there is a clear need for long-term solutions that aim to alleviate poverty first and foremost. However, new systems should be put in place without dismantling the existing food aid sector that feeds people in the short-term. In this regard, Wakefield et al. (2012) call for a reprioritization of anti-hunger advocacy, which rejects neoliberal imperatives and engages more equitable relationships between those providing and receiving food aid (447). Despite controversies surrounding this issue, there is clear demand to redefine the field of food insecurity responses by removing financialization from the equation and pushing for long-term solutions to replace the dependence-based programs that have taken root.

Understanding the social outcomes of SNAP is important for improving equity and advancing the program in the interest of its recipients, which includes responding to the social

stigmas surrounding food assistance programs. CFS practitioners, food justice leaders, or those conducting FSAs may be able to shed light on the regional and cultural needs of food assistance program recipients. Community responses to this issue, may incorporate integration of food assistance with AAFNs, just as the increasingly popular strategy of promoting SNAP and WIC acceptance at local farmers' markets. While this may be a positive solution in some areas, attention should also be paid to the barriers that recipients may face in benefitting from this kind of program. Marginalized communities may not benefit from this solution based on their proximity to farmers' markets, especially for those living in food deserts, or their inability to obtain reliable transportation, as well as the added constraint of time. Additionally, similar to the importance of food system diversity, diversity of food assistance programs may provide an added buffer of food security in the face of disruptions.

While local food systems are an important component of thriving food systems and poverty alleviation, it is also important to recognize the role of the global food system in upholding food access. This is particularly important to recognize in planning efforts so that food system practitioners and policy-makers do not over-emphasize local food systems as solutions to food insecurity and other consumer inequities. Planning and policies directed at promoting equity in the food system should recognize that the larger global food systems is necessary for achieving a resilient food system that accounts for the specific barriers and conditions of a bio-regional food system, without compromising food access to low income communities.

Equitable food systems that are able to withstand the disruptions of climate change will require food systems infrastructure that is equitable for all consumers. This means that planning should utilize the tools of FSAs and food system mapping in order to identify gaps and barriers to regional food access and stability. This solution is particularly important for identifying and

resolving food deserts but can also improve the planning and coordination of AAFNs and help identify regions that may lack a SNAP-participating retailer. Food system infrastructure spans food production, processing, distribution and aggregation, retail, and waste facilities. Strong food systems, which are capable of suiting the needs of a diverse population with varying circumstances, depends on having diverse food sources and avenues of distribution (Day-Farnsworth & Morales 2011, 228). This is important for maintaining resilience during social, economic, and environmental change. By bridging the resources and opportunities within a region, communities will be better prepared to address the issues that are being faced in a largely disconnected food system (Holt-Giménez 2011, 88-89). In this way, local food systems can also provide a solution to the global environmental impacts of agrifood industries but should be cautious not to overextend the capacity of local resources to resolve gaps and barriers within a foodshed.

While investments in infrastructure typically advance the diversity and resilience of food system, they should also be careful not to reproduce social injustices. Investments in infrastructure that focus on eliminating food waste throughout the life cycle of food in the marketplace should emphasize cooling, storage, and transportation as essential components of an efficient food system (Nierenberg 2018, 21). Although addressing the issue of food waste is imperative to solving social and environmental injustices in the food system, like other solutions, it is important to consider whether there may be unintended consequences of the chosen approach. In the context of food waste, it is important to caution against the fetishization of food recovery programs which may encourage farmers to overproduce crops or accept low costs for surplus that may have been sold through other marketplace options. Additionally, large food system infrastructure projects have the potential to displace low-income communities

inadvertently or signal to developers an opportunity for redevelopment (Alkon 2019, 793). This type of planning may benefit from the involvement of food policy councils who are able to communicate and advocate for the needs of the surrounding communities that are impacted by planning projects and policy developments.

Food system collaboration and participation in planning processes across industries, while calling for equitable engagement among community members is important for understanding the specific needs of marginalized communities. Such programs and efforts can be led by food policy councils, food justice efforts, and CFS leaders. Community engagement can also be improved through FSAs that determine and inform the agency, participation, and opportunities for all members of a particular bio-regional food system. Food system maps, like FSAs, become more efficient when they are informed by community involvement and social tools, such as interviewing, focus groups, surveys, and cognitive mapping (Sweeney et al. 2015, 213). Community engagement can pertain to a range of practices including stakeholder voice and collaboration, coordination across sectors and with social justice-oriented organizations, and empowering participation in planning and decision-making processes (Biehl et al. 2010; Brunori et al. 2016; Freedgood, Pierce-Quiñonez, and Meter 2010; Reece 2018). The body of literature reviewed in this research stresses the need for community engagement to be equitable and challenge systemic ideologies in their planning processes. For instance, Morris (2019) suggests that social movements in general can be elitist and that unintentional influences of white privilege can diminish the capacity to grasp social and cultural dynamics, especially of subaltern communities (126-128). This reality emphasizes the need to diversify leadership roles across food system movements and planning operations.

The social restructuring of food system leadership is not only important, but a necessary component of achieving equity in the food system. Despite the common goal of advancing justice and equity, food system movements often marginalize minority populations for lack of inclusion and misunderstanding of their circumstances. In the context of the civil rights movement, Morris (2019) explains that social movement scholars share elite values, embrace stereotypes, and that white scholars are likely to attribute “history-making capacities to members of their own group (125-126).” Promoting diversity of leadership positions is important, not only for leading food system and social movements, but in order to achieve equitable food system planning as well.

Recommendations to Food System Planners

The following recommendations are provided to assist food system planners in navigating the complex inequities that exist within the food system, with specific consideration to the influences of climate change among *consumers*:

1. Improve the capacities of food assistance programs to adapt to socio-cultural differences across the US, address social stigma, and coordinate with AAFNs and other local food infrastructure to improve food access.
2. Promote diversity of food sources including local, global, alternative models, and equitable expansion of infrastructure in food deserts and historically marginalized areas while upholding indigenous foodways.
3. Support and coordinate with poverty alleviation efforts as a critical step to addressing food insecurity.
4. Address power dynamics in food system planning and programming and promote diversity in leadership positions.

5. Seek avenues to coordinate through cross-sector collaboration.
6. Adopt universal policy language and address the inconsistencies of food system discourses by encouraging the establishment of universal definitions for food system concepts, such as food security, food sovereignty, and food justice.
7. Develop a climate action plan that emphasizes the socio-cultural and bio-regional dimensions of equity for consumers ensuring healthful and economically accessible (preferably local) foods in times of crisis and food system disruptions.

Research Question 3: Results and Analysis

Food insecurity is a major concern in both food system planning and climate change science. Research question 3 asks, how can results identified in Constitutive Research Questions 1 and 2 be applied to improve food security? Recognizing how social inequities within each food security dimension may be connected to climate change can help to draw stronger conclusions about how food insecurity will be impacted by climate change and how it may be alleviated. This section presents results and analysis in order to address this challenge by thinking specifically about how interventions to food system inequity might reflect across the dimensions of food security.

Results: Connecting Social Equity, Climate Change, and Food Security

The issues and approaches identified through constitutive research questions 1 and 2 are applied to the dimensions of food security in Tables 1 and 2 below, in order to examine the relationship of these findings to the experience of food insecurity.

Table 3. Issues and Approaches in Producer Equity and the Relationship to Food Security

Approaches to Food System Equity	Food Security Dimensions			
	Food Access	Food Availability	Utilization	Stability
Alternative Agrifood Networks	X		X	X
Corporate Control and Financialization	X	X	X	X
Crop Insurance and Subsidies			X	X
Disaster Relief	X	X	X	X
Education, Technology, and Adaption		X	X	X
Food Sovereignty	X	X	X	X
Labor Unions and Coalitions	X			X
Land Access	X	X		X
Organic and Sustainable Agriculture		X	X	X
Resilience and Transformation	X	X	X	X
Rural and Mental Health Disparities	X		X	X

Table 2. Issues and Approaches in Consumer Equity and the Relationship to Food Security

Approaches to Food System Equity	Food Security Dimensions			
	Food Access	Food Availability	Utilization	Stability
Food Cost Volatility	X			X
Food Cultures	X	X	X	
Food Deserts	X	X		
Food Justice	X	X	X	
Food Safety	X	X	X	X
Food Waste	X	X	X	X
Global Food Systems	X	X	X	X
Indigenous Foodways	X	X	X	X
Local Food Systems	X	X	X	X
Nutrition Assistance Programs	X	X	X	
US Food Movements	X		X	

The issues and approaches that have been introduced throughout this chapter connect clearly to each dimensions of food security. Through food system planning efforts that aim at improving food security, these issues and approaches can be considered according to their impact on each of the food security dimensions. Addressing issues such as corporate control, food sovereignty, and the many others which span all four dimensions of food security, are likely to have the largest impacts on improving food security over time. It is not surprising that the issues and approaches reviewed by this research reflect that food system discourses emphasize stability in the context of producers and food access for consumers. It is clear that several concepts influence a range of food security dimensions, highlighting the need to introduce policies that look multi-dimensionally across food security, climate impacts, and social ramifications.

Food access, which refers to the accessibility of food to all people through financially and socially acceptable means, is the most popularly discussed dimension of food security and is linked to several leading concepts in food systems literature. The popular intervention of nutrition assistance programs, designed as a tool to alleviate hunger and food insecurity, achieves this primarily through the dimensions of food access and availability. Additionally, AAFNs which have taken a central role in this research also have strong implications for supporting food access through the expansion of alternative networks that re-establish relationships among consumers and producers. However, as is mentioned in the analysis of the previous questions, AAFNs are also criticized as being exclusionary and elitist. Although there is credibility to this argument, the ability of AAFNs to fulfill distributional gaps for low-income and marginalized consumers ultimately depends on their operational model. For instance, farmers' markets operating in food deserts provide an additional measure of food availability and may improve financial access to healthful food choices when SNAP benefits are accepted. Food access and

availability are closely linked dimensions but are disrupted in different ways and require different approaches for being addressed.

In contrast to food access, food availability considers the physical availability of food in an environment. This dimension is closely linked to food deserts and the related socio-economic conditions that determine infrastructure and zoning policies. Though it is often confused with food access, food availability is the dimension most impacted by global environmental changes that limit agricultural productivity. This research has previously mentioned that food supply chains are impacted by climate change, causing repercussions to economic stability, experienced most significantly for the least advantaged—these impacts will pose the greatest threats to food security through the dimension of food availability. As shown in the table above, natural disaster relief assistance and other climate action planning has the potential to impact every dimension of food security. Resilience and climate action plans, including disaster relief can have huge implications for alleviating the strain caused by climate change on social issues in the food system. These types of planning can be particularly important to improving food security and protecting against the rise of food security caused by climate change, especially when consideration to existing social inequities is accounted for.

The dimensions of utilization and stability, though less visible than the other dimensions, are at risk for devastating outcomes as a result of climate change if not protected. Climate change will impact the utilization of food by threatening food safety and producing negative implications to nutritional uptake for already food insecure communities. Although it is not yet clear how exactly climate change will impact the nutritional availability of our foods, it is certain to increase prevalence of disease and vector-borne illnesses as global temperatures rise. Food safety is also impacted by safe cooking and storage practices, which will be impacted as climate

change and weather events disrupt our abilities to consistently utilize resources such as clean water and energy. It is clear that the instability caused by climate change will have a negative effect on the stability of the food security dimensions. The dimension of stability, which considers the stability of all other dimensions will be dramatically impacted by agricultural and supply chain disruptions. Food system stability is conditioned by economic, social, and political systems which will be challenged by the threats of climate change. Thus, food system planning should pay considerable attention to regulating the stability of these systems in the face of climate change in order to address the increasing risks to food insecurity.

Analysis of Equitable Planning Applications

It is clear through the analysis provided in the research above, that the US government does not do enough to uphold the right to food for American citizens and that their dominant solutions to food insecurity do not address the root causes of poverty and inequity. While FSAs and mapping can aim to determine the barriers to food security, it is not clear whether appropriate attention is paid to these social conditions as a cause in order to create valuable solutions. Additionally, solutions are often based on the idea of improved innovations and infrastructure on an industry-by-industry basis, which does not address the foundational concern of social inequities and poverty as a driver of food insecurity.

It should be clear by now, that there are several concepts within agrifood systems literature that can support our understanding of the causes and solutions to alleviating food insecurity. In this paper, we have covered issues and approaches of AAFNS, local and community food systems, food justice and sovereignty, health disparities, food deserts and waste, corporate influence, and several others. It is clear that food system planning and advocacy for social equity in the food system span several areas that interact with the dimensions of food

security. Notably, anti-hunger advocates who have fought the erosion of social programs and food safety nets, as well as environmentalists who warn of farmland loss to urban development and environmental justice advocates who focus on pesticide hazards and uneven risks for farmworkers, and low-income or rural communities of color (Gottlieb and Fisher 1996, 197). Additionally, there are advocates of family farms who have underscored the need for rural development efforts and raised issue with the uneven impacts of globalization on farmers (197). Each of these considerations are seen as issues impacting dimensions of food security by advocates who recognize the interactions of food security with economic, social and livelihood implications.

In regard to the recommendations made above for producers there are complex interactions across the dimensions of food security as they relate to social inequity and climate instability. Among these recommendations for producers several have the capacity to positively influence food security among producers by leveraging their success. These recommendations consist of encouraging collective bargaining power, improving access to resources, and enforcing corporate accountability. The recommendation to increase access to rural healthcare services, may also support food security along with the reduction of diet-related preventable diseases which often correlate with food insecurity. This is important as expansion of these resources may improve health outcomes and food security for all rural residents by supporting nutritional adequacy and utilization through improved healthcare services and ultimately food literacy.

In addition, some of the other approaches may improve food security for all participants in a food system by boosting regional access to healthful food choices and promoting poverty alleviation through food system planning. As described above, thriving local food systems have a

positive impact on economic mobility and food insecurity is strongly rooted in the experience of poverty. Thus, local food system planning is an important process for addressing poverty as a leading cause of hunger, which has been largely overlooked by national institutionalized programs. Recommendations that may have the strongest influence on improving food security for both producers and consumers relate to the adoption of universal and rights-based policy language, as well as the expansion of AAFN. AAFNs specifically, have numerous benefits across consumer and producer equity when they consider food sovereignty and food justice principles that encourage diverse leadership and take precaution not to reproduce social inequities.

The recommendations made above for consumers also have strong implications for the improvement of food security. The strongest correlation that is suggested is through the restructuring of food assistance programs to respond to the socio-economic disparities that drive food insecurity, as well as specific considerations to culture and social stigma. Additionally, diversifying food systems infrastructure and leadership positions are important elements of planning that will be important for upholding social equity during climate disturbances. Finally, cross-sector coordination could enhance food security efforts by recruiting support from similar planning projects or calling on them to integrate food security goals. This type of collaboration can span environmental, energy, transportation, community, and economic planning fields, which could enhance the success and traction of food system planning procedures.

Food system planning that aims to address social inequities in the face of climate change, with consideration to the four dimensions of food security have several things to consider. First, improving analysis of power dynamics and outcomes of CFS programs to ensure that programs aimed at addressing food insecurity and inequities are informed and inclusive of the communities

they aim to serve—including urban agriculture and food waste recovery programs. This leads to the importance of improved measures for assessing the impacts of food assistance programs and increasing planning that emphasizes poverty alleviation, focusing on opportunities within the food system. Additionally, in order to stabilize food security among vulnerable communities it will be paramount to consider introducing programs that regulate food costs for low-income consumers who are subject to high food cost volatility. Lastly, as climate change continues to impose unprecedented risks to the food system, food safety will require updated policies that address the new and changing risks to safety and sanitation in the food system.

Recommendations to Food System Planners

These recommendations for food system planning are designed to respond to the climate-related threats across food access, food availability, food utilization, and stability:

1. **Food Access:** Promote poverty alleviation efforts that address the social inequities that underlie persistent food insecurity and mitigate the aggravation of inequities by climate change.
2. **Food Availability:** Promote adaptation, mitigation, recovery, and bargaining power for the small-share farmers who uphold diversity in the food system.
3. **Food Utilization:** Encourage food literacy and safety, as well as ensuring safe cooking and storage capacities for disadvantaged communities.
4. **Stability:** Develop climate action plans that protect low-income and marginalized residents from the impacts of food cost volatility and food system disruptions, while promoting collective bargaining power for producers.

Contribution

This research has contributed to the food system planning field by developing a set of planning recommendations to address social and climate change-related inequities in the food system for producers and consumers. In addition to these recommendations, this research examines the ways that social inequities explained in this paper determine food security, in order to assess the ability of these planning recommendations to address each of the dimensions of food security. This food security analysis concludes by summarizing the major considerations for food system planners aiming to produce equitable and long-term solutions to food insecurity.

Conclusions to this research are based on the critical inquiry and review of literature presented in this paper. Significant attention is paid by this research to the method of literature review in order to answer the constitutive research questions which are heavily based on the available literature, discourse, and planning materials relating to social inequities and climate change impacts on the food system. In this section I explain how the results presented above can be applied to food system planning. In order to do this, I will review and analyze which issues and approaches best fit within the scope of the food system planning strategies that are outlined in the Background and Significance chapter. Lastly, I reflect on the scope of this research and the breadth of concepts that were included or omitted in the research process, which leads to a section that will provide recommendations for future research.

The issues and approaches identified by this research pertaining to the intersection of social equity and climate change can be applied to food system planning at various scales and through various types engagement. In Table 3 and subsequent sections I explain how these concepts can be engaged by food system practitioners through the models of food system planning described in Chapter 2.

Table 3: Issues and Approaches in Social Equity and Opportunities in Food System Planning

Food System Concepts	Food System Planning Models					
	Food System Assessments	Food System Mapping	Community Food Systems	Food Policy Councils	Resilience and Climate Action Plans	
AAFN	X	X	X	X	X	X
Corporate Control	X		X	X	X	X
Education, Technology, and Adaption			X	X	X	X
Financialization	X			X	X	X
Food Cost Volatility	X	X	X	X	X	X
Food Cultures	X		X	X	X	X
Food Deserts	X	X	X	X	X	X
Food Justice	X		X	X	X	X
Food Safety	X		X	X	X	X
Food Sovereignty	X	X	X	X	X	X
Food Waste	X	X	X	X	X	X
Global Food Systems	X	X	X	X	X	X
Indigenous Foodways	X	X	X	X	X	X
Labor Unions and Coalitions	X			X	X	X
Land Access	X	X		X	X	X
Local Food Systems	X	X	X	X	X	X
Nutrition Assistance Programs	X	X	X	X	X	X
Organic and Sustainable Agriculture	X	X	X	X	X	X
Resilience and Transformation	X		X	X	X	X
Rural and Mental Health Disparities	X	X	X	X	X	X
US Food Movements			X	X	X	X

Food System Assessments

FSAAs may assist in bridging the gap across food system and climate change planning by considering some of the recommendations made by this research in their assessments. In the case of the first constitutive research question, addressing inequities among producers, FSAs might assess the issues of equitable land and market access, or health and labor injustices experienced by marginalized farmers and farmworkers. Regional climate action plans that aim to alleviate inequities for small-share farmers can learn from FSAs about the gaps in food system distribution chains in order to identify opportunities for improving market access or AAFNs that support these producers. Additionally, assessments that investigate agricultural growing regions may draw conclusions about how planners can improve land access and anticipate environmental disruptions to food production. Similarly, some assessments may be able to inform planners about available resources for producers that may improve coordination for small-share farmers to access improved adaptation technologies and educational tools.

FSAs have a track record of responding to social injustices experienced by consumers. Notably, these assessments have shed light on the rates of food insecurity, diet-related diseases, or access to healthy local food options. For this reason, even existing FSAs may provide valuable insights into how climate action plans can address the existing inequities in the food system. Climate action plans should consider the contribution of FSAs for alleviating inequities as an important component of planning in order to protect livelihoods in the face of climate instability. As I recommended in the contributions of this research, alleviating poverty is one way that planning can address the intersection of social and climate change-driven inequities. This is particularly important for climate action plans because the experience of poverty is both an indicator of vulnerabilities to climate change and an impediment to socio-economic recovery. In

sum, there are several ways that FSAs can bolster the effectiveness of resilience and climate action plans by informing planners with an array of interdisciplinary food systems knowledge. Since climate change will impact regions and communities in distinct ways, FSAs, which are often conducted on regional or local scales may offer crucial contributions to planning for climate change at this level.

Food System Mapping

Similar to FSAs, food system mapping can coordinate across many sectors and inform interdisciplinary planning efforts. Food system mapping offers a unique advantage to resilience and climate action plans because of the body of available mapping systems that can express and predict climate variabilities. When the data from weather and environmental-based maps are overlaid with food systems data conclusions can be made about where food access and infrastructure should be improved, as well as where and how farmers may be most vulnerable to environmental changes. For these reasons food system maps may assist in improving social equity for food producers in terms of building market capacities, accessing productive agricultural lands, and preparing for and adapting from extreme weather and environmental changes. In addition to these environmental considerations, food system maps can be used to identify and inventory existing food systems infrastructure and resources. This kind of mapping might include tracking available resources for farmers, such as cooperative extensions or other agricultural agencies in order to identify gaps in access to these resources, particularly in rural and remote areas.

Food system mapping also has potential to guide the alleviation of consumer inequities by exposing inequities of food access and other geographic disparities. Mapping such data sets can provide evidence for understanding social inequities and their causes or relationships to other

socio-economic conditions. For example, food system maps might provide visual evidence that draws distinctions across the relationships of poverty, food deserts, and the prevalence of diet-related diseases. Such conclusions may be important for improving planning initiatives in addition to communicating their impact to community stakeholders and policy-makers. Finally, food system maps may improve cross-sector collaboration by improving coordination across sectors who can contribute diverse sets of information to a food system mapping project.

Community Food Systems

Community food systems can play an important role in the advocacy of social equity and food justice issues by playing active roles in the facilitation of these issues across stakeholders, communities, planners, and policy-makers. CFS practitioners can help to bridge the gap of food systems and social equity in climate change planning by advocating for these issues at a community scale and facilitating these solutions to be scaled upward. Planning recommendations made by this research that may benefit from CFS initiatives relate to addressing power dynamics in the food system by initiating new avenues for farmers and farmworkers to organize or by promoting diverse leadership and stakeholders in food system planning and programming. Addressing food access issues is another area where CFS initiatives have dominated local efforts which can provide valuable considerations to planning for social equity and climate change. One way this might happen is by strengthening food assistance programs. As is suggested in the planning recommendations made for consumers, mitigating the aggravation of social inequities relating to food insecurity relies on improving our response to the socio-cultural barriers and social stigma of participating in food assistance programs and coordination with efforts to alleviate poverty.

CFS leaders are also more likely to advance social equity for producers through planning and advocacy in a number of ways. Compared to planners who prioritize climate change over social impacts, CFS practitioners are more likely to recognize the importance of equitable healthcare access to food producers and rural communities. In planning processes, this recognition is an integral part of improving conditions within the food system and ensuring thriving local food production, particularly as climate change threatens the health of these populations. Additionally, their interests in social justice position them to be valuable advisors to climate planning by recognizing the social dimensions of resilience. For instance, CFS practitioners may recognize the needs for diverse food access and AAFNs to promote food access and local food supplies, which in turn provide an added dimension of food system resilience for those communities.

Food Policy Councils

FPCs operate in a variety of fashions and may play important roles in improving resilience and climate action plans to address social equity issues in the food system when they serve as advisory councils or interventionists. FPCs have become influential facilitators of food system discourses by advocating for all variety of interests across the food system. For this reason, FPCs have gained recognition as respected leaders across government departments, NGOs, and nonprofits, positioning them to call for greater inclusivity of food system issues in climate and resilience planning. These councils can advocate or design policy agendas and take advantage of opportunities to bridge the food system gap in climate change planning. Another important task that FPCs may be able to accomplish in food system and climate action planning is establishing consistent language and common agendas. FPCs can advocate for policy language that improves the impact of these measures to address social equity concerns. FPCs can also call

for policies to adopt consistent language that reflects human rights and climate change. In addition to policy language, FPCs can play an important role in demanding corporate accountability in the food system. By acting as advisors to government institutions FPCs can take advantage of their position to influence policy development by calling for provisions that limit the power of corporate influence over food economies. FPCs are interdisciplinary in nature, thus their capacity to advocate for the recommendations made by this research is broad.

Resilience and Climate Action Plans

There are many opportunities for planning to address the social issues behind climate change and food system inequities, which span issues of improving land and resource access, inclusive stakeholderhood and bargaining power, and poverty alleviation, among others.

Resilience and climate action plans may likely play the largest role in mitigating the exacerbation of social inequities by climate change. However, this research has found that they remain notably disconnected from the food system planning field. Each of the recommendations made by this chapter highlight opportunities for resilience and climate action plans to address food system issues while mitigating the aggravation of social inequities by climate change. These methods of planning may also be supported by the previously stated food system planning models, in order to effectively respond to regional food system barriers and inequities. Schipanski et al. (2016) argue that targeted policies and programs aimed at the specific needs of impoverished and smallholder populations produce more cost-effective and integrative approaches to improving measurable well-being outcomes (602). This may be an important argument for climate planners who have not identified adequate reasons to engage in food system issues.

Food system planning recommendations that may be most complimentary to existing climate action agendas relate to the development of AAFNs, corporate accountability, and

promoting food system diversity, among several other recommendations. Each of these recommendations highlight interactions with climate action and resilience efforts by reducing climate impacts from the food system or bolstering food system resiliency. This research concludes that while there are significant opportunities for planners to promote equity in the face of climate change, food system and climate change planning fields remain largely disconnected and neither adequately address climate-driven threats to social equity.

A major conclusion that this research draws is the need for improved coordination across planning sectors and greater integration of food system planning in general. This is particularly important in the contexts of improving social equity and addressing climate change. Planning efforts that aim to address the risks of climate change on a regional or national level do not provide adequate evidence of accounting for social equity in the food system or the larger food system in general. Such resilience plans and climate action plans would benefit from the insights of FSAs, food system mapping, and FPCs, which shed light on the barriers experienced by regional food systems. This can be an important step that will prove necessary for improving food security before, during, and after times of crisis and environmental or economic disturbances. The lack of coordination among food system planning in the public planning field, leads to an emphasis of these climate-related plans on energy, transportation, community, economy, and other industries. Despite the lack of awareness in planning for food system issues, there is little evidence of food system planning for climate change across the US to fill this gap.

Recommendations for Future Research

This research aims to recognize the diverse and broad scope of inequities in the food system. While it took steps to recognize the different experiences of inequities across consumers and producers, it does not distinguish across several other social groups who may be uniquely

impacted by social inequities and climate change. For this reason, future research may enhance the results of this research by considering the circumstances of immigrant, indigenous, and subsistence groups, which were not adequately discussed in the scope of this research.

Additionally, certain food-related industries were not considered at length to account for unique injustices that may arise in response to climate change. This includes such industries as livestock farming, fish and seafood industries, and food service and processing sectors. In addition to these social groups and industries, some leading concepts to address climate change could also be further investigated.

This research has emphasized the social and economic systems that drive or alleviate inequities in the food system in order to critically assess their capacity to address the added barriers imposed by climate change. However, it is important to note that there are several leading concepts in literature central to addressing climate change through action in the food system that were not addressed. This is because these concepts focus on the environmental and ecological aspects of climate change, however, this does not mean that they do not have social impacts. These concepts which warrant further investigation into their impacts on social equity pertain to agricultural practices such as carbon sequestration, or other adaptation and mitigation priorities. While the adoption of these models, impacts the livelihoods of farmers who adopt them and operate within a system that increasingly favors them, these concepts are primarily concerned with issues of agricultural productivity and so they were not considered to be central to the social dimensions discussed by this research.

Summary

In this chapter I conducted a review of literature in order to comprise the results of my constitutive research questions. In response to the first two questions, the review of literature

found that there are several leading issues and approaches pertaining to the social inequities faced by producers and consumers in the food system, which warrant consideration from food system planners. For food system producers, these are: land access, financialization, and corporate control; rural and mental health disparities; crop insurance; subsidies, and disaster relief; labor unions and coalitions; education, technology, and adaptation; food sovereignty; organic and sustainable agriculture; and, resilience and transformation. To answer the second constitutive research question relating to social equity for consumers, the key concepts identified are: local vs. global food system; food safety; food waste; food deserts; food cost volatility; food and nutrition assistance programs; food justice and US food movements; and, food cultures and indigenous foodways. These concepts together reflect the scope of food systems discourse in academic literature that is concerned with social equity, climate change, and food system planning.

After identifying these concepts, the first two constitutive research questions, present an analysis of these concepts. This analysis is conducted in order to identify how these concepts might be applied through food system planning to alleviate social inequities and prevent the aggravation of social inequities by climate change. To conclude this analysis a set of recommendations are made in response to each question drawing on the discourses presented in literature across food systems, social equity, planning, and climate change. Finally, the analysis of these results leads to my final constitutive research question, which considers the ability of these recommendations to improve food security.

My final constitutive research question extrapolates the findings of the first two research questions and applies them to a framework of food security. The framework that organizes these results consists of four dimensions of food security—food access, availability, utilization, and

stability. A table is provided to represent the interactions of the key concepts identified in this research and key words that reflect the purpose of planning recommendations. Across these dimensions an analysis is conducted to reflect on the interactions of key concepts and recommendations with the components of upholding food security. This chapter concludes by explaining the key findings and contributions that this research makes to the food system planning field, as well as making recommendations for future research. In the following chapter, I will conclude my thesis by presenting the overall conclusions of this paper.

Chapter Five

Conclusion: Food System Planning to Prevent the Aggravation of Inequities by Climate Change

This research addresses social and climate change-related inequities in the food system because I want to learn how concepts in food systems literature can be applied to planning so that inequities are not reproduced or exacerbated in the face of climate change. It asked, how can food systems literature be applied to planning initiatives so that inequities are not reproduced or exacerbated in the face of climate change? To answer this question, I first explained important concepts relating to social inequities in the food system, the relationship between climate change and the food system, and introduced leading methods of food system planning. I then explained my methods, methodology, and positionality to this research. Finally, in Chapter 4 I presented the results, analysis, and contribution this research made to the field of food system planning. This thesis presents foundational knowledge based on a review of the literature to analyze social equity in the food system, accounting for the threats of climate change and identifies opportunities for improved food system planning.

This research has responded to the gap in the climate action and resilience planning fields to adequately address food systems and social equity, as well as the lack of evidence of coordination with food system planners. Key findings produced by this research offer critical insights for food system planners into the ability to address social inequities in the food system in coordination with climate change responses. These findings provide concrete recommendations to be applied by food system planners which could positively influence the capacity of planning to protect marginalized populations against the aggravation of social inequities by climate change.

These recommendations based on inequities experienced by producers in the food system are: (1) Increase equitable market access for small-share producers through AAFNs while maintaining a strong and diverse distribution system which recognizes the importance of integrating the globalized food system; (2) Enforce corporate accountability to ensure that inequities are not being exacerbated or reproduced through the intersection of climate change and globalization; (3) Encourage collective bargaining power for farmers and farmworkers, including access to unions and other forms of organizing for improved labor and working conditions that account for the changing and increasingly dangerous conditions posed by climate change; (4) Improve access to education, technology, adaptation tools, and scientific knowledge; and encourage progress in these fields to address the specific issues and needs of small-share farmers; (5) Improve equitable land access by enforcing equal opportunities to access credit, secure long-term rental agreements, promote land-share opportunities, and expand agricultural land trusts and farmland protections; (6) Adopt policies that improve farmers' abilities to obtain adequate health insurance and healthcare access, including mental health support and suicide prevention resources; (7) Adopt "rights-based" language in planning and policy to reinforce government responsibility to upholding rights in the food system; and (8) Prepare regionally-specific climate action plans which address existing inequities and responds to the specific threats faced by farmers in a given region—including supports before, during, and after a natural disaster.

The recommendations made to improve equity for consumers in the food system are: (1) Improve the capacities of food assistance programs to adapt to socio-cultural differences across the US, address social stigma, and coordinate with AAFNs and other local food infrastructure to improve food access; (2) Promote diversity of food sources including local, global, alternative

models, and equitable expansion of infrastructure in food deserts and historically marginalized areas while upholding indigenous foodways; (3) Support and coordinate with poverty alleviation efforts as a critical step to addressing food insecurity; (4) Address power dynamics in food system planning and programming and promote diversity in leadership positions; (5) Seek avenues to coordinate through cross-sector collaboration; (6) Adopt universal policy language and address the inconsistencies of food system discourses by encouraging the establishment of universal definitions for food system concepts, such as food security, food sovereignty, and food justice; and (7) Develop a climate action plan that emphasizes the socio-cultural and bio-regional dimensions of equity for consumers ensuring healthful and economically accessible (preferably local) foods in times of crisis and food system disruptions.

Finally, the following recommendations are made to address the social impacts of climate change on each of the dimensions of food security (i.e., food access, availability, utilization, and stability). These recommendations are: (1) Food access: Promote poverty alleviation efforts that address the social inequities that underlie persistent food insecurity and mitigate the aggravation of inequities by climate change; (2) Availability: Promote adaptation, mitigation, recovery and bargaining power for the small-share farmers who uphold diversity in the food system; (3) Utilization: Encourage food literacy and safety, as well as ensuring safe cooking and storage capacities for disadvantaged communities, and; (4) Stability: Develop climate action plans that protect low-income and marginalized residents from the impacts of food cost volatility and food system disruptions, while promoting collective bargaining power for producers. In sum, this research provides to food system planners an improved method of systematically understanding and addressing the intersection of climate change and social inequities through informed

recommendations that take into consideration the complex interactions of global climate change and socio-economic systems.

Climate change will disproportionately affect low-income households, minorities, women, rural communities, and small-share farmers and ranchers, threatening to aggravate the inequities already experienced by these communities. As climate events continue to produce severe environmental and weather conditions across the globe, farmers and farmworkers are increasingly exposed to unsafe working conditions as a result of severe smoke from wildfires, dangers of flood, and hazards of severe heat conditions, among others. Similarly, consumers will be faced with supply chain inconsistencies, food cost volatility, and disruptions to social, political, and economic systems. In response to these growing threats of climate change, which will aggravate social inequities in the food system, this research has uncovered key concepts that can be applied to address the intersection of these social and climate inequities through food system planning. This research calls for greater attention to the food system and social inequities in planning for climate change and offers crucial guidance to food system planners in this process.

References

- Alkon, A., Cadii, Y., and Moore, F. 2019. "Subverting the new narrative: food, gentrification and resistance in Oakland, California." *Agriculture and Human Values*, 36:793-804.
- Alkon, A., and Guthman, J. 2017. *The new food activism: Opposition, cooperation, and collective action*. University of California Press.
- Alkon, A., and Mares, T. 2012. "Food sovereignty in US food movements: Radical visions and neoliberal constraints." *Agriculture and Human Values*, 29 (3): 347-359.
- Allen, P. 2004. *Together at the table: Sustainability and sustenance in the American agrifood system*. Penn State Press.
- Allen, P., and Sachs, C. 2007. "Women and food chains: the gendered politics of food." *International Journal of Sociology of Food and Agriculture*, 15: 1-23.
- Anderson, M. 2008. "Rights-based food systems and the goals of food systems reform." *Agriculture and Human Values*, 25 (4): 593-608. <https://doi.org/10.1007/s10460-008-9151-z>.
- Anderson, M. 2013. "Beyond food security to realizing food rights in the US." *Journal of Rural Studies*, 29: 113-122.
- Berti, G., and Mulligan, C. 2016. "Competitiveness of Small Farms and Innovative Food Supply Chains: The Role of Food Hubs in Creating Sustainable Regional and Local Food Systems." *Sustainability*. Sustainability. doi:10.3390/su8070616.
- Bilal, U. 2016. "The long shadow of redlining on the food system." *Johns Hopkins Center for a Livable Future* (blog). July 8, 2016. Retrieved from: <http://livablefutureblog.com/2016/07/redlining-food-system>
- Biehl, E., Buzogany, S., Huang, A., Chodur, G., and Neff, R. 2017. "Baltimore food system resilience advisory report." *Johns Hopkins Center for A Livable Future and Baltimore Office of Sustainability*.
- Biehl, E., Buzogany, S., Baja, K., and Neff., R. 2018. "Planning for a Resilient Urban Food System: A Case Study from Baltimore City, Maryland." *Journal of Agriculture, Food Systems, and Community Development*: 39-53. <https://doi.org/10.5304/jafscd.2018.08b.008>.
- Bon Appetit. 2012. "Inventory of Farmworker Issues and Protections in the United States. 2011" Bon Appetit Management Company Foundation, and The United Farmworkers.
- Brunori, G., Galli, F., Barjolle, D., Van Broekhuizen, R., Colombo, L., Giampietro, M., Kirwan, J., Lang, T., Mathijs, E., Maye, D., De Roest, K., Rougoor, C., Schwarz, J., Schmitt, E., Smith, J., Stojanovic, Z., Tisenkopfs, T., and Touzard, J. 2016. "Are Local Food Chains More Sustainable than Global Food Chains? Considerations for Assessment." *Sustainability*. <https://doi.org/10.3390/su8050449>.
- Cairns, K., Johnston, J., and Baumann, S. 2010. "Caring about food: Doing gender in the foodie kitchen." *Gender & society*, 24 (5): 591-615
- Candy, S., Biggs, C., Larsen, K., and Turner, G. 2015. "Modelling food system resilience: a scenario-based simulation modelling approach to explore future shocks and adaptations in the Australian food system." *Journal of Environmental Studies and Sciences*, 5 (4): 712-731. <https://doi.org/10.1007/s13412-015-0338-5>.

- Canning, P., Rehkamp, S., Waters, A., and Etemadnia, H. 2017. "The role of fossil fuels in the US food system and the American diet." *United States Department of Agriculture, Economic Research Service*. Economic Research Report, 224.
- Campbell, M. 2004. "Building a Common Table." *Journal of Planning Education and Research*. doi:10.1177/0739456x04264916.
- Campbell, B., Vermeulen, S., Aggarwal, P., Corner-Dolloff, C., Girvetz, E., Loboguerrero, A., Ramirez-Villegas, J., Rosenstock, T., Sebastian, L., Thornton, P., and Wollenberg, E. 2016. "Reducing risks to food security from climate change." *Global Food Security*, 11: 34-43. <https://doi.org/10.1016/j.gfs.2016.06.002>.
- Center on Budget and Policy Priorities (CBPP). 2019. Chart Book: SNAP Helps Struggling Families Put Food On The Table. *Center On Budget And Policy Priorities*. <https://www.cbpp.org/research/food-assistance/chart-book-snap-helps-struggling-families-put-food-on-the-table>
- Clapp, J., and Isakson, S. 2018. "Risky Returns: The Implications of Financialization in the Food System." *Development and Change*, 49 (2): 437-460. doi: 10.1111/dech.12376.
- Clendenning, J., Dressler, W., and Richards, C. 2016. "Food justice or food sovereignty? Understanding the rise of urban food movements in the USA." *Agriculture and Human Values*, 33: 165–177.
- Comstock, D. 1994. "A Method for Critical Research." *Readings in the Philosophy of Social Science*. MIT Press. 625-639.
- Day-Farnsworth, L., and Morales, A. 2011. "Satiating the Demand: Planning for Alternative Models of Regional Food Distribution." 227-248. <https://doi.org/10.5304/jafscd.2011.021.020>.
- DeBono, N., Ross, N., and Berrang-Ford, L. 2012. "Does the Food Stamp Program cause obesity? A realist review and a call for place-based research." *Health & Place*. 18 (4): 747-756.
- Dhanireddy, P., and Frisvold, G. 2012. "Disaster Assistance and Crop Insurance Participation in US." *Agriculture and Applied Economics Association*. doi:10.22004/ag.econ.124720.
- Ericksen, P. 2008. "Conceptualizing Food Systems for Global Environmental Change Research." *Global Environmental Change*. doi:10.1016/j.gloenvcha.2007.09.002.
- Fairbairn, M. 2012. "Framing transformation: The counterhegemonic potential of food sovereignty in the US context." *Agriculture and Human Values*, 29: 217–230.
- FAO. 2008. Food Security Information for Action: Practical Guides: An Introduction to the Basic Concepts of Food Security. *FAO Food Security Programme*.
- FAO. 2009. "1.02 Billion People Hungry." *Press Release*. Rome: FAO. Retrieved from: <http://www.fao.org/news/story/en/item/20568/icode/>
- Fisher, A. 2017. Big hunger: The unholy alliance between corporate America and anti-hunger groups. *MIT Press*.
- Freedgood, J., Pierce-Quiñonez, M., and Meter, K. 2011. "Emerging Assessment Tools To Inform Food System Planning." *Journal of Agriculture, Food Systems, and Community Development*: 83-104. <https://doi.org/10.5304/jafscd.2011.021.023>.
- Ghosh, J. 2010. "The unnatural coupling: Food and global finance." *Journal of Agrarian Change*, 10 (1): 72-86. doi: 10.1111/j.1471-0366.2009.00249.x.

- Giancattarino, A., and Noor, S. 2014. "Building the Case for Racial Equity in the Food System." *Center for Social Inclusion*. Retrieved from: <https://www.centerforsocialinclusion.org/publication/building-the-case-for-racial-equity-in-the-food-system/>
- Goodwin, B., and Rejesus, R. 2008. "Safety Nets or Trampolines? Federal Crop Insurance, Disaster Assistance, and the Farm Bill." *Journal of Agricultural and Applied Economics*. doi:10.1017/s1074070800023713.
- Gottlieb, R., and Fisher, A. 1996. "FIRST FEED THE FACE: ENVIRONMENTAL JUSTICE AND COMMUNITY FOOD SECURITY." *Antipode*. doi:10.1111/j.1467-8330.1996.tb00522.x.
- Gunderson, R. 2014. "Problems with the defetishization thesis: ethical consumerism, alternative food systems, and commodity fetishism." *Agriculture and human values*, (31) 1. 109-117.
- Harper, A., Shattuck, A., Holt-Giménez, E., Alkon, A., and Lambrick, F. 2009. "Food Policy Councils: Lessons Learned." *Food First: Institute for Food and Development Policy*.
- Heynen, N., Kurtz, H., Trauger, A. 2012. "Food justice, hunger and the city." *Geography and compass*, 6 (5): 304-311.
- Hoefler, R., and Curry, C. 2012. "Food Security and Social Protection in the United States." *Journal of Policy Practice*, 11 (1-2): 59-76.
- Holt-Giménez, E. 2011. "Reform or Transformation? The Pivotal Role of Food Justice in the U.S. Food Movement." *Race/Ethnicity: Multidisciplinary Global Contexts: Food Justice*, 5 (1): 83-102. Indiana University Press.
- Holt-Giménez, E. 2019. "Capitalism, food, and social movements: The political economy of food system transformation." *Journal of Agriculture, Food Systems, and Community Development*, 9 (1): 1-13.
- Holt-Giménez, E. and Shattuck, A. 2011. "Food crises, food regimes and food movements: rumblings of reform or tides of transformation?" *The Journal of Peasant Studies*, 38 (1): 109-144.
- Inuit Circumpolar Council (ICC). 2015. "Alaskan Inuit food security conceptual framework: how to assess the arctic from an Inuit perspective." *ICC-Alaska*. Retrieved from: <http://iccalaska.org/wpicc/wpcontent/uploads/2016/05/Food-Security-Full-Technical-Report.pdf>
- Islam, N., and Winkel J. 2017. "Climate change and social inequality." *Department of Economic and Social Affairs, United Nations*.
- Jesson, J., Matheson, L., and Lacey, F. 2011. "Doing your literature review: Traditional and systematic techniques." *Sage*.
- Jones, C. 2009. *Health status and health care access of farm and rural populations*. Diane Publishing.
- Lang, T., and Barling, D. 2012. "Food security and food sustainability: Reformulating the debate." *The Geographical Journal*, 178 (4): 313-326. doi: 10.1111/j.1475-4959.2012.00480.x.
- Lawrence, G. 2017. "Re-evaluating food systems and food security: A global perspective." *Journal of Sociolog.* 53 (4): 774-796. doi: 10.1177/1440783317743678.
- Levkoe, C. 2011. "Towards a transformative food politics." *Local Environment*, 16 (7): 687-705. <https://doi.org/10.1080/13549839.2011.592182>.
- Masson, D., Paulos, A. and Beaulieu Bastien, E. 2017. "Struggling for food sovereignty in the World March of Women." *The Journal of Peasant Studies*, 44 (1): 56-77.

- Minkoff-Zern, L. 2014. "Subsidizing farmworker hunger: Food assistance programs and the social reproduction of California farm labor." *Geoforum*, 57: 91-98.
- Morris, A. 2019. "Social movement theory: Lessons from the sociology of WEB Du Bois." *Mobilization: An International Quarterly*, 24 (2): 125-136.
- National Research Council (NRC). 2015. *A Framework for Assessing Effects of the Food System*. National Academies Press. <https://doi.org/10.17226/18846>.
- National Sustainable Agriculture Coalition (NSAC). 2015. "WHO OWNS U.S. FARMLAND AND HOW WILL IT CHANGE?" NSAC (blog). September 18, 2015. Retrieved from: <https://sustainableagriculture.net/blog/total-2014-results/>
- Nierenberg, D., 2018. *Nourished Planet: Sustainability in the Global Food System*. Island Press.
- Poppendieck, J. 1998. "Want Amid Plenty: From Hunger to Inequality." *Monthly Review*, 121 (7): 125-136.
- Quinlan, A., Berbés-Blázquez, M., Haider, L., and Peterson, G. 2016. "Measuring and assessing resilience: broadening understanding through multiple disciplinary perspectives." *Journal of Applied Ecology*, 53 (3): 677-687. <https://doi.org/10.1111/1365-2664.12550>.
<https://dx.doi.org/10.1111/1365-2664.12550>.
- Reece, J. 2018. "Seeking Food Justice and a Just City through Local Action in Food Systems: Opportunities, Challenges, and Transformation." *Journal of Agriculture, Food Systems, and Community Development*: 211-215. <https://doi.org/10.5304/jafscd.2018.08b.012>.
<https://dx.doi.org/10.5304/jafscd.2018.08b.012>.
- Reed, D., and Claunch, D. 2020. "Risk for Depressive Symptoms and Suicide Among U.S. Primary Farmers and Family Members: A Systematic Literature Review." *Workplace Health & Safety*: 216507991988894. <https://doi.org/10.1177/2165079919888940>.
- Rosenfeld, J. 2019. "US Labor Studies in the Twenty-First Century: Understanding Laborism Without Labor." *Annual Review of Sociology*, 45: 449-465.
- Schipanski, M., Macdonald, G., Rosenzweig, S., Chappell, M., Bennett, E., Kerr, R., Blesh, J., Crews, T., Drinkwater, L., Lundgren, J., and Schnarr, C. 2016. "Realizing Resilient Food Systems." *BioScience*. 66 (7): 600-610. <https://doi.org/10.1093/biosci/biw052>.
- Schulte, P., and Chun, H. 2009. Climate Change and Occupational Safety and Health: Establishing a Preliminary Framework. *Journal of Occupational and Environmental Hygiene*, 6 (9): 542-554. <https://doi.org/10.1080/15459620903066008>.
- Slocum, R., and Cadieux, K. 2015. "Notes on the practice of food justice in the U.S.: understanding and confronting trauma and inequity." *Journal of Political Ecology*, 22 (1): 27. <https://doi.org/10.2458/v22i1.21077>.
- Soma, T. and Wakefield, S. 2011. "The Emerging Role of a Food System Planner: Integrating Food Considerations into Planning". *Journal of Agriculture Food Systems and Community Development*. doi:10.5304/jafscd.2011.021.006.
- Stevenson, G., Ruhf, K., Lezberg, S., and Clancy, K. 2007. "Warrior, builder, and weaver work: Strategies for changing the food system." In *Remaking the North American Food System: Strategies for Sustainability*, edited by C. Claire Hinrichs and Thomas A. Lyson, 33-62. Lincoln: University of Nebraska Press.
- Stone, J., and Rahimifard, S. 2018. Resilience in agrifood supply chains: a critical analysis of the literature and synthesis of a novel framework. *Supply Chain Management: An International Journal* 23 (3): 207-238. <https://doi.org/10.1108/scm-06-2017-0201>.

- Sweeney, G., Hand, M., Kaiser, M., Clark, K., Rogers, C., and Spees, C. 2016. "The State of Food Mapping: Academic Literature Since 2008 and Review of Online GIS-based Food Mapping Resources." *Journal of Planning Literature*. 31 (2): 123-219.
- Tendall, D., Joerin, J., Kopainsky, B., Edwards, P., Shreck, A., Le, Q., Kruetli, P., Grant, M., and Six, J. 2015. "Food system resilience: Defining the concept." *Global Food Security*. 6: 17-23. <https://doi.org/10.1016/j.gfs.2015.08.001>.
- Thornton, P., Ericksen, P., Herrero, M., and Challinor, A. 2014. "Climate Variability and Vulnerability to Climate Change: A Review." *Global Change Biology*. doi:10.1111/gcb.12581.
- Vitiello, D., and Brinkley, C. 2014. "The Hidden History of Food System Planning." *Journal of Planning History*. 13 (2): 91-112. <https://doi.org/10.1177/1538513213507541>.
- Wakefield, S., Fleming, J., Klassen, C. and Skinner, A. 2013. "Sweet Charity, revisited: Organizational responses to food insecurity in Hamilton and Toronto, Canada." *Critical Social Policy*. 33 (3): 427-450.
- Walker, R., Keane, C., Burke, J. 2010. "Disparities and Access to Healthy Food in the United States: A Review of Food Deserts Literature." *Health & Place*. Doi: 10.1016/j.healthplace.2010.04.013.
- Wang, S. 2014. "Cooperative Extension System: Trends and Economic Impacts on U.S. Agriculture." *The magazine of food, farm, and resource issues*. 29 (1): 1-8. Agriculture & Applied Economic Association.
- Weiler, A., Hergesheimer, C., Brisbois, B., Wittman, H., Yassi, A., and Spiegel, J. 2015. "Food Sovereignty, Food Security and Health Equity: A Meta-narrative Mapping Exercise." *Health Policy and Planning*. doi:10.1093/heapol/czu109.
- Yu, M., Lombe, M., and Nebbitt, V. 2010. "Food stamp program participation, informal supports, household food security and child food security: A comparison of Africa American and Caucasion households in poverty." *Children and Youth Services Review*. 32 (5): 767-773.