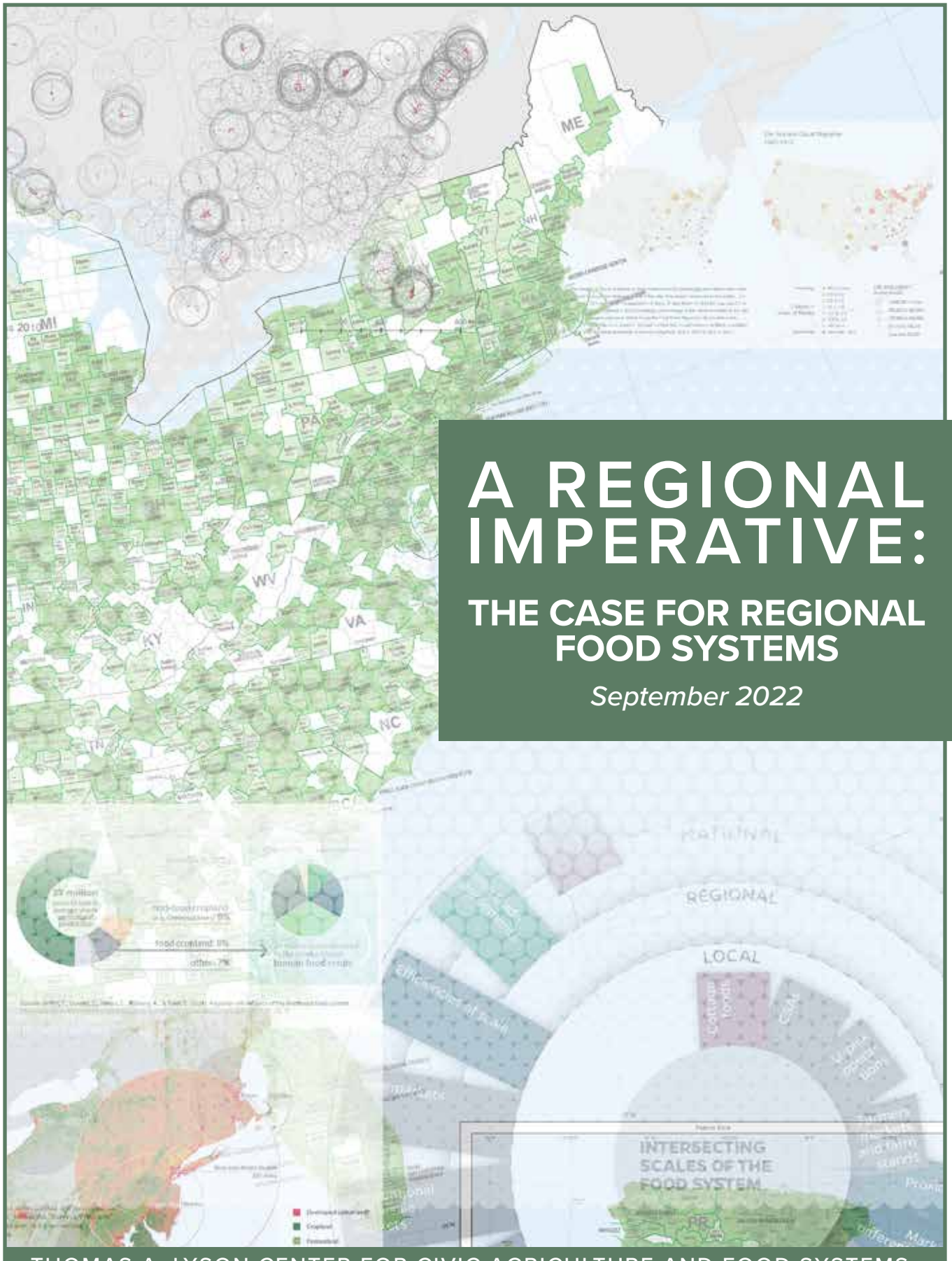

A REGIONAL IMPERATIVE:

THE CASE FOR REGIONAL FOOD SYSTEMS

September 2022

THOMAS A. LYSON CENTER FOR CIVIC AGRICULTURE AND FOOD SYSTEMS

A REGIONAL IMPERATIVE:

The Case for Regional Food Systems

≈

By Kathryn Z. Ruhf
and Kate Clancy

≈

Final Report | September 2022

Published by the Thomas A. Lyson Center for Civic Agriculture and Food Systems

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Acknowledgments

Deep appreciation to all who contributed to this report. It would not have been completed (nor attempted!) without the expertise, guidance and support of those listed here. Thank you.

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- Zoë Ruhf

Funders

- Doris Duke Charitable Foundation

- John Merck Fund

- Lawson Valentine Foundation

- Merck Family Fund

Graphic Design

- Josh Trudell Imagery, www.joshtrudell.com

The Thomas A. Lyson Center for Civic Agriculture and Food Systems works to connect people to create stronger food systems and healthier communities. The Lyson Center is a fiscally sponsored project of the Center for Transformative Action, a nonprofit affiliate of Cornell University. The Lyson Center publishes the *Journal of Agriculture, Food Systems, and Community Development* (JAFSCD) and facilitates the North American Food Systems Network (NAFSN).

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FOREWORD

The four of us on the Discussion Team brought a diverse set of experiences, skills, and life histories to our tasks. As food system advocates, activists, and academics, we offered these perspectives and more to the work we did with Kate and Kathy to strengthen this report's treatment of race and racial equity. In the process, we learned a lot about the food system in general, and about regionalism and the value of regional food systems. Regions and regional borders are both geographically and socially constructed, and have political, legal, and cultural meanings. The report suggests a vibrant food future where regions and their borders are places of exchange, creation, and sharing rather than exclusion or marginalization.

This report provides a persuasive argument for why regional food systems are possible and desirable. While it focuses on regional food systems, racial equity is of course at the heart of building a resilient food future at all scales. Social justice in the food system is a topic deserving of an entire library, to which this report is a significant contribution.

Regional food systems may be a new idea for some; for them, this report is a sweeping introduction. But for Indigenous Peoples, regions—including those that transcend contemporary political borders—have reflected reality for millennia. This report acknowledges the historic and ongoing nature of regionalism here in the Northeast and in other regions of Turtle Island. Future work inspired by this report will ensure that food system activities are not foreclosed by region-adverse policies, and that regional thinking will bolster food sovereignty as a foundational element of sustainable and just food systems.

We thank Kathy and Kate for the invitation and opportunity to be a part of this process. We appreciate being able to provide substantial input and feedback to improve how race and equity are addressed in the report, and to comment on their thoughtful accompanying piece, "What We Learned." We recognize how crucial it is to acknowledge the many profound shifts and changes in our society. We believe that this report is a valuable reference on the journey for knowledge and social change. Working with the authors affirmed that the time is right for reflection and collaboration.

For us, the process was informative and worthwhile. Far from being a "rubber stamp," the Discussion Team's work with Kathy and Kate was deep and meaningful. We discussed our

views and perspectives and engaged in some fruitful debates. We brought the interdisciplinary, intersectional, and intergenerational nature of our work that is personal to each of us in our respective roles and geographic locations to an open and productive dialogue.

This report will be valuable to anyone involved in food systems, particularly those working toward systemic change. It presents a well-researched and reasoned approach to understanding and promoting regional food systems thinking with a focus on social justice and equity. It is not the answer to the issues of race and inequity in the food system, nor does it presume to be. But it reveals how our own work on these issues fits within—and can benefit from—a regional food systems framework. This report is forward-thinking; it suggests a future food system that embraces diversity and reckons with climate change. "A Regional Imperative" makes an important contribution to the literature on food systems and food system equity in the Northeast and beyond.

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PREFACE

In updating our 2010 working paper on regional food systems, we committed to elevating several topics and themes that it had not adequately addressed. Most significant of these were climate change and racial justice. So much had happened in those areas in the ensuing decade, and we believed these issues to be of paramount importance in advancing our vision of a just, resilient, and sustainable food system. We also recognized that we were not subject experts in either area, so we sought individuals and resources to inform our report on both topics.

When the report was released in January 2022, we received some criticism about our "treatment of racism and racial equity" from the Northeast Sustainable Agriculture Working Group (NESAWG), the report's original sponsor. We took immediate steps to address these concerns and strengthen our report in these areas.

In a supportive collaboration with us, the Thomas A. Lyson Center for Civic Agriculture and Food Systems published a "discussion version" of the report. We issued a public statement and invited feedback on the report. We convened a Discussion Team of four scholar-practitioners with diverse perspectives and experiences (see the report foreword) who provided concrete feedback on the report's language, factual errors, and omissions. They also added to the diversity of the examples in the report. We are most grateful for their work.

Beyond these specific corrections, we explored several themes with the Discussion Team that emerged from our reflection on the criticism. As white authors, we wanted to explore how to effectively and impactfully address racial and other oppression in our report and in similar products. We have not seen our critics raise these considerations, and we believe they are worth sharing in a separate reflection (see the file entitled "What We Learned").

This report is a broad sweep and analysis of regional food systems. As such, it is not a deep investigation of any particular theme. Rather than a limitation, we see this report as a contribution to the collective search for food system justice and sustainability. It is an invitation and an opportunity for others to write more on this topic through their own lenses, analyses and lived experiences. We hope that our observations may help others to advance equity in their work in respectful and productive ways.

EXECUTIVE SUMMARY

'Regional food systems' appears with increasing frequency in scholarly works and among food system practitioners. Yet regional food systems are understudied and undervalued. Much more attention to regionalism and regional food systems is necessary to create more sustainable, equitable, and resilient food systems for all. Building from the authors' 2010 paper, "It takes a region… Exploring a regional food systems approach: A working paper," this greatly expanded report explores the concepts, practices, challenges, and promise of regional food systems. The report's focus is on the Northeast U.S., a laboratory for regional food systems thinking and action, but it also describes and gives examples of regional food systems development across the country. The arguments in favor of regional approaches and explorations apply to all regions and embracing them could not be more imperative to address contemporary conditions.

Regions are geographic places whose features and functions can be described. Regionalism, or "thinking regionally," is an approach—a strategic framework based on scale, geography, and systems thinking applied to food system change. Both place and approach are essential. That said, many food system issues transcend regionalism: a regionally focused food system is not inherently more socially just or ecologically principled. The report focuses on how structural food system issues manifest at the regional scale and how regionalism can contribute to positive food system change.

The report was prepared during the COVID-19 pandemic and heightened attention to the Black Lives Matter movement. Each has shined a glaring light on the vulnerabilities and inequities of food systems at all scales, and of the deeply embedded structural oppression that marginalized communities face. Both force new examination of how and by whom food is produced, processed, transported, and purchased, and of the gaping flaws in food access and security.

Closely examining the regional scale does not slight the importance of 'local.' Yet, as interest in regional food systems has increased, the conflation of 'local' and 'regional' food and food systems is a continuing problem. The differences are important, because 'local' and 'regional' are not the same. Conflating or confusing the terms prevents analysts and advocates from touting 'local' on its own merits, and from making the case for 'regional' food systems as strong as it

could be. Furthermore, 'local' has many positive connotations (not all of which are grounded in fact), and significant cachet in the marketplace, while 'regional' resonates to a lesser degree. If the terms continue to be confused or perceived as identical, and regional is not seen as a legitimate and necessary food systems framework, it will lose its potential to achieve a regional food systems vision, and to implement the numerous practical strategies and benefits it offers.

In food systems, 'regional' is larger geographically than 'local,' and also larger in terms of functions: volume, variety, supply chains, markets, food needs, land use, governance, and policy. A regional food system operates at various scales and geographies toward greater self-reliance. Thinking regionally provides the opportunity to frame food production, needs, and economies in a larger context—within locales and regions, and across state borders, as well as among and across regions, however they may be described and bounded.

Like 'local,' regions can be described in many ways, including by their natural resources, land uses, and sociocultural, economic and political dimensions. Regions are composed of multiple 'locals,' but are more than the sum of them. Regions overlap; they "nest." Their boundaries are fluid. Agri-food systems are characterized by fixed geographic factors such as climate conditions, topography, soil types, suitable farmland, water, and other natural resources. Land and other input costs, farm scale, and crop options play out at the regional level. Regional differences, for example, in transportation, processing, and distribution infrastructure; local, domestic, and international market access; as well as food preferences, security, and access shape a region's comparative food system advantages and challenges.

The report details many characteristics of the Northeast region, made up of twelve states and the District of Columbia. With less land to feed more people than other regions, the Northeast and its subregions have both advantages and challenges to building more sustainable and resilient food systems. The report focuses on land-based food production, while noting the significant contributions to and from the region, from marine and freshwater fisheries, as well as from fiber, nursery, and other nonfood agricultural products. This report acknowledges the Northeast region's particular history of exploitation and dispossession, and contributes to confronting the contemporary challenges around systemic racism in the Northeast's food systems.

The report posits the attributes of ideal regional food systems, including that they:

- Produce a volume and variety of foods to meet as many of the dietary needs and preferences of the population as possible within the resource capacity of the region.
- Lead to self-reliance, but not self-sufficiency.
- Go "beyond local," providing more volume, variety, and market options than local.

- Build regionally relevant solutions around equity, justice, and stewardship.
- Exhibit attributes of both conventional and alternative systems.
- Connect with both local and national and global levels.
- Reject one-size-fits-all agriculture and food policies.
- Consider scale, markets, and values, not just geography.
- Provide more affordable, appropriate, good food options to mainstream markets.
- Encourage decentralization in markets, infrastructure, and governance.
- Develop new institutions and forms of governance.

Diversity, resilience, and sustainability—fundamental to systems thinking—are the core of a complex regional food systems framework. Regions must determine which resilience characteristics already exist and which need development. Social justice—broadly referring to the fair and equitable distribution of political, economic and social rights, benefits, power and opportunity in a society—is a central value and another core concern in regional food systems development.

These overarching and unifying themes are reflected in six dimensions that describe the current conditions, salient elements, and potential of regional food systems. These six dimensions are:

- **Food needs and supply.** Knowing a region's food production capacity makes it possible for all involved to understand the parameters within which they are working and offers a pragmatic understanding of the complementary needs for food imports from national and global sources. The Northeast, for example, can produce only a small percentage of its food needs because of its large, dense population areas and small arable land base. Meeting a larger proportion of the region's food demand would lead to greater regional food security, self-reliance, and carrying capacity. Meeting this demand requires more diversified production of multiple crop and animal foods suited to the region, more regional food supply chains, and a greater emphasis on midsize farms and businesses. Urban food production has a modest but important role to play in the regional food supply, along with significant food supply chain activities in urban and peri-urban zones, including processing, storage, and wholesale and retail sales.

- **Natural resources.** The long-term ability to sustain—and in some regions, increase—the production of crops and animals depends on a sufficient and well cared for natural

resource base. One serious threat to agricultural production is climate change. Its effects on crop health and yields, water supply, livestock and fisheries productivity, and supply chain function will vary by crop and region. These effects need to be addressed through regionally appropriate climate mitigation and adaptation that often will be expensive. Such efforts will require subsidies and incentives to smaller and lower-income farmers for them to remain viable. Such efforts will require subsidies and incentives to smaller and lower-income farmers for them to remain viable.

Land use, protection, and access (framed in the context of land justice) for agriculture are priority issues across U.S. regions. Local-level policies on farmland protection and expansion (or restoration) should be integrated with efforts at the regional level, similar to the way many water policies are considered in regions across the country (e.g., watershed and conservation districts). Institutional diversity at a regional scale provides the optimal degree of resilience when complex natural resource problems arise. Biodiversity at a regional scale is a critical contributor to resilience by offering redundancy and spreading risk across and between regions.

- **Economic development.** A hallmark of a regionally focused food system is that more economic returns stay within both the rural and urban areas of the region, and that such returns are distributed equitably. Regions are crucial units of analysis for mapping land use and growth patterns and trends, assessing agricultural markets, and promoting smart-growth initiatives. Appropriate conclusions from research assessments are not possible without distinguishing 'local' from 'regional" Regional planning can transcend understandable but often short-sighted and parochial (i.e., local) advocacy, and can develop critical linkages among urban, peri-urban, and city areas. Regional food supply chains offer much-needed resilience to regions through diversity and redundancy. They preserve the values of "place," offer greater supply, variety, and dependability than local markets, and are economic engines for midsize farms. Public and private economic development entities and funders must increase their support for food supply chain entrepreneurs and new business models through multiple financing mechanisms, education, and training. Finally, both import substitution and exports are critical to economic viability in the food sector. Inter-and intraregional trade are essential.

- **Infrastructure.** Insufficient and inappropriate supply chain infrastructure is seen as the biggest barrier to building strong and resilient regional food systems. Among the needs are more terminal and public markets across regions; increased food processing capacity, including slaughterhouses and packing plants to bolster the viability of midsize farms through scaling up and increasing production; upgraded roads, bridges, and broadband services; improved collaborations among shippers, trucking firms, and wholesale buyers; better logistics to improve the efficiency of midscale distributors; and more attention to the role played by independent supermarkets in rural areas and small towns. The purchasing power of all types of public and private institutions

should be harnessed to expand regional food procurement. And efforts should be made to align branding activities to create market synergy across a region.

- **Social justice.** A regional lens creates appreciation for a region's particular historical context, demographics, and cultures, and paves the way for place-appropriate actions to address the manifestations and consequences of racism and other forms of social injustice. The regional framework proposed in the report addresses food needs, access, and security, along with fairness and opportunity for all players in the food chain. The disparities uncovered by the pandemic and the Black Lives Matter movement highlight the need for substantive change in many food-related matters. A food justice framework at the regional level can be used to advocate for change, and tie concerns to other structural issues such as in housing, education, and public health. Regions can—and must—confront their particular histories of oppression, and center racial equity throughout the food chain, from removing barriers faced by farmers from marginalized communities to supply chain operations to food availability and preferences.

- **Human and political capacity.** Regionalism and regional food system approaches must be more firmly embedded in governance, including government institutions such as regional development organizations and councils of government, private-sector food industry and trade groups, and civil society entities, such as nonprofit organizations and food policy councils. A regional approach means creating multisector coalitions based on place rather than silos, promoting region-suited federal policies, thinking strategically rather than parochially, and strengthening regional industry and provider networks. This needs to be done with trust and skilled facilitation, because interests within a defined region and between regions may conflict. While regulations and understandable loyalties get in the way of regional cooperation, more can be done to overcome these barriers.

  Regional food systems require collaborations across multiple scales in public and private domains; they can start by taking advantage of existing multistate entities and frameworks. A city region may be a powerful construct to advance regional governance for food systems. Few groups explicitly prioritize or champion regional. Governments must have the vision and political will to establish, develop, and maintain multistakeholder structures at multiple scales, and their diverse constituents must pressure them to do so. State governments must work with neighboring states on issues ranging from transportation to climate mitigation to marketing, and they should share models and best practices. Federal agencies can do more to foster and promote regionalism and food systems. Policies are needed that (1) address specific regional needs and priorities; (2) accommodate regional differences and foster regional solutions in general; and (3) do not disadvantage any particular region.

Moving to a more regional food paradigm is not an easy task. The process of regionalizing food systems requires the combined engagement of experts, practitioners, and advocates from planning, finances, governance, economic development, logistics, policy, and

other arenas. Regional food systems can be strengthened if relevant actors use systems approaches to transcend boundaries and strengthen urban-rural linkages. This requires champions in governments, supply chains, nonprofits, and research and educational institutions, and among consumers.

The language conundrum that conflates local and regional undermines the comprehension of these essential concepts. Most people are not inclined to think "regionally." Those most engaged in this work should strive for clarity about terms and concepts. Educating about regional food systems helps citizens to make system connections and can mobilize actions for change through the multiple entry doors that food systems offer. Thinking regionally can foster solidarity across diverse communities and interests. It can overcome the pitting of local against regional or metropolitan against rural.

Acting regionally requires receptivity to the concept, advantages, and applicability of regionalism. Regional action requires appropriate governance from the public and private sectors, including supply chain actors and cross-sector coalitions and other types of networks. It means thinking strategically, placing equity and anti-oppression as core guiding values. It requires balancing tensions and tradeoffs around efficiency and competing interests across all food system dimensions. It invites participation by all constituents in the work of reshaping the food system.

~ ~ ~

I. INTRODUCTION

Why this update?

In 2010, we wrote a working paper on regional food systems on behalf of the Northeast Sustainable Agriculture Working Group (NESAWG) (Ruhf & Clancy, 2010). At that time, Kathy was the NESAWG coordinator. In that capacity, she was one of the leading proponents of regionalism as a food system construct, and a close working colleague of Kate, a food systems scholar and expert in regional food systems. A shorter article based on the working paper appeared in Choices magazine (Clancy & Ruhf, 2010). In 2015 Kathy published an article on regionalism and resilient food systems (Ruhf, 2015). In 2018, "Digging Deeper: New Thinking on 'Regional'" (Clancy & Ruhf, 2018) was published as a column in the *Journal of Agriculture, Food Systems and Community Development.*

The 2010 paper received widespread recognition in the Northeast and beyond as interest in "thinking regionally" grew, and agri-food research and experience have amplified regionalism on the ground. A decade later, the time has come to update and expand the paper. Our goals with this report are to:

- Bring forward findings from major relevant projects, along with recent writings by colleagues across the country and abroad;
- Provide more history on regional food system-related topics to learn from them and apply lessons to present and future work;
- Apply nearly a decade of observation and analysis to the original paper and bolster (or modify) key assumptions and concepts based on recent research;
- Deepen understanding with some real-world examples in and beyond the Northeast;
- Introduce, expand, and elevate key elements and issues not adequately addressed in the 2010 paper;

- Bring awareness about historic and contemporary racial injustice in the context of regional food systems, and suggest regionalism's role in advancing social justice in food systems change;

- Set a useful contemporary stage and recommendations for region-scale food planning; and

- Expand the reach of this topic to a broad range of academic, practitioner, organizing, and advocacy networks by encouraging a network of interdisciplinary and intergenerational leaders to guide further exploration and action.

In conducting the research for this update, we were excited to find more new information and examples than we had anticipated from different disciplines and sectors in North America and Europe. The thinking about scale and place has advanced. That said, regionalism and regional food systems remain, in our opinion, inadequately understood and appreciated. We hope this report contributes to greater understanding and action.

Approach

In this report, we introduce resilience, diversity, and sustainability as overarching themes in a regional food system. We also lift up and examine specific issue areas that we felt were not adequately addressed in the earlier paper. These are:

- Race, equity, diversity and social justice

- Climate change and adaptation

- Land use, availability, protection, and access

- Economic development

- Supply chain infrastructure

We include more information about fisheries and nonfood production as vital components of a food system in which producers supply a range of agricultural products. We emphasize a systems approach, and explore production capacity, urban agriculture, transportation, trade, financing, and governance, among other topics.

This report reflects both what currently exists and what can be imagined about an ideal regional food system. We are, however, more interested in a pragmatic vision of the future than a utopian one. Regional thinking requires a deeper analysis of the cause and effect of specific food system issues, most of which are broader and more complex than those found at a smaller scale.

In writing this report, we paid close attention to language and terminology. We recognized that terms evolve and go in and out of favor. Not everyone agrees about Indigenous versus Native America, Latino or Latinx, BIPOC or POC, Black or African American, food desert, or the acronym JEDI for justice, equity, diversity and inclusion. Terms like discrimination, disadvantaged and marginalized are understood in different ways. For example, in this report marginalized means to be socially, economically and/or politically distanced from or deprived of power and resources. Marginalized communities may include groups excluded from economic structures and benefits across racial, ethnic and gender categories. Our decisions regarding language reflect input we sought and the guidance of our editors. When citing a source, we used the terminology used by that source.

We gratefully acknowledge our subject experts and reviewers, who were integral to our process. Subject experts weighed in on drafts of specific sections, with edits, comments, and additional resources. With social justice as a central value, we sought to infuse the report with diverse material and perspectives, and to suggest where regional thinking and systemic oppression intersect. Our Discussion Team was invaluable in helping us strengthen the race, equity, and diversity aspects of the report.

Regionalism builds healthy connections and can overcome a zero-sum mentality.

This report reflects and builds on the valuable academic work of many colleagues, combined with observations and examples from our own experiences in the field. We humbly acknowledge the limitations of that experience and our perspectives.

Among these experiences over three decades is our participation in the Enhancing Food Security in the Northeast project (EFSNE) (Penn State College of Agricultural Sciences, n.d.). Kate was deputy director and Kathy led the outreach team. The EFSNE project elevated the importance of the regional scale and worked for seven years to produce what Duncan Hilchey, editor in chief of the *Journal of Agriculture, Food Systems and Community Development*, calls "the most exhaustive analysis ever conducted of a single regional (multistate) food system in North America" (Hilchey, 2017, p. 1).

Although the Northeast may be well-suited as a laboratory for regional food system thinking and action, important food systems development is occurring at multiple scales across the country. We believe that our arguments in favor of regional approaches and explorations are applicable to other regions regardless of differences in natural, social, or political dimensions. Furthermore, our concept of regionalism fully embraces the notions that regions overlap, interrelate, and are malleable. It is also notable that in a regional framework, regions trade, compete, and collaborate. In this way, regionalism builds healthy connections and can overcome the zero-sum mentality that so often divides people and communities. Regional thinking can also focus attention on, and offer solutions for racial and social injustices in the food system.

Setting boundaries on a topic as rich as regional food systems was a challenge. We tried to be thorough, but we acknowledge the gaps in our report. For example, as important as fisheries are to the Northeast's food system, our examination of that sector is somewhat limited.

This report is not an analysis or critique of the food system writ large; we leave that to others with whom we largely agree about its problems and challenges. Nor does it center racism and racial inequity as the primary analytical lens. Our extensive review of literature of all types led us to examine over 30 different topics. And while this report is not an exhaustive review of all these topics, it does acknowledge the multiple perspectives needed to build better food systems and, through the references, allows readers to learn more about and utilize the research and thoughts about regional food systems of academics and practitioners from many countries, disciplines, and sectors.

Closely examining and lifting up the regional scale does not slight the importance of local; both should be given weight in the planning and execution of food systems improvements. We believe that work on local food systems can lead to an acknowledgment of how important it is to broaden the scope and scale of change efforts. We hope that this report will encourage such action.

We recognize that many food system issues transcend regionalism and cannot be solved by "going regional." The structure of U.S. agriculture, farm and food policies, farming practices, diet and nutrition, concentration, consolidation and wealth distribution, food injustice, fair wages, food and land access, farm viability, and the cost of food, for example, go beyond any particular scale or location. Furthermore, as we state in several places, we do not propose that a regionally focused food system is inherently more just, ecologically principled, or productive. Finally, as food system advocates and practitioners grapple with structural racism, equity, and social justice, we humbly acknowledge our own learning curve. In promoting regionalism and regional food systems, we see possibilities at this scale to effectively critique the structural inequities in the food system and to tackle the systemic barriers that marginalized communities experience.

This report starts with an examination of the language and concept challenges around 'local' and 'regional' as they apply to food systems. Then, in Chapter III, we review and explore definitions of a region and regionalism in more detail. Chapter IV focuses on the characteristics and history of the Northeast U.S., including a summary of food systems thinking in the Northeast region. Next, in Chapter V we posit nine attributes of regional food systems.

Chapter VI dives into the dimensions of regional food systems. We look at food needs and supply, natural resources, economic development, infrastructure, social justice, and human and political capacity. Chapter VII examines the constraints and challenges to more regionally focused food systems, from political boundaries to production, infrastructure, food inequities, and human capacity. In the concluding chapter, we summarize key concepts and suggest what is needed to achieve more resilient and robust regional food systems.

As we point out, regionalism has gone in and out of favor over time. We submit that as a construct for action, regional thinking could not be more relevant to address contemporary conditions. Our final round of writing and edits occurred during the COVID-19 coronavirus pandemic, with heart-wrenching lessons on the dangers of both globalism and parochialism. Harsh light has shined on the fragility of long-distance food supplies and local infrastructure and on the tragic consequences of pitting one state against another. Emergency food providers and food retailers coordinated at regional levels. Federal relief packages have been fought for and analyzed through regional lenses—for example, around the loss of migrant farmworker labor and the loss of direct markets.

There are no easy solutions during this particular crisis, nor for food systems in general. A "wicked problem" like sustainable, resilient and just food systems, for which no simple solution exists, has become even more challenging. That said, we hope this report will serve as a tool to help shape and support regional food systems in the Northeast and beyond.

II. LANGUAGE AND CONCEPT CONUNDRUMS

Conflating "local" and "regional"

As interest in regional food systems has increased, food system practitioners and advocates still confront the challenge of clarifying and agreeing on some terms and definitions. A significant problem is the continuing conflation of 'local' and 'regional' food and food systems by many actors in these arenas. As we argue in this report, the differences are important. Conflating or confusing the terms prevents analysts and advocates from touting 'local' on its own merits, and from making the case for 'regional' food systems as strong as it needs to be. If the terms continue to be perceived as identical, and regional is not distinguished as a legitimate and necessary food systems framework, we lose its place, power, and potential to achieve an overall vision, as well as to implement practical strategies.

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Despite growing sophistication about food systems, 'local' and 'regional' are still often taken to be synonymous or are used interchangeably such that no distinctions are made between them. In some cases the two terms are defined in exactly the same way. In its request for applications for the Local Food Promotion Program, the U.S. Department of Agriculture's Agricultural Marketing Service (AMS) defines "locally or regionally produced food" as "a food product that is raised, aggregated, stored, produced, processed, and distributed in the locality or where the final product is marketed to consumers" (USDA AMS, 2017, p. 6). The definition from a Congressional Research Service report on the role of local and regional food systems in U.S. farm policy also conflates the two terms in stating that, for the purposes of its report, "local and regional food systems refer to systems in which foods are marketed directly to the consumer, or in which the identity of the farm where the food is produced is preserved in some way" (Johnson, 2016, p. 1).

A report on food systems innovation in New York state (Mehta, 2021) does not define local or regional, and with a few exceptions makes no distinction between the two scales. It sometimes applies 'local' to the state, but often to small-scale farms selling directly close to where they are located.

In the same vein, but with the addition of geographic distance, both the 2008 and 2018 farm bills define a "local or regional agricultural food product" as one that is "raised, produced, and distributed within the locality or region in which the final product is marketed … so that the total distance that the product is transported is less than 400 miles from the origin of the product, … or in a state in which the product is produced" (Food, Conservation, and Energy Act of 2008, [Congressional Research Service, 2008] Section 6015, and the Agriculture Improvement Act of 2018 [Congressional Research Service, 2019]).

In a paper on best logistics practices for regional food systems by Mittal, Krejci, and Craven (2018), the term 'regional' is utilized consistently even though virtually all the research and reports cited relate to what would be considered 'local.' In a report to Congress on trends in local and regional food systems, authors Low and colleagues (2015) write that "since neither term is well-defined, the distinction between [local and regional] is unclear so the terms will be used interchangeably in the report" (p. 1).

These definitional problems will continue unabated until the recognition of the importance of—and differences among—scales is more widespread. In the next two sections we attempt to make the distinctions clearer, offer the definitions that we use in this report, and address the challenges in bringing the benefits of multiple food system scales into the larger academic and public discourse.

Meanings and uses of 'local,' 'local food,' 'local food systems,' and other related phrases

The phrases "local foods," "locally grown foods," and "buy local" to describe alternative approaches to the mainstream food system have catapulted into common usage and have significant cachet in the marketplace. In these contexts, the use of 'local' as pertaining to a particular, small area has strong resonance among consumers and is a rallying cry for food producers and marketers. It has positive connotations in food system advocacy and is used as a proxy for various health, social, and economic attributes, many but not all of which are firmly grounded in fact. The use and meaning of "local" can vary based on culture, race and ethnicity. To some, "local" suggests community, connection, relationship and trust. Note the contrast with meanings imputed to regional, below.

Local areas, as well as regions, can be described in various ways, most of which contain some spatial or boundary reference. The description of local can be political (e.g., county or school district), geographic (e.g., the Pioneer Valley of western Massachusetts), or cultural (e.g., the Greenpoint neighborhood of Brooklyn). In fact, the systems approach

that we employ requires setting spatial boundaries of some type for an area being studied (Institute of Medicine and National Research Council, 2015). As Schonhart, Penker, and Schmid (2009) note, "In most cases the relevant criteria are spatial distances and personal relationships among the various stages of a food supply chain, as well as restrictions to a geographic region" (p. 176).

In some situations, geographic or political boundaries are sufficient, but when looking at transportation, distribution, or commuting patterns, for example, actual mileage distances are necessary. Distance is a measure that has been widely used for decades by consumers, retailers, and researchers across sectors to define 'local.' In Chapter III we discuss the city-region food system model. All the cities that have adopted the model spent significant time defining their boundaries "in order to map and assess specific territorially defined data and indicators" (Food and Agriculture Organization of the United Nations [FAO], 2017, p. 1). Boundaries and distance by themselves do not define 'local.' But combined with other criteria, they allow researchers and practitioners to study, plan, and operationalize efforts within a systems framework.

Definitions of 'local food'

Despite the frequent use of 'local,' there is no formally accepted definition or uniform legal standard for 'local food' at this time. In a telling statement, Thilmany McFadden (2015) wrote that the 2014 farm bill did not define local foods, "perhaps because arriving at agreement on a definition defied consensus" (p. 1). That said, governments, researchers, organizations, and consumers have used some combination of spatial and other descriptors to define local food. The result is a wide array of definitions, examples of which we look at here.

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Several research studies ask U.S. consumers how they would define "locally grown food." In a 2003 study of the Cape Girardeau, Missouri, area that included five contiguous Missouri counties, respondents were asked how they would define local. The largest percentage said it was within the southeast Missouri region; unprompted, another 25% said it would include southeast Missouri and the abutting counties in southern Illinois. Twelve percent of the respondents would consider the entire state to be 'local' (Brown, 2003). A survey of 475 consumers in three counties in Washington state (Selfa & Qazi, 2005) found that in two counties the largest percentage of respondents said 'locally grown food' meant within their county or the adjacent county. In the third county, 30% of the respondents chose the state or the Northwest region. Between 19% and 27% of consumers in the three counties defined 'locally grown' by the distance they were willing to travel to purchase it (Selfa & Qazi, 2005).

A 2010 national survey found that food "produced within 50 miles" (70%) and "produced in my county" (45%) were considered local (Onozaka, Nurse, & McFadden, 2010). Several

years later, researchers found that about two-thirds of consumers in a national survey thought that 'locally grown' refers to food produced within a 100-mile radius, and one-third of the respondents thought of it as food being grown within the state (Rushing & Ruehle, 2013).

A survey of Wisconsin residents found that "within the state" was the most widely accepted definition of local food (Witzling, Shaw, & Trechter, 2016). In an international review of this topic, the most frequently found definition of local food, regardless of country, was based on distance, from 10 up to 100 miles (Feldmann & Hamm, 2015). Other definitions of 'local' purchases found in the review were "homegrown," political boundaries such as states, and brand names associated with a region (Feldmann & Hamm, 2015). Notwithstanding this emphasis on state boundaries and/or a specific radius, sometimes 'local' is used to embrace much larger geographic areas, such as in the banner shown in Figure II A promoting a six-state marketing initiative.

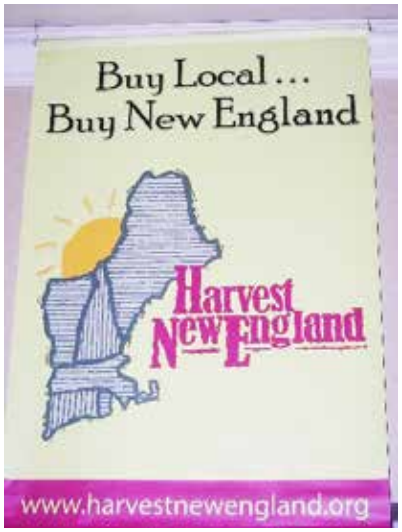


Figure II A. A Six-State Marketing Initiative

Source: Harvest New England conference, 2013 Photo: K. Ruhf.

To encompass its large number of products and growers, the La Montanita Co-op in New Mexico defined 'local' as within a 300-mile radius of Albuquerque (Diamond & Barham, 2012).

Grocery retailer definitions regarding distance can be confusing, as they are based on either a radius or state boundary with no standardization. Whole Foods Market leaves the definition of 'local' up to its stores, but generally uses state boundaries, except in the case of California (Whole Foods Market, n.d.). Walmart's definition is also food grown within a state, no matter its size (Cooperative Grocer Network, 2016). Other food retailers use various definitions. Sprouts stores in California uses a 500-mile radius (Renee, 2018). Wegmans uses a 100-mile radius (Wells, 2017).

A recent Nielsen survey of 20,000 consumers found extreme variability in what was considered local depending on the type of product. They asked, what is the maximum distance in miles from the store that a product can claim to be local? The consensus definition was 50 miles, but the distance depended on the product. For example, there was higher agreement on a 50-mile limit on bakery items than on frozen foods (Nielsen IQ, 2019).

Looking across much of the literature, 'local' is not just defined by distance. It has been claimed to have some or all of the following attributes (Feldmann & Hamm, 2015; Thilmany McFadden, 2015):

- Fresh and minimally processed foods
- Mainly produce (fruits and vegetables), sometimes also dairy and meat products

- Sold directly from producer to consumers, institutions, or retailers (farmers markets, farm stands, community supported agriculture [CSAs], restaurants, local produce section of supermarket)

- Utilizing "sustainable" production practices

- Coming from small farms

- Small volumes

Local food initiatives typically do not focus on larger volumes or processed foods. However, sometimes 'local' refers to local farmers selling to big-box stores like Walmart. As shown above, the term is used to describe a broad array of conditions and has become a commonplace advertising term (National Agriculture Law Center, n.d.). In the most recent survey conducted on this topic by the USDA Agricultural Marketing Service (Tropp, 2018), the top reasons why shoppers purchase locally grown products are freshness/in season, support for the local economy, and taste.

Two Belgian researchers published a review of 123 peer-reviewed studies on local food systems (LFS) (Enthoven & Van den Broeck, 2021) in which they compared common beliefs about local food against scientific evidence of the claims. Forty-five percent of the studies they reviewed were done in the U.S., with most of the rest done in Europe. The authors noted that the definitions of 'local' in the U.S. involve much longer distances than those in Europe.

Regarding eight common claims about LFS, they found that:

- Consumers who participate in LFS have better health, but no causal link exists;

- Consumers are willing to pay more for local food, but there are important variations depending on consumer characteristics, buying habits, and particular products;

- Farmers feel recognized for their work in LFS;

- Participation in LFS is associated with low farm economic performance, but this is strongly case specific;

- The social bonds sought through consumers' and farmers' desire to foster the well-being of the community are limited to their respective interests (profitability and control for farmers; access to healthy and affordable food for consumers);

- The lack of consistency in methodological approaches in the studies of the impact of LFS on local economies results in limited insights;

- LFS are associated with environmentally friendly production practices, but there are differences across countries; and

- LFS claims to mitigate climate change are not supported in the studies.

The shortcomings found in the papers led the researchers to recommend robust causal research that would be useful to many stakeholders. One of their recommendations is to conduct research inquiries at both local and regional scales.

Definitions of 'local food systems'

'Local food systems' are sometimes called or equated with 'community food systems,' referring to "a number of interrelated pieces that connect to make 'local food' a component of the U.S. agricultural food system" (National Agricultural Law Center, n.d., p. 1). Other authors describe local food systems as aligning consumer demand with locally produced and distributed food (Goddeeris, et al., 2015). According to Cornell University's *Primer on Community Food Systems*,

> *A community food system is a food system in which food production, processing, distribution, and consumption are integrated to enhance the environmental, economic, social and nutritional health of a particular place. A community food system can refer to a relatively small area, such as a neighborhood, or progressively larger areas—towns, cities, counties, regions, or bioregions. The concept of community food systems is sometimes used interchangeably with "local" or "regional" food systems, but by including the word "community" there is an emphasis on strengthening existing (or developing new) relationships between all components of the food system. (Cornell University, n.d., p. 1)*

While this definition of community food systems acknowledges that various scales—including regions and bioregions—can be referred to as 'local,' the more common understanding is the same as the attributes ascribed to 'local' as above. When we refer to community food systems, we mean 'local food systems.'

Other terms—for example, 'foodshed'—are compelling but also problematic. Foodshed is used to describe both existing and desired conditions, "as a tool for understanding the present flow of food in the food system and as a framework for envisioning alternative food systems" (Peters et al., 2008a, p. 1). It also does not distinguish 'local' from 'regional.' Some researchers (such as Peters et al., 2008b) have used the foodshed concept to develop models to evaluate food production capacity. Foodshed might connote many of the elements and values of a regional food system vision, but some marketing professionals note that the term has relatively little recognition by the public. Kremer and Schreuder (2012) note "much confusion arises over the definition of a region for the purpose of foodshed analysis" (p. 173).

Another term often associated with local food is 'place-based.' A supplemental issue of the *Journal of Agriculture, Food Systems, and Community Development* (2019) published the proceedings

(peer-reviewed papers from presentations) from the 2018 Place-Based Food Systems Conference held in British Columbia, Canada. While the proceedings discuss concepts and activities at both local and regional scales, they do not include a definition of 'place-based food systems.' The conference's event promotion targeted "community-level regional food system leaders" (The Land Institute, 2018, para. 1) echoing the conflation conundrum presented earlier. Most of the proceedings' materials discuss local and 'community' projects. In her proceedings paper, Gail Feenstra points to "some distinguishing features of place- based, regional food systems" without being explicit about what a "place-based, regional food system" is (Feenstra, 2019, pp. 61–62).

One problem often presented by this lack of differentiation is how alternative models are envisioned. 'Local' reinforces the popular assumption that if the problem is the conventional, concentrated, industrialized, globalized, natural resource–degrading food system, the antidote is its reverse, i.e., localism. As Hinrichs (2007) observes, "While the broad contours of such assessment about a globalizing, conventional food system *versus* [emphasis added] a localizing, alternative food system may be accurate, the precise workings on the ground are variable and complex" (p. 11). Some of the most ardent advocates of food system change contend that an alternative vision for economic optimization, environmental harmonization, and ethical actualization "argues for more community-based food systems in which relationships among people … are primary" (Hamm, 2007, p. 216). Lengnick (2015) observed that as the globalizing, concentrated, corporate U.S. food system presented obstacles to sustainable production systems, "local food emerged as a sustainable solution" (p. 317). But these dichotomous analyses miss the scope of the food needs of a population and the contributions of regions. Both local *and* regional food systems have important roles to play.

There is little clarity or agreement on what these place-based food systems look like, how local and regional are different and, most significantly, why it matters.

In this report, a 'local food system' is characterized by or includes:

- Predominantly small-scale farms but also including some smaller midsize farms;
- Direct marketing (e.g., farmers markets, CSAs, farm stands, farm-to-retail [restaurant, school, institution], custom meat slaughter and processing);
- Emphasis on nearby producer-consumer connections, consumer awareness, "community";
- Primary focus on fresh food products;
- Self-provisioning (e.g., backyard and community gardens);

- Some small-scale processing and product aggregation for retail and institutional purchase;

- Home- and community-scale processing of small volumes of specialty products; and

- Geographic sourcing within a boundary or a distance that includes a preponderance of the elements in this list.

This list is similar to the collection of 'local' attributes proposed by others, above.

Meanings and uses of 'regional' and 'regional food systems'

In defining 'regional,' one dictionary emphasizes its distinction from 'local': "of or relating to a region of considerable extent not merely local" (Dictionary.com, n.d.). The USDA Regional Food Systems Partnership program, authorized in the 2018 farm bill and begun in 2020, is focused on regional food systems, but does not specifically define 'region' or 'regional.' 'Local and regional food' is defined together, referring to the distance between farm and consumer, which is "kept to a minimum, or both the final market and the origin of the product are within the same State, territory, or tribal land" (USDA AMS, 2020, pp. 23–24). It does recognize multistate, multicounty, and major metropolitan areas as eligible regional entities. Examples of food systems projects and programs that we consider regional range from multiple counties (Southeast Missouri), to multiple states (New England, the Great Lakes states, the Four Corners), to city-regions (described as a functionally interconnected cluster composed of a city and surrounding areas), and to megaregions (the Eastern Seaboard). The Appalachian Regional Commission's project to "study agriculture and local food in the Appalachian Region," which comprises all or parts of thirteen states, aims to assess the "region's agriculture sector and local food economies" (Karen Karp & Partners, 2021, para. 1). This recent project could be an opportunity to conduct analyses at, and teach about, multiple scales.

In the EFSNE Project, mentioned in the Introduction and explained in more detail in Chapter IV, focus group participants were asked to which region they felt connected. Respondents mentioned the East Coast, New England, and the mid-Atlantic. Several named the Delmarva Peninsula (comprising parts of Delaware, Maryland, and Virginia) or the Chesapeake Bay. Also, many EFSNE surveyed participants identified the state in which they lived as their region (Palmer et al., 2017). In a national study, over 60% of the respondents considered food "produced in my state" or "produced within 300 miles" (50%) to be regional (Onozaka, Nurse, & McFadden, 2010).

Hall (2022) notes race and ethnicity may play a part in how "local" vs. "regional" food systems are viewed and interpreted. To some in Black, Latino, Indigenous and other marginalized communities, "regional" means "more white." It implies government departments and agencies; people outside the community. It connotes a more corporate mindset, more politics,

less connection, less trust. This important observation calls for regional food system advocates to promote regionalism in ways that communities can resonate to in positive ways, and also to work on dismantling those aspects of regional systems that justify those expressed cautions.

Donkers (2015) comes closest to our arguments in his classification framework for local and regional food systems. At the outset he acknowledges the difference between them and employs a systems view: "Each local or regional food system is a whole in itself and at the same time a part of a bigger whole" (p. 105). To Donkers, a region contains both city and associated countryside, not as separate entities but rather as a whole. Several charts, diagrams, and tables illustrate Donkers' framework, involving geography, governance, and supply chains to distinguish regional from local, and leading to a regionalized approach "as opposed to the current national and global set-ups" (p. 114).

Regional food systems are composed in part of multiple local food systems (with the latter nested inside the former). Local is a necessary but not sufficient component of a regional system. Regional food systems also operate in relation to other regions as well as in relation to national and global food systems. To some practitioners, a regional food system is a "scaled-up" local food system. Scaling up means to enlarge or increase a single node in a system or network. But a regional food system is more than a "bigger" local food system. It is also more than a "scaled-out" local food system (i.e., more local food system "nodes"). A regional food system functions differently from a scaled-up local one in crucial ways. A regional system is more than the sum of the local systems within its boundaries. A regional food system encompasses the local food systems within its boundaries, along with the interplay among those systems, balancing the complexities, assets, and challenges of each location, considering demand, volumes of food, supply chains, and many other elements.

Regional food systems are composed in part of multiple local food systems (with the latter nested inside the former).

This is true because, among many reasons addressed in this report, regions encompass resources such as land, water, climate, and soil types that span and connect across wide distances and multiple locales. Regions manifest complicated and border-transcending problems that do not exist in a smaller, local area. Regional supply chains and markets are qualitatively different from multiple local ones. Regions include complex urban-rural linkages that replace the detachment between "urban and rural citizens, consumers and producers" (Debru et al., 2019, p. 830). They connect flows of people, products, services, and resources—all of which need to be organized and governed differently than at a local level (Debru et al., 2019).

'Regional' is larger geographically than 'local,' and larger in terms of functions—volume, variety, supply chains, markets, food needs, land use, governance, and policy. **A regional food system operates at various scales and geographies to supply some significant portion of the food needs of its population.** In most cases, local or 'community-based' food production

addresses a small portion of a locale's needs, with extremely important direct and indirect benefits. But not all food production is—or ever will be—local. Thinking regionally provides the opportunity to frame food production and food needs in a larger context— within locales and regions, across state borders, as well as among and across regions, however they may be described and bounded. As Hinrichs (2013) describes it, "It is a strategic consideration that may facilitate understanding, managing, and changing the food system" (p. 10).

The concept of 'optimization' is useful here. Optimization refers to finding the most effective performance or solution in a range of options by maximizing desired factors and minimizing undesired ones. A food systems example would be maximizing food self-reliance (defined as meeting as much of the food need as possible) while minimizing negative impacts such as environmental degradation or unequal food access. Regional may be the best scale at which a large number of variables can be optimized.

'Regional' is also vulnerable to the same connotation problems as 'local.'

'Regional' is also vulnerable to the same connotation problems as 'local.' It is important to avoid the "regional trap" of thinking that certain attributes, such as fresh, culturally appropriate sustainable, or fair, are applicable, by definition, to regional food systems (Born & Purcell, 2006). As Born and Purcell point out, such attributes are not necessarily a function of a particular scale (or location), and local food systems are no more likely to be "healthy" per se or fair than systems at other scales. They also make the very useful observation that the choice of scale is a strategy—not an end goal.

In this report, we contrast the attributes of regional food systems with those of local food systems, listed above. Regional food systems are described by various characteristics, such as landscape, land uses, broader socioeconomic factors such as demographics and markets, and political relations and identities. As with 'local,' geographic distance is one factor in the larger context. The attributes of regional food systems are explored in greater detail in Chapter V.

Summary

The language and conceptual conundrums described above are summarized here.

- We stress that the terms 'local' and 'regional' are not at odds with each other. Work on local food systems is essential. And for many food systems practitioners and activists, local is the entry point from which they move to regional work. What should be clear is that both local and regional have standing, and that a local food system always functions inside and in relation to larger food systems.

- Language and definitions matter. The lack of clear definitions and distinctions between 'local' and 'regional' makes it difficult to engage different scales in the search for food system resiliency and to execute the planning necessary to build or strengthen food

systems in general. There may always be different definitions of both local food systems and regional food systems, depending on context and functions. This is acceptable if people clearly recognize that both are essential.

- 'Local' and 'regional' do not mean the same thing and are not interchangeable. If used interchangeably, the important aspects of a regional framework lose focus because most people will think of the attributes of direct, fresh, small volume, small scale, small farm, niche, producer-consumer connection, and limited geographic radius.

- There are important differences between 'local food' and 'local food systems.' The former describes specific foods that meet the criteria for 'local.' The latter refers to the entire food system of a local area, including all its components.

- While 'local' has tremendous cachet in the marketplace, 'regional' has little cachet at the present time. Advocates need to build awareness and engagement around a concept that is hard to capture and is frequently confused with local.

- 'Regional'—like 'local'—is a spatial reference. It implies geography, distance, and scale. However, while these are critical elements of a regional food system, they are not the only determining characteristics.

In the following chapters, we continue to explore the differences and complementarities between local and regional. We argue that 'regional thinking' will be critical to securing optimal, resilient food systems.

III. REGIONALISM AND REGIONAL THINKING

What is regionalism?

This report emphasizes the importance of regions in food systems. It also stresses regionalism and "thinking regionally" as approaches to food systems change. Regionalism is a framework for economic, policy, and program development that (1) responds to regional differences and needs and (2) encourages regional approaches and solutions. A regionalist approach assumes that regions are unique and that regions are both uniquely appropriate for, and capable of, addressing many economic and social issues. Effective public policies, economic development, and programming reflect and respond to regional characteristics and differences (Hance, Ruhf, & Hunt, 2006). According to Wallis (2002), regionalism is characterized by visioning, benchmarking of performance, regional reporting in different media, developing leaders who understand and champion regional issues, creating formal and informal networks, and building collaboration and conflict-resolution skills.

Why regional thinking? As Al Gore says, "Many issues—such as transportation, air pollution, and economic development—transcend defined borders, and so should our solutions" (quoted in Katz, 2000, p. ix). In fact, "regions also are often viewed as the premier unit of competition in a global economy" (Foster, 2001, p. 4). A Lincoln Land Institute publication titled *Regionalism on Purpose* (Foster, 2001) observed that public officials, civic leaders, and city residents increasingly look to regionalism to address complicated, state border-transcending problems such as urban sprawl, regional economies, uncoordinated land use policy, environmental challenges, and inequities in housing and education. Food was not on the radar for the Lincoln Land Institute at that time, but in 2013 Hinrichs pointed out that more practitioners and academics had started to consider regional "as distinct from localized food systems" (Hinrichs, 2013, p. 10). In these examples of regional thinking in other sectors, the definition of regional varies as much as it does within food systems.

Today, highly mobile citizens have an expanded shared sense of responsibility for, and feel investment in, a broader geography. Business suppliers, workers, and customers rarely

reside in a single jurisdiction. These factors encourage regional thinking. The devolution of responsibility by federal and state governments for issues such as pollution, transportation, and workforce development has resulted in an emphasis on regional solutions.

Regionalism can be applied effectively to a range of public challenges.

Regionalism can be applied effectively to a range of public challenges. For example, fiscal regionalism can lead to merging services or sharing financial resources. Equity regionalism can narrow disparities by standardizing and/or redistributing resources. Environmental regionalism can foster natural resource management. Cultural regionalism can protect or promote a particular identity or network. Other regional frameworks include economic, growth-based, political, and ad hoc (Foster, 2001).

The food system engages all these public challenges. In fact, "food can and should be connected to community vitality, cultural survival, economic development, social justice, environmental quality, ecological integrity and human health" (Hinrichs, 2007, p. 1). Regardless of the specific lens or reach, stated former Vice President Gore, "regionalism can be a powerful way of thinking and acting" (Katz, 2000, p. x). In 2002, Lorna Butler noted that "imaginative regional policies can help protect the land base of agriculture" (Butler, 2002, p. 10). A few years later, Partridge and Clark (2008) recommended that more effective regional planning and economic development authorities be created in Ohio. More recently, Galt laid out the relevance of regional political ecology for agriculture and food systems (2016) and Devaney and Iles (2019) argued that the bio-economy across the country could thrive if it were organized around regions. It has also been argued that a regional identity can have economic benefits: an identity "built through a complicated process of developing cohesion in the industry and communicated to opinion-makers and consumers" (Christensen et al., 2015 p. 85).

Influential research on the theory of regional food systems was described in a special edition of the *Cambridge Journal of Regions, Economy and Society* in 2010. In that issue, Kneafsey's (2010) illuminating article on how researchers and practitioners were conceptualizing these issues made a number of arguments and observations with which we agree. She pointed out that:

- The concept of regions in relation to food is different according to the context (biophysical, social, and political);
- Regional food networks contain a number of food system elements that are "organized on a regional basis in order to create a food network that is geographically distinctive and recognized as such by the actors involved" (p. 181);
- Regional food networks do not deal only in regional foods but can be constructed around all commodities produced in a region;
- The strengthening of regional governance structures could assist the development of regional links between food producers and consumers through multiple steps, such

as regional land-use planning decisions and campaigns to purchase more regionally produced food, including public sector procurement; and

- There is a need for a greater understanding of the ecological limits and potentials of regions and whether farmers and other supply-chain entities in a region have the productive capacity to meet demand.

We do not align with one of Kneafsey's contentions, however: that the complexity of the food supply and volumes of food needed to supply urban populations are barriers to regional institutions' ability to influence the organization of food production and consumption. We believe there are a number of existing institutions and mechanisms, and ones that could be developed, that could influence a significant number of regional food systems improvements. We do not disagree that there are barriers and strong challenges, as discussed in this report. However, we posit that deeper regional thinking about future food needs can result in collaborations, laws and regulations, and other actions that can overcome those barriers.

The characteristics of a region have important implications for how its populations will respond to food and other challenges. For example, how various subpopulations within a region experience government, poverty, discrimination, and markets will influence their likelihood to engage in regional solutions. Given the racial history of the South, African American farmers in that region will be less likely to trust USDA lenders. Refugee farmer communities might be wary of any government "solutions." Pastor et al. (2000) believed that regions might offer the minimum size for markets and business networks to achieve economies of scale, and the maximum size for crafting and sustaining working relationships. Lengnick augments this assertion by stating that regional "is the scale you need to provide all the qualities of a resilient system to create the diversity you need … and a large enough scale to create the wealthy asset base that systems need in order to be resilient" (in Olson-Sawyer, 2017, p. 6).

The characteristics of a region have important implications for how its populations will respond to food and other challenges.

Yet regionalism reflects a classic dilemma of U.S. society: how to realize the common (regional) good while safeguarding individual (local) freedoms (Foster, 2001). Parochialism and Americans' ingrained preference for small, responsive (read local) government work against thinking regionally. Regionalism has gone in and out of favor since the country's founding, as noted by Dabson: "The regional landscape is cluttered with [these] attempts. … It is a big challenge for states to work together. Some initiatives work…; many fail" (Dabson interview, in Bowell et al., 2014, p. 123). Acting regionally can contribute to solutions, but is not a silver bullet.

Despite regionalism's checkered history and cautions, i**t is the premise of this report that regionalism is not only an appropriate framework for food systems work, but is also**

necessary for the food systems changes we seek and to mitigate the havoc wreaked by future threats like another pandemic. The promise and challenges of regionalism will be addressed throughout the report.

Descriptions of a region

Chapter II introduced the meanings and uses of 'regional,' particularly as distinguished from 'local.' Here we further explore the ways regions are described—in general, and specifically in food systems work.

Regions can be described in many ways; the definition of their boundaries may be fluid, rather than rigid. A region may be defined by political or administrative boundaries (e.g., multiple counties, New England states, EPA Region I, Appalachian Regional Commission, northern California), watersheds or bioregions (e.g., Chesapeake Bay watershed, mid-Atlantic Highlands, Hudson Valley), or culture (e.g., Cape Cod, Down East Maine, the Upper Peninsula of Michigan). In the global context, a region can be quite large, as in "Europe" or "the West." Going in the other direction, a region may be a subarea of a single state, as in the Finger Lakes region of New York state. In this report, a region is always more than a single town, city, or county. It may be multiple communities, several states, or parts thereof, or may encompass parts of two or more states. See more on this topic in Chapter II.

Regions can be described in many ways; the definition of their boundaries may be fluid, rather than rigid.

For food systems work, it is useful to consider USDA's delineations of regions based on (a) natural resources and (b) farm production. In Figure III A, the Land Resource Regions map delineates regions by geographic location combined with the characteristics of the dominant agricultural and silvicultural activities in that area.

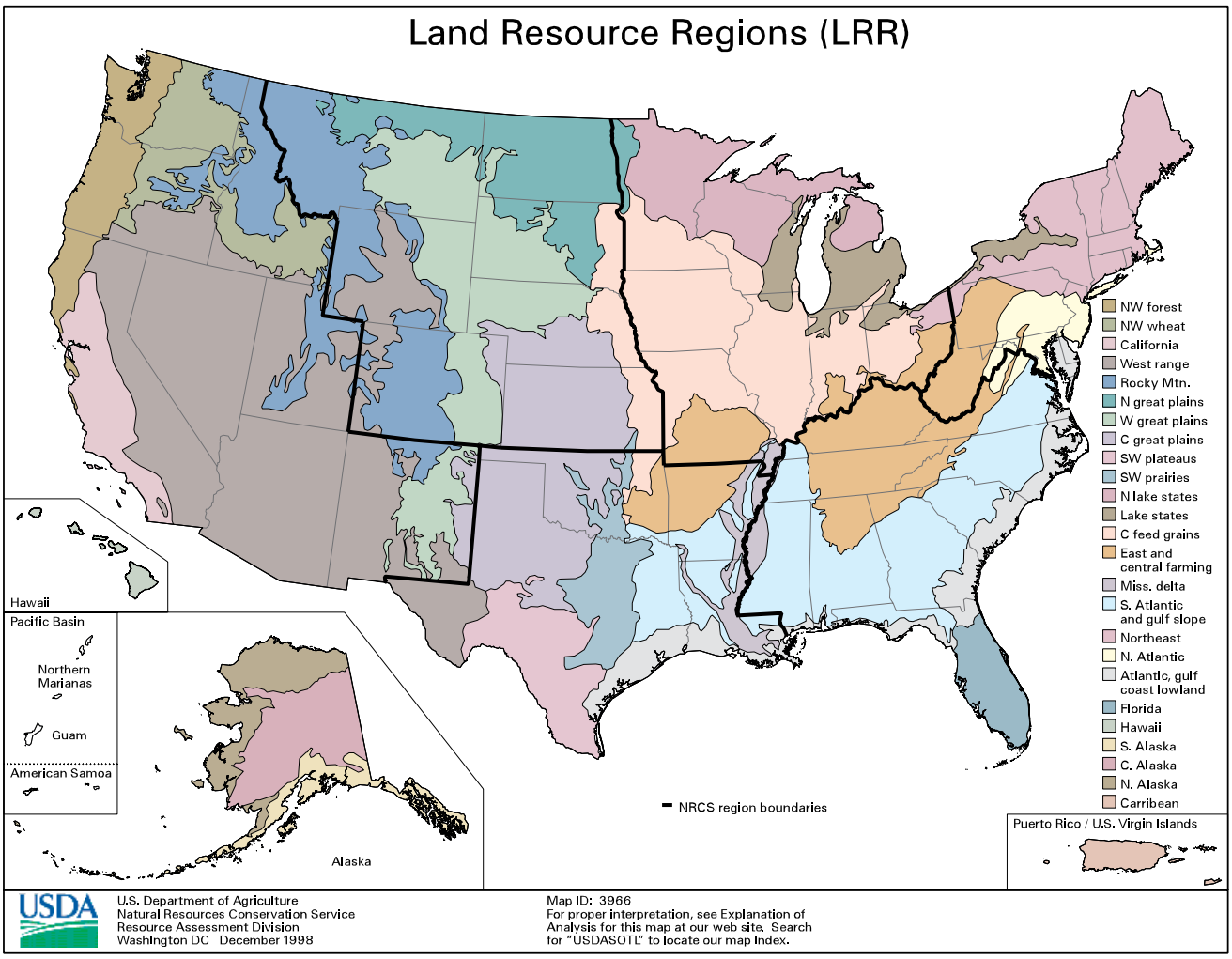


Figure III A. Land Resource Regions

Source: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/nri/?cid=nrcs143_013721

Figure III B is a map of the USDA Farm Production Regions. The boundaries and names of these regions have been adjusted over time. But they have always followed political lines (by states), regardless of what was or is actually produced.

Figure III B. Farm Production Regions

Source: https://www.researchgate.net/figure/USDA-Farm-Production-Regions_fig4_258607795

Regions may be composed of subregions. They overlap. They "nest" in larger regions. For example, the Berkshires and Cape Cod are regions of Massachusetts, which is part of New England, which is part of the Northeast. The Chesapeake Bay is a part of the Mid-Atlantic, which is often (but not always) considered part of the Northeast. Multiple smaller regions nest in Appalachia, which encompasses all or parts of twelve states, from southern New York to northern Mississippi.

Bringing a landscape approach to food, agriculture, and natural resources management can promote more equitable, resilient, and sustainable urban and rural communities (Forster & Getz Escudero, 2014). But, as we point out, regions are more than their landscapes. As applied to food systems, regions can be characterized by various factors and features that highlight both commonalities and differences among them.

As far as food systems, regions can be defined in terms of the interplay among various factors that include:

- **Natural resource features** such as soils, topography, water resources, and climate;
- **Agricultural land uses** and production systems, including varieties and breeds, that develop on the natural resource base including land dispossession and access;
- **Economic dimensions,** including supply chains, infrastructure, and markets;
- **Sociocultural factors** such as demographics, development patterns, racial and ethnic make-up, group identity, values, and relationships; and
- **Political dynamics and identities** established through governmental structures, civic and nongovernmental associations, and political processes.

Regionalism can be expressed through organizational or institutional structures (e.g., regional districts and councils, metro area governments), agreements (e.g., compacts and partnerships), programs and policies (e.g., regional planning, tax base sharing), practices (e.g., regional visioning and forums, regional philanthropy), and cultural expressions (e.g., events and branding). Regions connect with and relate to other regions; they collaborate, compete, and trade; goods are transported from one region to another. In 1981 The Cornucopia Project (a program of the Rodale Institute and Rodale Press) wrote that the path to "a secure, affordable, and ecologically sustainable food supply" (p. 111) for states would include regionalizing their food supplies by promoting production within their own and nearby states. Their findings are described in Chapter VI.

Later, McCabe and Burke (2013) argued that, as part of the New England Food Vision process, "using a regional approach that has soft geographic, i.e., fluid, boundaries, promotes regional food security, enhances local food production, and is ideally of a scale that promotes stewardship, access, and sustainability. A regional approach to structuring food systems also offers environmental, economic, and cultural resource advantages with increased transparency and accountability compared to large-scale food system structures" (p. 555). They acknowledged the capacity for multiple, overlapping regional systems to more fully realize the advantages of geography and scale (McCabe & Burke, 2013).

"A regional approach to structuring food systems also offers environmental, economic, and cultural resource advantages..."

In 2010, New York City Council commissioned a report to look at how to improve the city's food system (Food Works, 2010). The goal addressing agricultural production included two strategies. One was to preserve and increase regional food production by (1) strengthening regional supply channels and (2) leveraging the city's economic power

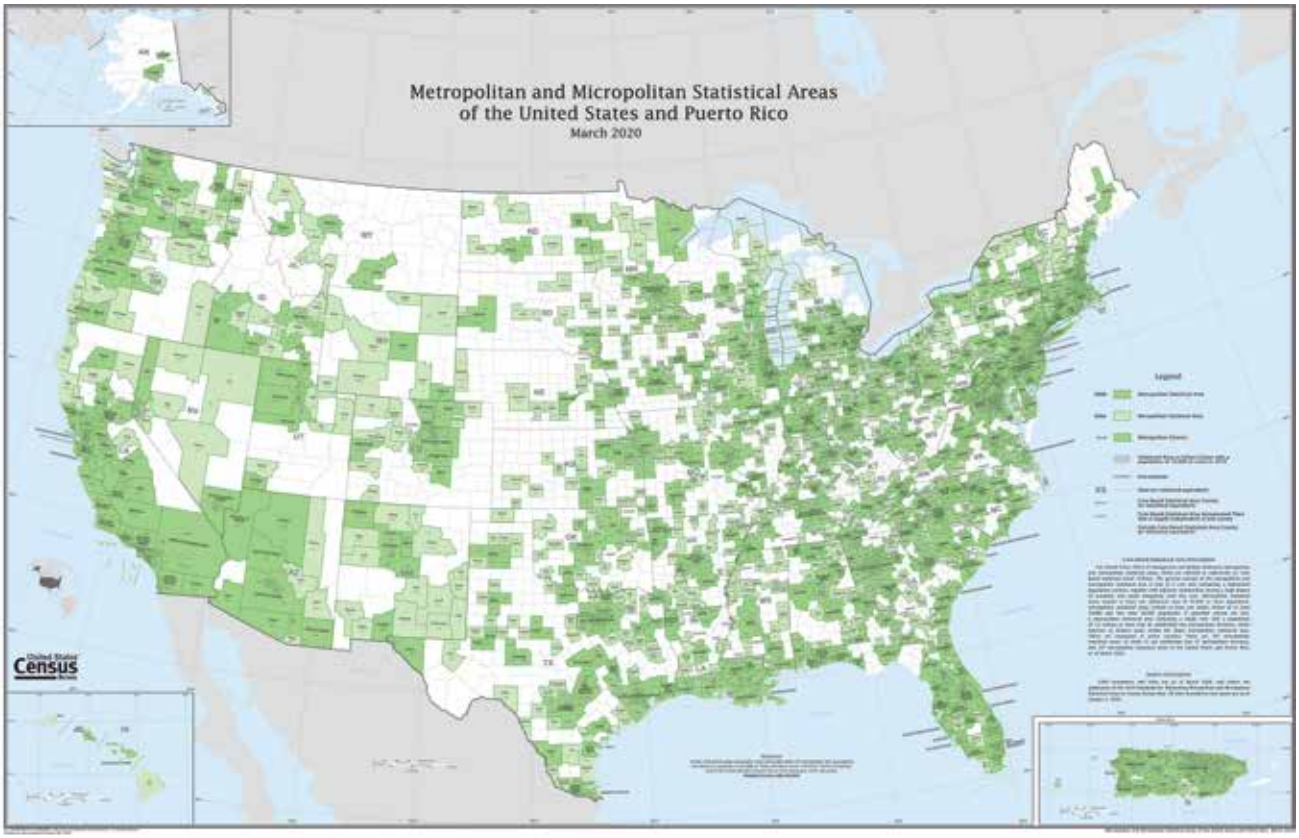


Figure III C. Metropolitan and Micropolitan Statistical Areas of the U.S. and Puerto Rico

Source: https://en.wikipedia.org/wiki/Micropolitan_statistical_area

to support regional producers—for example, by purchasing food produced in New York state and surrounding states for its school lunch and other meal programs. The second strategy considered the role of urban food production. Ten years later, the New York City 10 Year Food Policy Plan more strongly championed regional food systems. It acknowledges "the region's critical role in food policy planning and seeks to deepen coordination with regional governments, business and other partners" (City of New York, 2021, p. 24). This report specifically recognizes the critical role played by northern New Jersey as a processing and distribution hub, and by the Lehigh Valley of Pennsylvania as an important cluster for last-mile distribution into the city.

Regions may be based on the urbanized and adjacent areas of "metropolitan regions" or "city regions," defined by the FAO as urban centers and their surrounding peri-urban and rural hinterlands (FAO, 2022). The U.S. Census Bureau (2020) delineates metropolitan and micropolitan areas to reflect economic connections (see Figure III C). Defined by the

U.S. Office of Management and Budget, metropolitan statistical areas are cities with high population density at their cores linked by social and economic ties to their surrounding

communities. Micropolitan statistical areas are labor market areas centered on an urban area with a population between 10,000 and 50,000. In 2013, there were 536 designated micropolitan areas in the U.S. and Puerto Rico.

"Metropolitanism" is another word for the regional reach of a city. A city region is a landscape-based spatial construct for policy consideration which, for food, is based on "the complex relation of actors, relations and processes related to food production, processing, marketing, and consumption in a given geographical region that includes one main or smaller urban centres and surrounding peri-urban and rural areas that exchange people, goods and services across the urban rural continuum" (Forster & Getz Escudero, 2014, p. 1). Economic conditions are experienced across an entire region because cities and their suburbs and exurbs are interdependent (Partridge & Clark, 2008). Similarly, "the problems and challenges that communities face are structural and systematic as well, meaning that one community's problem in a region spills over into the broader region" (Partridge & Clark, 2008, p. 3).

Building on earlier approaches such as foodshed, bioregion, and place-based, the city region food system (CRFS) concept has been refined and even operationalized in some places around the globe (RUAF, n.d.) as a way to integrate flows of resources and products across sectors and to develop relevant rural-urban policy frameworks (FAO, 2019). Blay-Palmer and colleagues (2018) point out that while foodshed and bioregion constructs help to connect people to their food supplies, "they do not explicitly consider the diverse and complex relationships between urban and rural beyond food flows" (p. 5) that CRFSs do, such as multiple livelihood and food security issues. Globally, 60 percent of urban food demand comes from small towns and medium-sized cities, whose proximity to and interaction with rural areas makes them key sites "for the creation of sustainable rural-urban territories" (FAO, 2019, p. 8). In fact, the number-one guiding principle in the 2030 Urban Food Agenda is rural-urban synergies (FAO, 2019).

For food systems thinking, the metropolitan region is a fruitful concept (Lengnick et al., 2015). It encourages advocates to both confront and take advantage of the inextricable relationships between urban and rural. Rather than dividing, urban and rural spaces complement each other and, in fact, depend on one another. The rural-urban interplay is key for food systems, even if its operationalization is currently more aspirational than functional. In the food system context, rural and urban need each other; they are inherently related, from the production base to markets to needed infrastructure to cultural responsiveness (see, for example, Butler, 2002; Katz, 2000; McKinney & Johnson, 2009; Partridge & Clark, 2008; and Pastor et al., 2000). More recent research has approached the issue by asking what policies could be developed to support urban food as well as rural economic development goals (Jablonski & Thilmany McFadden, 2019).

Metropolitan regions are where 83 percent of the U.S. population lives (U.S. Census Bureau, 2020). Although often pitted against one another, "it is to the benefit of neither city nor rural residents to be framed in terms of their divisions and differences. The emphasis should be on the complementarity and interdependence of [their] futures" (Dabson, 2009, p. 106).

The challenges faced by cities and their surrounding peri-urban and rural areas are spatially shared and connected through flows of people, products, services, and resources across administrative boundaries (Forster & Getz Escudero, 2014; Partridge & Clark, 2008). In this framework, downtowns and peri-urban areas provide important contributions to food production, and rural food insecurity counts as a food access concern. Suburbs are efficient sites for food processing and wholesaling (Saberi, 2016), and shorter supply chains may benefit producers and conserve resources. Also, "boundaries along the urban-rural continuum are porous with continuous economic and social flows" (Jablonski et al., 2019, p. 3). Yet there are often different perspectives, priorities, and cultural and political concerns along the urban-rural continuum. Stakeholders have different entry points and forms of governance that require them to balance competing priorities and find common ground. Implementing a plan for a CRFS is a way to develop policies and programs across local and regional and urban and rural scales. Doing so also puts a strong focus on the need to develop better integration of regional and national governance operations (Blay-Palmer et al., 2018).

In the 1920s, zoning in the U.S. was delegated to some 39,000 municipalities with the unstated premise that suburban and rural reaches had distinct rights to develop their land as they wished. Now, the distinction between metropolitan centers and the surrounding areas is much more blurred. The metropolitan region of Chicago includes 262 cities, and New York City's metropolitan area encompasses 756. Katz (2000) observes that on the issue of land use, complex, politically defended, and multilayered sets of laws make effective "growth management" or "smart growth" efforts largely futile.

Examining regional foodsheds, Kremer and Schreuder (2012) map circles with 100-mile radii around U.S. cities with populations larger than 50,000. They note that very few of the circles do not overlap with neighboring circles, and that, "in addition, the geographic characteristics of a region do not always comply with the radius definition" (p. 174). They note that as long as definitions of local and regional food systems remain unclear, assessing the capacity of an area to feed metropolitan areas remains problematic.

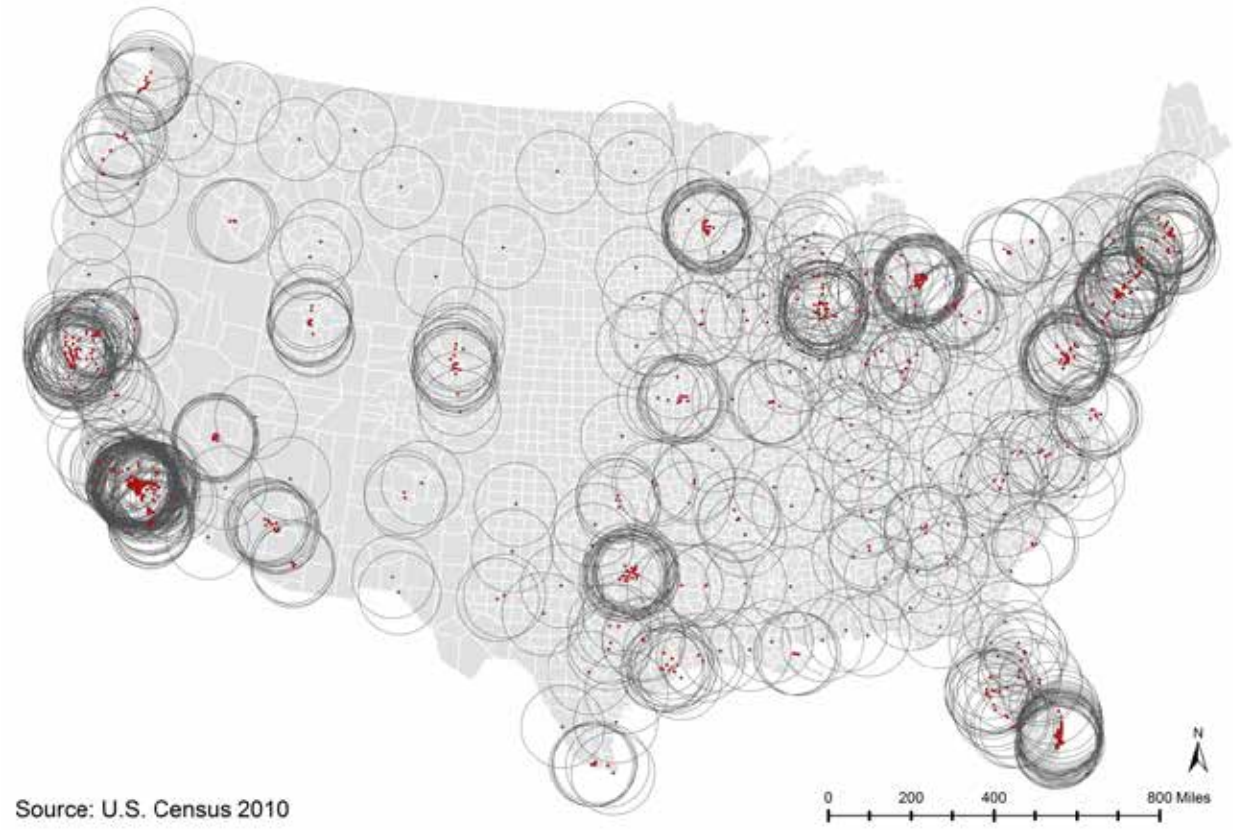


Figure III D. Local Foodsheds Delineated by a 100 Mile Radius Around U.S. Cities with Population Larger than 50,000

Source: Kremer, & Schreuder, 2012, p. 174.

Using the "nested regions" concept, 'mega-regions' are large networks of metropolitan regions that share at least some infrastructure systems, environmental systems and features, economic linkages, land use patterns, and/or culture and history (Regional Plan Association, 2006). Figure III E is a recent depiction of nine U.S. megaregions (American Planning Association, 2017). Yaro, Yang and Steiner (2022) describe a more recent configuration of 13 mega-regions which are home to more than 80 percent of the U.S. population, including more than 80 percent of Black, Latino and immigrant populations. The Northeast mega-region extends from the area north of Boston to south of Washington, D.C. The 400 miles from Boston to Washington recall the USDA's definition of 400 miles as 'local.' A 400-mile radius from Washington, D.C., also extends to Cleveland, OH—across two mega-regions and certainly not considered local Among the Northeast's unique characteristics is that it is the most urbanized of the U.S. mega-regions.

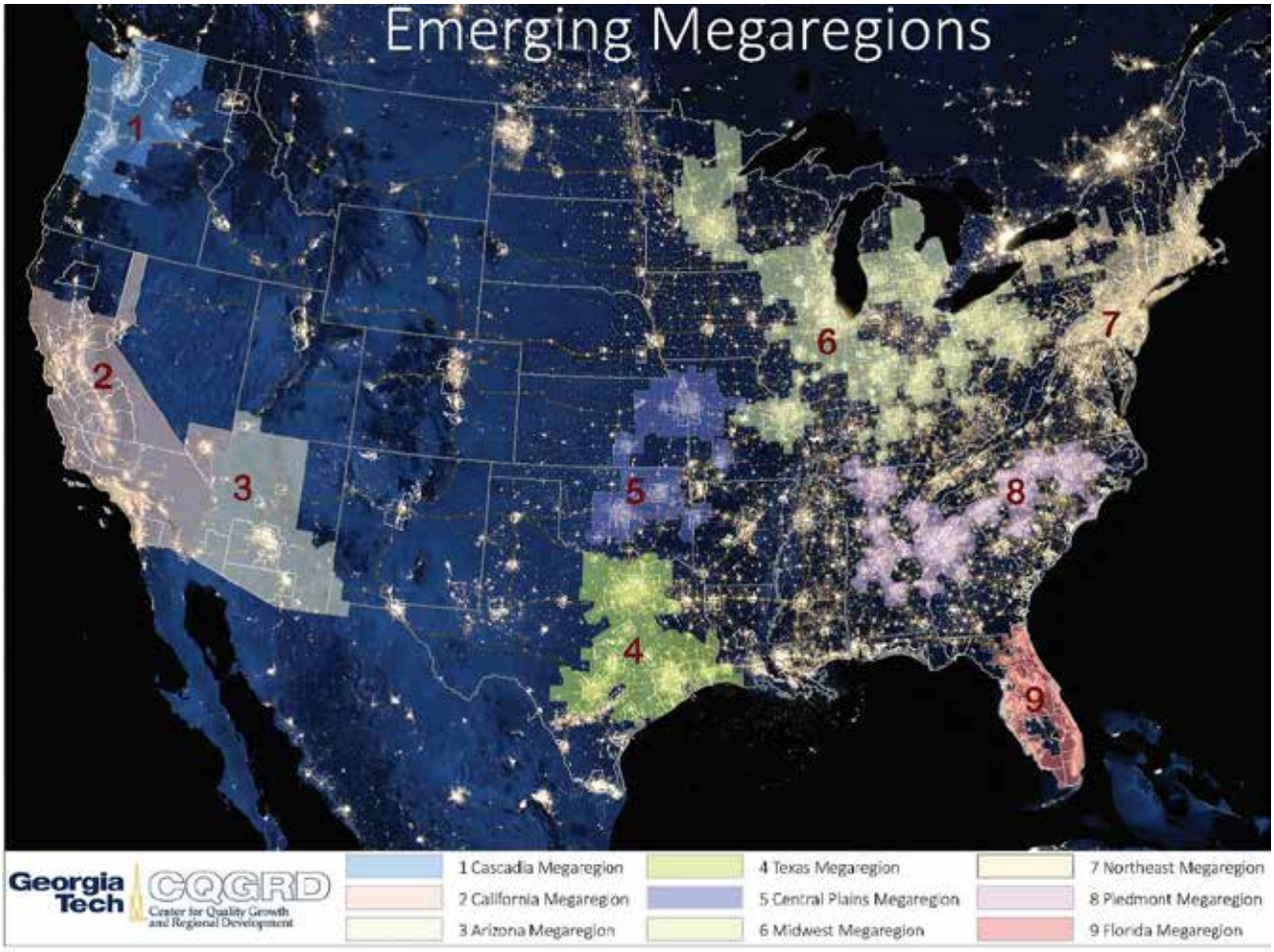


Figure III E. Emerging Megaregions

Source: American Planning Association, 2017

These ways of understanding regions can provide a basis for developing policies and programs that are responsive to regional needs, leverage regional economic and institutional strengths, and allocate resources in ways that are efficient, effective, and politically acceptable (Hagler, 2009). An example is the formation in September 2021 of a Midwest Council on Agriculture to speak with a unified voice for that region's agribusinesses and other agriculture sectors including, specifically and exclusively, large-scale farmers (Schlecht et al., 2021). We believe that the inclusion of midscale farmers in the council would contribute to the diversity of voices and to the resiliency of the region.

Regionalism applied to food systems: Why it matters

Unlike the manufacturing and service sectors, which are less dependent on the natural capital and resource bases of particular regions, food systems—particularly production—are characterized by "the geographic fixity of primary factors in production, including suitable

farmland, regional climate conditions, natural resource base, and proximity to primary upstream industry" (Canning & Tsigas, 2000). Topography, water availability, land and other input costs, farm scale, and crop options play out at the regional level.

These fixed factors invariably influence and reflect regional cuisines and consumer food preferences that are shaped by history as well as contemporary dietary preferences. A practice, technology, or market strategy that works in one region may not work in another. Likewise, regional differences in transportation, processing and distribution infrastructure, local, domestic and international market access, as well as food insecurity and access, for example, shape a region's comparative food system advantages and challenges. It does not hurt that developing a regional identity for food products can spur economic growth and be a "strategic resource for producer communities" (Christensen et al., 2015, p. 85).

Figure III F presents a model of the scales in food systems. They overlap; not all the activities take place at only one scale. For example, supermarkets are at the regional scale because they most likely are selling food within a radius typically defined as their region (Palmer, 2017).

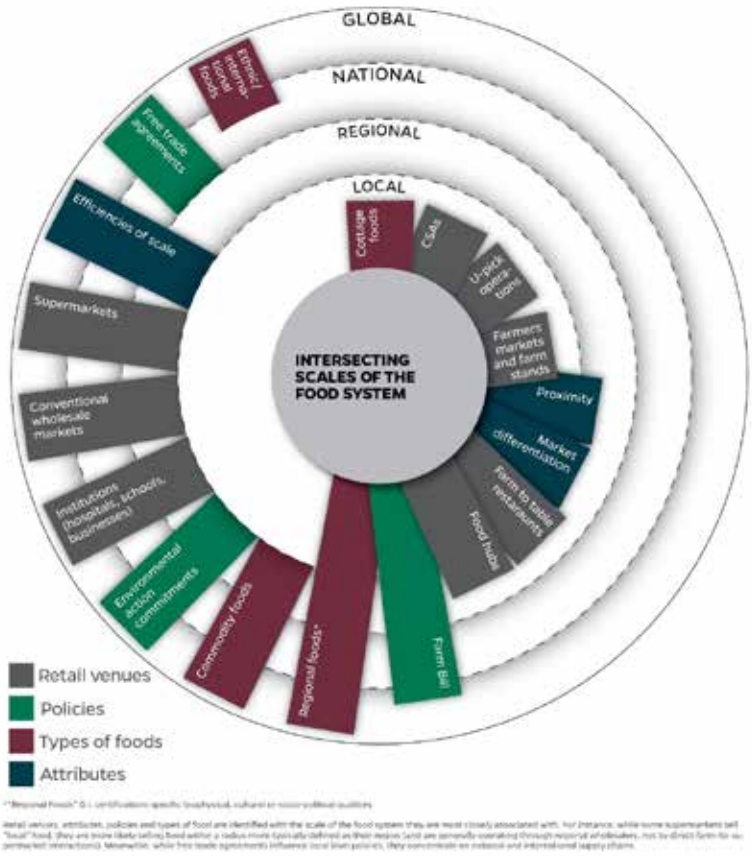


Figure III F. Intersecting Scales of the Food System

Source: Figure created by Michael Milli and Raychel Santo, from Palmer et al. (2017).

To us, neither local nor regional food systems are "alternatives" to national or global ones. They all exist and will continue to do so, despite deep flaws. As Tagtow and Roberts (2011) emphasize, the present "unbalanced" food system is overly dependent on the outer circles. In shifting the balance toward increased sustainability and resilience, the regional scale nests prominently in the middle (Ruhf, 2015). It assumes greater emphasis but does not replace or dominate the others.

Important political and biophysical dimensions play out at regional (and often multistate) levels. These include land and water use policies, transportation, food-related infrastructure, economic development, and responses to energy needs and climate change. Examples include multistate transportation authorities, U.S. Environmental Protection Agency (EPA) regions, USDA regions, regional planning agencies, and multistate energy and climate agreements. Regional population demographics (such as density, movement and settlement trends, and racial and ethnic distribution) directly affect food demand, supply, self-provisioning, and importation, for example.

As we demonstrate in this report, **regionalism is a powerful and necessary construct for developing sustainable and resilient food systems**. Despite the challenges in "thinking regionally," examples we offer from the food system sector and others serve to reinforce both success and possibility.

IV. THE NORTHEAST REGION

Why focus on the Northeast?

The Northeast is an ideal laboratory for regional food system thinking. It contains all the complex elements of food systems and regionalism discussed here, from varied geographies to diverse constituencies and rural-urban dynamics. The pressure to feed a large population with a limited and threatened land base has always placed the region in a larger context—and with an increasing urgency to protect and optimize what the Northeast offers. The region must address social inequities and long-term sustainability as well as efficiencies all along its supply chains, perhaps sooner than other regions.

The Northeast contains all the complex elements of food systems and regionalism discussed here.

As emphasized throughout this report, regions are different. The Northeast is not representative of every characteristic of other U.S. regions. It does not have vast ranches, deserts, or large tracts of public land. It is not dominated by commodity crops or challenged by water politics (yet). While the Northeast may have moved beyond its image as an "old industrial [region] … of high taxes, urban problems, high costs of services and economic stagnation" (Stanton & Weaver, 1979, p. 2), aspects of that portrait linger, along with a whiff of disdain by agriculture-dominant regions for the Northeast's relatively marginal contributions to agricultural production.

The solutions that will work for the Northeast may not work for other regions. But **regional thinking can be applied anywhere, and lessons can be shared.** Certainly, as evidenced by the resources used in this report, Northeast stakeholders learn from colleagues in every other U.S. region, as they also learn from and within the Northeast.

Comprehensive thinking about regional food systems is not new to the Northeast. In 1991 the Northeast Network for Food, Health and Agriculture (NNFHA), led by faculty at Penn State University and Cornell University, developed a number of white papers and educational materials about the Northeast region food systems (Maretzki & Anderson, 1991). David Lee's 1991 NNFHA paper on international trade posited that while some of

the arguments for increasing regional food production were laudable and might "represent worthy goals for public policy interventions" (p. 26), it was difficult to argue on economic grounds that scarce resources should be devoted to this pursuit "*absent other compelling reasons*" (emphasis in the original, p. 26). Thirty years later, we believe that there are other compelling reasons, such as climate change and energy concerns, and that it is necessary for economic arguments to be tempered with concerns such as resource conservation and social justice. Recent events such as the COVID-19 pandemic painfully demonstrate why resilience may trump economic efficiency.

In the early 1990s, a small group of Northeasterners convened to replicate the Midwest Sustainable Agriculture Working Group's (MSAWG) approach to networking and advocacy. At their very first meeting, there was a strong push to name the new network the "Northeast Regional Food Systems Network." At the time, however, 'regional' and 'food systems' were obscure terms, and in solidarity with MSAWG and the new Southern SAWG, it became the Northeast Sustainable Agriculture Working Group (NESAWG). Among the founding members of NESAWG are this report's two authors, who have led projects, taught, and written on this topic since that time. Kathy wrote for NESAWG in 1998 about "regional foodsheds as a powerful and effective unit of analysis" (Ruhf, 1998). Many Northeast activists, practitioners, researchers, and educators have been actively engaged in regional food systems thinking for decades and have negotiated the tensions between local and regional advocates by recognizing the complexity and flexibility needed to accommodate both (Hinrichs, 2013).

Many Northeast activists, practitioners, researchers, and educators have been actively engaged in regional food systems thinking for decades.

Characteristics

How regions function and develop depends on their characteristics and history. These characteristics have been categorized in previous chapters. Here, the report offers an overview of the population, natural resource, and food production characteristics of the Northeast region.

People

The U.S. Department of Agriculture definition of the Northeast comprises the twelve states from Maine to West Virginia, plus the District of Columbia. North to south, this is a distance of about 1,200 miles. The estimated population of the Northeast region, including Washington, D.C., in 2019 was about 65.6 million people, making up nearly 21 percent of the U.S. population (excluding U.S. territories) (U.S. Census Bureau, 2019). The population density is the highest of any region in the country—about *four times* the national average.

The Northeast states with the largest populations are New York, Pennsylvania, and New Jersey. The states with the lowest populations are Delaware and Vermont. In 2010, eight of the region's twelve states had an urban population of 70 percent or more of their total population. On the other hand, the three most rural states in the U.S., that is, the states with the largest rural population, are Maine, Vermont, and West Virginia (Lisa, 2019).

The Northeast exhibits a rich cultural, ethnic, and racial diversity, with people of color primarily situated in metropolitan areas. This diversity extends throughout the Eastern Seaboard. It includes Native/Indigenous tribes and communities, descendants of enslaved African Americans, other Black communities, and waves of European, Hispanic/Latino, and Asian immigrants and refugees from colonial times to present-day arrivals. In 2017 Black Americans made up 12.7 percent of the Northeast population (not including Washington, D.C.), about the same as the U.S. average. Hispanics made up 13.6 percent of the Northeast population, about five percent lower than the U.S. average. (Washington, D.C., is about 44 percent white, 49 percent Black, and 4 percent Hispanic.) The four states in the U.S. with the highest percentage of white Americans (over 90 percent) are in the Northeast region: Vermont, Maine, New Hampshire, and West Virginia (Governing, 2017). These groups have their unique histories and cultural experiences with food production and consumption but are often connected by histories of racism and dispossession.

The Northeast has the highest concentration of Italian-Americans, Irish-Americans, and Jews in the U.S., along with high numbers of Indians, people from African countries, Koreans, Japanese, Filipinos, Amish, Hindus, Muslims, Catholics, French Canadians and Eastern Europeans. Nearly half of the residents of the New York City borough of Queens are foreign-born; 50 percent identify as non-white, and 56 percent speak a language other than English at home. New England is one of the few regions in the country where recent Black immigrants outnumber Black people of multigenerational American origin. Various groups of Afro-Caribbeans have settled throughout New England, mainly in metropolitan areas (Wikipedia, 2022).

One result of this diversity throughout the Northeast region is a rich, varied cuisine, often built upon agricultural and fishery products characteristic of the region, from lobster to crab cakes, cranberries and apple cider to scrapple, and bagels to shoofly pie. Foods such as blueberries, maple syrup and varieties of the Three Sisters (corn, beans and squash) were, and continue to be, traditional foods of Indigenous communities in the Northeast. Added to these are culturally familiar food products (e.g., water spinach, jilo, sofrito, callaloo) and the special dishes of waves of immigrants from dozens of countries.

Many states with large, diverse populations also have high levels of income inequality, segregation, and other manifestations of structural racism.

In the shadow of this cultural portrait are food insecurity, poverty, and inequality. Many states with large, diverse populations also have high levels of income inequality,

segregation, and other manifestations of structural racism. In 2013, state-level income inequality across the U.S. was highest in New York. In the Northeast, New York, Connecticut, and Massachusetts had income inequality indices higher than the national average (Mather & Jarosz, 2014). Corollaries to income inequality include disparities in employment, education, health, and experiences with law enforcement, as well as in access to food, land, and capital.

In 2018 the population of the Northeast region had a median household income of $67,230—significantly higher than the U.S. median of $61,372, and ranging from over $80,000 in Maryland, New Jersey, and D.C., to $43,000 in West Virginia (U.S. Census Bureau, n.d.).

In 2019 the average poverty rate across the 12 Northeast states and D. C. was 9.4 percent, slightly lower than the national average of 10.5 percent (Semega et al., 2020). The rate ranged from 3.7 percent in New Hampshire to 16 percent in West Virginia (U.S. Census Bureau, 2021). The rate for Black residents ranged from 12.8 percent in Maryland to 36.2 percent in Vermont, compared to the national average of 21.2 percent. For Hispanic populations, the rate ranged from 8.9 percent in DC to 27.1 percent in Pennsylvania-compared to the national average of 17.2 percent. For Asian/Native Hawaiian and Pacific Islander the rates ranged from 6.2 percent in Rhode Island to 13.4 percent in New York-compared to the national average of 9.7. The poverty rate for American Indian/Alaska Natives ranged from 15 percent in Maine to 36.5 percent in Massachusetts compared to the national average of 24.2 percent (Kaiser Family Foundation, 2019).

While much of the country's poor live in urban settings, rural, white Appalachia (including parts of New York, Maryland, and Pennsylvania, and all West Virginia) has some of the highest poverty rates in the nation. And in 2015 the suburbs contained more poor people than cities (Kneebone, 2019).

Many marginalized communities in all geographic settings experience daunting challenges in obtaining healthy and acceptable food. Overall, food insecurity in the Northeast, defined as households experiencing "a lack of consistent access to enough food for a healthy and active life" (Coleman-Jensen et al., 2020), was 9.6 percent in 2019, lower than the national level of 10.5 percent.

The Northeast's food insecurity rates between 2017 and 2019 ranged from 6.6 percent in New Hampshire to 15.4 percent in West Virginia. The percentage of households with very low food security averaged 4.4 percent across the region, about the same as the U.S. average of 4.3 percent. Maine (6.2 percent) and West Virginia (5.9 percent) had the highest percentage and New Hampshire had the lowest percentage (3 percent) of households with very low food security (Coleman-Jensen et al., 2020).

In 2019 the rates of overall, low, and very low food insecurity by race/ethnicity in the United States was 19.1, 11.5, and 7.6 percent for Black non-Hispanic households; 15.6, 10.7 and 4.9

percent for Hispanic households; 9.5, 5.5 and 4 percent for other non-Hispanic households; and 7.9,4.6 and 3.3 of White non-Hispanic households (Coleman-Jensen et al., 2020).

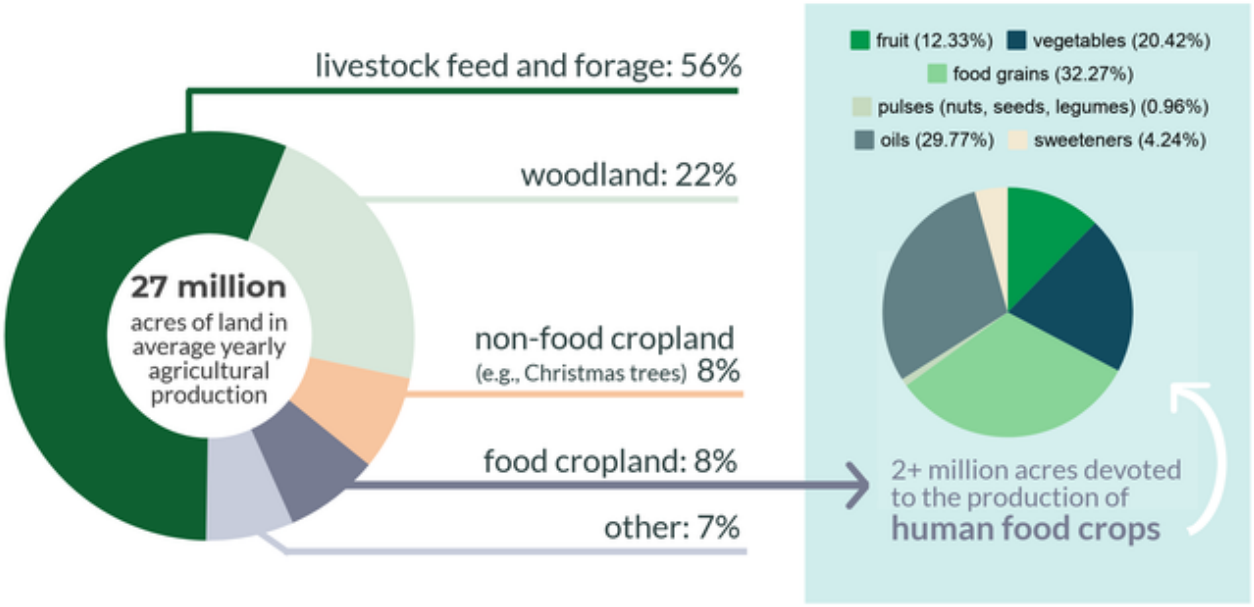
A regional breakdown of food insecurity among Native American communities is not available. It is known, however, that twenty-five percent of Native Americans, mainly on reservations, experience food insecurity, compared to one in eight Americans overall. Native American families are 400% more likely to report being food insecure (Move for Hunger, n.d.).

Land for farming

Only about 37 percent of Northeast land is suitable for cultivation, compared to 64 percent in the North Central region.

Farming in the Northeast has been shaped by its land, climates, and relatively abundant water supplies. Varied terrain and soil types—much of them the result of glaciation—provide a relatively modest amount of farmland. Only about 37 percent of Northeast land is suitable for cultivation, compared to 64 percent in the North Central region (Blair, 1991). According to the USDA Natural Resources Inventory (USDA, 2018), prime farmland (the USDA designation of land that has the best combination of characteristics for producing agricultural products) as a percent of overall land cover (crop, pasture, forestland, land in the USDA Conservation Reserve Program (CRP), and "other rural land") by Northeast state ranges from 3 percent (Maine, New Hampshire, and West Virginia) to 36 percent (Delaware). The Northeast average is about 11 percent, while the percentage of prime farmland in Iowa is 51 percent. Northeast prime farmlands are concentrated in certain extremely fertile areas such as Lancaster County, Pennsylvania, the Eastern Shore of Maryland, the Connecticut River Valley, the Ontario Lake Plain, and the Finger Lakes region of New York, and scattered about in smaller pockets, along with areas of sloped, wet, or stony topography best suited to perennial, forage, and livestock production. In addition to the prime soil areas above, there are several unique production subregions. These include the Champlain Valley (Vermont and New York), the Aroostook Lowlands of Maine, and the St. Lawrence River Valley and eastern Long Island (New York). Sixty percent of the total Northeast land base is in forest.

The Northeast region and the regions within it have advantages, potential, and challenges related to building more sustainable and resilient agri-food systems. As noted, there is less land to feed more people than in other regions. This relatively limited land base is spread unevenly across the twelve states. Pennsylvania and New York contain 58 percent of all the farmland in the region, and Maryland and West Virginia account for another 22 percent (USDA National Agricultural Statistics Service [NASS], 2021). Chapter VI addresses the loss of farmland in the region. At present, there are excellent transportation networks and sufficient water. However, as elaborated in Chapter VII, climate change will cause some watersheds to experience stresses such as more frequent and intense rainfall that causes flooding, and/or too little water in the summer (U.S. Global Change Research Program, 2018).



Source: Griffin, T., Conrad, Z., Peters, C., Ridberg, R., & Tyler, E. (2015). Regional self-reliance of the Northeast food system. *Renewable Agriculture and Food Systems*, 30(4), 349-363. doi:10.1017/S1742170514000027

Figure IV A. Northeast Acres in Agricultural Production

Source: https://agsci.psu.edu/research/food-security/news/2018/efsne-project-concludes-after-seven-years

Agricultural production

In 1982 the Northeast contributed about $10.2b in agricultural market value (6.7 percent of the total U.S. market value) from about 170,000 farms on 29.1 million acres. In 2017, the region contributed about 4.7 percent of the total U.S. market value of agricultural products from 167,000 farms on about 27 million acres (USDA NASS, 1982, 2017).

Of the total Northeast land in farms between 2001 and 2010, calculated as an annual mean across the 10 years, 26 percent was used to raise forage crops, 20 percent was in pasture, 11 percent in field crops (a total of 57 percent), 8 percent in nonfood crops (nursery, flowers, and ornamental crops, Christmas trees, and fallow and conservation land), and approximately 8 percent in food crops (Griffin et al., 2018). Note that nearly all forage, pasture, and field crops go to feed animals for human consumption. About 28 percent was not in active production; nearly one-quarter was woodland (not pastured).

Land for agricultural production can be divided into two broad categories: land that contributes to the food supply and land that does not. Between 2001 and 2010, about 65 percent of Northeast land in farms contributed to the regional food supply (Griffin et al., 2015). It should be noted that, as detailed above, over half of farmed land during that time

period was devoted to growing crops used as livestock feed for poultry, beef, pork, dairy, and egg production (Conrad et al., 2017).

Northeast agriculture includes—and relies on—a wide diversity of products: over 100 different crops and six livestock species (Griffin, 2015). New York (47 percent), New Jersey (19 percent), Pennsylvania (6 percent), and Maryland (5 percent) account for 77 percent of the fresh market vegetables grown in the region (USDA NASS, 2018). In 2018, the nine states in the Northeast region as defined by Farm Credit East saw a fresh market and processing vegetable acreage of approximately 190,000, and a farm value of $795 million (Rickard, 2019). Of 24 milk producing states in the U.S., three are in the Northeast. They account for 13 percent of the total U.S. milk production: New York (7 percent), Pennsylvania (4 percent), and Vermont (1 percent) (USDA NASS, 2019). Of note is that in Vermont alone, nearly 68% of milk produced as of 2017 came from farms employing immigrant workers from Latin America. (Mares, 2019). The Northeast food system also includes over 200 species of fish and shellfish (National Oceanic and Atmospheric Administration [NOAA], 2018); fisheries and seafood are addressed in the next section.

Much of the value of Northeast agricultural production comes from locations in or near urban areas. Data from USDA National Agricultural Statistics Service's 2017 Census of Agriculture (USDA NASS, 2017a) and USDA Economic Research Service's 2013 Urban Influence Codes (USDA ERS, 2019) reveal that about 60 percent of Northeast farm operations and 51 percent of its land in farms, accounting for 67 percent of the market value of agricultural products sold, are located in metropolitan counties. Given this proximity to urban areas, it is not surprising that the region has the third-highest cropland value and second-highest pasture value of the 10 U.S. regions defined by USDA (USDA ERS, 2018). This value comes from "highest and best use" (development) value as well as the high-value crops that are grown in those areas. Nationally, 91 percent of fruits, tree nuts, and berries, 77 percent of vegetables and melons, and 68 percent of dairy products are produced in metropolitan and adjacent areas (Sorensen et al., 2018).

...it is not surprising that the region has the third-highest cropland value and second-highest pasture value of the 10 U.S. regions defined by USDA.

In terms of acreage, the average farm size (133 acres) in the Northeast is about one-third of the national average of 444 acres (USDA NASS, 2017a). However, the USDA uses income, not acreage, in its farm typology. Nationally, 88 percent of all farms are categorized as "small"—having less than $350,000 in annual gross cash income (USDA ERS, 2020). In most Northeast states, 90 to 95 percent of all farms are small. Ninety-seven percent of West Virginia farms are small. New York and Maryland farms average slightly larger, with 85 to 90 percent in the category of small. With competing land uses and diverse economic bases in most of the region, only one Northeast county, in West Virginia, is classified as a "farm-dependent" county, defined by the USDA as receiving at least 25 percent of its earnings from agriculture or having 16 percent of its employment in agriculture (USDA ERS, 2015).

With the exception of federal support programs for dairy farmers, most Northeast producers are not dependent on federal commodity supports. Many producers take advantage of diverse and proximate markets, including direct markets for specialty as well as wholesale products. Research by Blair (1991) concluded that "Northeast farmers are relatively financially stable, compared to those in other regions" (p. 7), due in part to proximity to supplemental employment opportunities and less reliance on global markets. While not directly comparable to Blair's 1991 assertion, a 2018 Union of Concerned Scientists "scorecard" on farm and food health assessed the relative position of states along ten categories ranging from farming outlook to ecosystem impacts to diet and health outcomes. Based on scores averaged across the categories, the Northeast states' scores are fairly high. All states except New Jersey and Delaware were in the top 20, with Vermont, Maine, New Hampshire, and Massachusetts receiving the highest scores, in that order. Nonetheless, Northeast farms face many challenges to their viability.

Direct marketing includes both direct-to-consumer (e.g., CSA, farm stands, pick-your-own, farmers markets) and direct wholesale (e.g., farm sales to restaurants, retail markets, institutions, or food hubs). Recent research (O'Hara & Benson, 2019) indicates that despite challenges in comparing data due to changes made to the Census of Agriculture between 2012 and 2017, the most recent census reveals a considerable decline in the number of farms engaging in direct marketing across the country—at least 10 percent in direct to consumer and at least 41 percent in direct wholesale. They show declines in New York and Pennsylvania, as well as in three West Coast states that represent two of the most prominent U.S. regions for direct-to-consumer sales. While the decline is unambiguous, O'Hara and Benson do not reach any conclusions about the causes—or implications—of this trend, but they do speculate about the impacts of online shopping, land values, and development as reasons for the decline. That said, this trend would seem to have significant implications for the Northeast, where direct markets have been both an attraction and a stabilizing force for the region's agricultural industry.

Fisheries

Marine and freshwater fisheries are an important component of the Northeast regional food system. The Northeast has a "long and storied history of fishing, beginning with the Native American tribes who celebrated annual fish runs, and continuing with the colonial settlers, the whalers, and the modern fishing fleet" (NOAA, n.d.-a). However, detailed contemporary data on the region's fishing industries are hard to come by. The NOAA, housed in the U.S. Department of Commerce, is organized by regions. The Greater Atlantic Region comprises New England and the Mid-Atlantic (from Maine to Cape Hatteras, North Carolina, the Great Lakes, and the rivers and estuaries within this range). Fourteen fishery management plans, collaborations between NOAA and Fishery Management Councils, and the Atlantic States Marine Fisheries Commission oversee the implementation

Marine and freshwater fisheries are an important component of the Northeast regional food system.

of sustainable fisheries plans (commercial and recreational), care of protected species, habitat conservation, research, regulation and permitting, and public engagement.

Recent NOAA data (Liddel & Yencho, 2018) show that in 2017 over 857 million pounds of seafood were landed in New England and the Mid-Atlantic for a value of $1.65 billion. Massachusetts and Maine lead in volume and value. According to Blair (1991), "for some states along the Northeast coastal waters, cash receipts from fishing and aquaculture are higher than for agriculture" (p. 8). In 1988, Massachusetts ranked third, Maine eighth, and Rhode Island tenth in the U.S. in the cash value of their landings. In the same year, the value of the Northeast catch was 19 percent of the value of the entire U.S. catch. In fact, the port with the highest value of seafood landed in the U.S. in 2017—and for 18 consecutive years—has been New Bedford, Massachusetts, more than twice the second highest (Dutch Harbor, Alaska). This noteworthy status is largely due to the scallop industry. In 2016, there were 171 fish processing plants in the Northeast, 20 percent of the U.S. total, and 13,366 people employed by processors and wholesalers, also 20 percent of the U.S. total (Liddel & Yencho, 2018).

Marine and inland aquaculture—defined as the propagation and rearing of aquatic species in controlled or selected environments (National Aquaculture Act, 1980)—is a growing sector, although globally the U.S., and the Northeast specifically, are not major aquaculture producers. According to the USDA Census of Aquaculture, which reports the value of aquaculture products sold by type and state, in 2018 sales of aquaculture products from the Northeast region totaled approximately $176 million, about 11 percent of U.S. aquaculture sales (USDA National Agricultural Statistics Service, 2018b). Maine, Maryland, and Massachusetts lead the region. Seaweed farming is gaining interest in the region as a food product that also yields several environmental benefits (*The Economist*, 2021).

History of the Northeast region food system

The beginning

While neither the soils nor the climate were especially attractive, the Northeastern coast's exceptional harbors and navigable rivers supported settlement, trade, and expansion.

The history of the Northeast food system begins with the history of the region itself, which was noted more for its abundant harbors and navigable rivers than rich soils. Indigenous People were the original inhabitants of the region. Abenaki, Haudenosaunee (Iroquois Confederacy), Lenape, Massachuset, Pequot, Passamaquoddy, Penobscot, Nauset, Pawtuxet, Wampanoag, Narragansett, Mohegan, Montauk, Delaware, Nipmuc, and other tribes harvested crops, animals, fish, and fiber for millennia. There were an estimated 70,000 to 100,000 Native Americans in New England at the beginning of the 17th century, when they began to trade with European merchants (National Geographic Society, 2022).

The eastern coast of the U.S. was among the first regions of the continent to be widely settled by European colonists, who cleared and exploited it rapidly beginning in the

Figure IV B. Dispossession of the American Indian

Source: https://sanfacon.com/mascots/thepeople.html

seventeenth century. While neither the soils nor the climate were especially attractive, the Northeastern coast's exceptional harbors and navigable rivers supported settlement, trade, and expansion. The diet of the early European settlers was based on domestic livestock, game, fish, and corn, along with gathered and cultivated fruits and berries. The Indigenous tribes shared with settlers literally life-saving farming practices that included the use of nitrogen-fixing crops, and fertilizers of wood ash and fish.

Extensive trade developed between the French, English, and Dutch colonizers along the Atlantic coast and the tribes of the Northeast. Native peoples got caught up in trade and land wars among the British, French, and various tribes. Others were dispossessed of their land by swiftly multiplying European settlements, as Figure IV B shows. Seventeenth-century settler colonialists never regarded Native land as legally "possessed" by its original inhabitants (Brox, 2004), as they pushed Indigenous tribes from areas desired for cultivation.

Based on the ancient "doctrine of discovery" first invoked by Pope Alexander VI in 1493, the sovereignty of "pagan" land belonged to the Christians who "discovered" it (Upstander Project, n.d.). The U.S. Supreme Court adopted this doctrine in 1823, as tribes began entering into treaty relations, typically by force, with the U.S., on terms unfavorable to them. In the

early 1800s, pressure was building among white Americans for the relocation of Native Americans from the eastern U.S. to lands west of the Mississippi River. The 1830 Indian Removal Act authorized treaties to "rid" the East of "Indians" which was accomplished by expelling Indians from the East easily, quietly, and legally (Perdue, n.d.). The combination of laws, violence, and disease resulted in the severe decline of Native tribes. Nonetheless, they have endured. Nearly 600,000 Indigenous persons live in the twelve Northeast states (World Population Review, 2021b).

The abundance of land in the Northeast and beyond—compared to where the colonists had come from—and its "availability" (disregarding Indigenous populations) made settlement and expansion attractive even with the drudgery of clearing the forest for crops and the "inconvenience" of removing Indigenous peoples. This "inconvenience" reverberates today, with weighty dialogues about reparations and "rematriation" (the process of returning land, either voluntarily or forcibly, to its owner or origin). For example, in 2005 the U.S. Supreme Court ruled that the Oneida Indian Nation could not assert its tribal sovereignty over land it historically occupied 200 years ago in New York State and had purchased in 1997 and 1998 (*City of Sherrill v. Oneida Indian Nation of New York*, 2005).

Slavery was part of colonial life in the North, from Maryland and Delaware into New England.

Neither has the history of the Northeast escaped the violent legacies of Black slavery. Slavery was part of colonial life in the North, from Maryland and Delaware into New England. Northern merchants profited from trade in molasses, rum, and slaves. Massachusetts was a center for the slave trade throughout the seventeenth and eighteenth centuries; by the middle of the 1700s, exporting and enslaving of Africans was an "undeniable" part of New England (National Geographic, 2020). More than 1,000 slave ship voyages departed from New England, and some slaves were brought directly into the region.

In fact, slavery was embedded in the economy of New England's colonial towns, although in a different way than in the South. In both rural and in-town New England, slave-holding families typically had one or two "household" indentured servants, and/or enslaved people. They were seen as part of the family structure—as dependents under the family patriarch (Hardesty, 2019). In 1703, 42 percent of New York households included enslaved people (Oltman, 2005). In 1776, 20 percent of the populations of Philadelphia and New York City were enslaved people (Strainchamps & Anderson, 2016). There was also a free Black population constituting about 10 percent of Boston's population in 1752. The same author reports that by 1840, all Northern states had passed legislation abolishing slavery, although implementation in some instances was gradual (Klein, 2014).

The Nineteenth and Twentieth Centuries

From the eighteenth to the nineteenth century, the portrait of Northeast agriculture changed. During the eighteenth century, agriculture in the Northeast ranged from subsistence and

specialty crop (e.g., sheep and, later, cranberries) farming on small acreages in New England to large plantations of export crops (cotton, tobacco, sugar) further south in the region. Throughout, farmers cleared land for corn, wheat, flax, livestock, and orchards (Brox, 2004).

For Thomas Jefferson, who heralded the "yeoman farmer," there always needed to be a frontier of new lands for farmers (who, according to Jefferson, did not include Native Americans, Blacks, or females) (Brox, 2004). He proclaimed, "There are but two means of acquiring the native title. First, war; for even war may, sometimes, give a just title. Second, contracts or treaty" (Brox, 2004, p. 48). For a roll of cloth, a settler could purchase rights to all the land he could surround in a day's travel (Brox, 2004). Jefferson anticipated the allure of the Midwestern prairie that spurred the abandonment of Northeastern farms, which often scraped by on meager and hilly soils. In addition, population growth near the coast exceeded farmers' capacity to feed and clothe nonfarmers. The region's farmers abandoned the more marginal farms and migrated west to clear and plant "new land," or to the industrializing Northeast cities for a life in manufacturing (Brox, 2004).

Less than a century later, The Indian Removal Act of 1830 authorized the federal government to forcibly remove southern and Mid-Atlantic Native American tribes to federal territory west of the Mississippi. The white settlement of their ancestral lands and the infamous Trail of Tears were outcomes of this legislation (Carlos et al., 2022; Fixico, 2009). This Act and several subsequent legal instruments served to sever Indigenous Peoples from their territories and cultural identities. Food, as a mode of cultural expression and transmission, was particularly targeted by colonial authorities (Mosby, 2013).

Before the end of the nineteenth century, agricultural specialization had begun to change the look of agriculture in the Northeast.

Despite the exodus of farmers and others to seek opportunity and more fertile land, and the forcible displacement of Indigenous communities working the land, Northeastern agriculture persisted. Before the end of the nineteenth century, agricultural specialization had begun to change the look of agriculture in the Northeast. For example, dairy operations seemed well suited to the pastures and hay lands of New England and some other Northeastern states.

During that era, other regional specializations developed; these examples are worth noting because they will likely continue to be significant sources of these food items within the region (Hilchey, 2020).

- Aroostook (Maine) potatoes (and now broccoli)
- Fruit belts (Ontario Lake Plain and South Mountain, Pennsylvania
- Food processing industry cluster in Southeast Pennsylvania

- Kennett Square (Pennsylvania) mushroom industry cluster
- Growing areas of Maine blueberries and Massachusetts and New Jersey cranberries
- Marine and freshwater fisheries, e.g., shellfish and kelp farming
- Concord Grape Belt of western New York and PA
- New York viticultural areas of the Finger Lakes, Hudson Valley, and Long Island
- Maple production areas (primarily New York and Vermont)
- Poultry of the Delmarva Peninsula (Delaware, Eastern Shore of Maryland, and Virginia)
- East End Long Island, New York, potatoes and greenhouse operations

The development of the railroad and canal systems, along with the invention of iceboxes and refrigerated rail cars, made cross-country transport feasible and undermined concerns about self-reliance; one could get food easily and affordably from far away, foreshadowing the current food system. Around 1920, apples produced in the Northwest greatly supplanted New York State apples in the New York City market (Clancy, 1998).

This shift in production centers has been very apparent in the Northeast. For example, the agricultural land base contracted by nearly 70 percent for a number of Northeast states, mostly after 1900 (Griffin et al., 2015). Much of this land lost from production in the twentieth century reverted to forest cover. By 1924, only 5 to 10 percent of the food supply of New England was locally produced, a situation that propelled The New England Council to propose ways to help the region's farmers. In fact, The New England Council, formed in 1925 to promote the region's economic growth, developed "the first New England-wide program for improved marketing of farm products" (2021, para. 4). In its eighty-sixth year, the council continues to advocate for New England's business community, including agriculture, in Washington, D.C. Not until the 1970s were the same efforts made again, this time driven by the effects of the oil crisis on food costs and world food supplies (Clancy, 1998).

Over the last century, several megatrends in the overall food system have shaped U.S. agriculture, including in the Northeast. Increased specialization and productivity, technological advances, and consolidation have resulted in improvements to some Northeast farmers' lives and profitability, while dooming others. In many sectors, the products resulting from large Western grower cooperatives and horizontal integration were able to replace Northeastern products.

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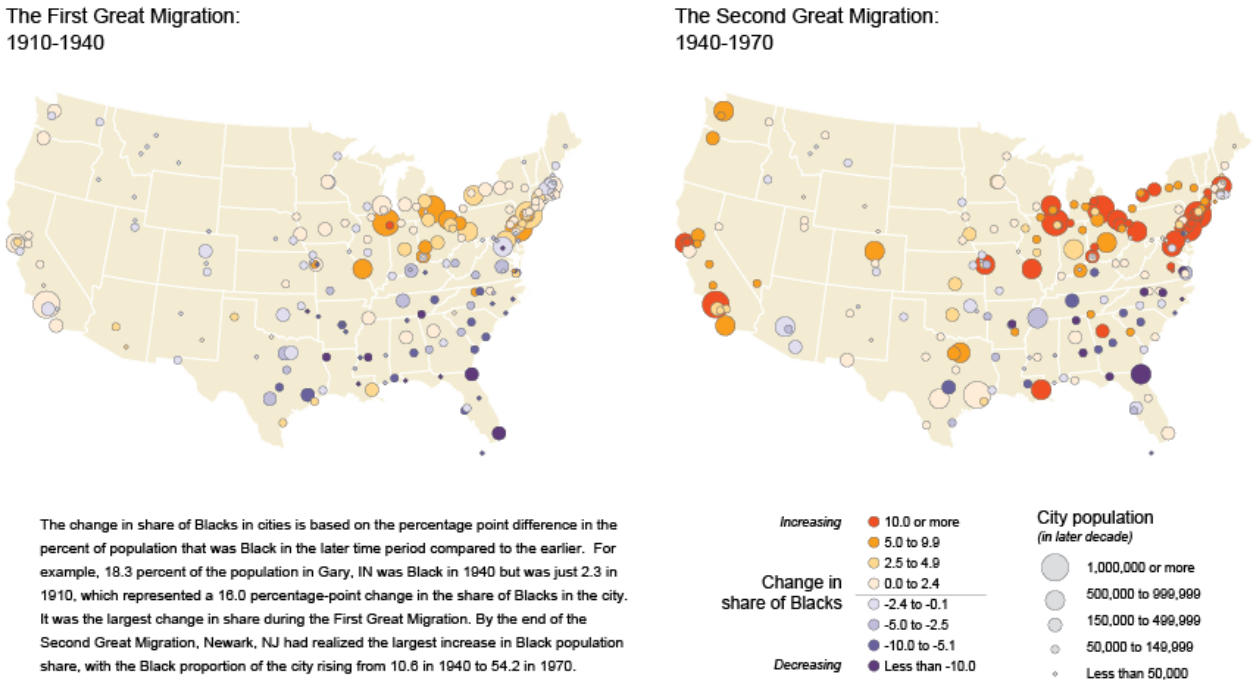

Figure IV C. The Great Migration shown by changes in the African-American share of populations of major U.S. cities, 1910–40 and 1940–70

Source: https://en.wikipedia.org/wiki/Great_Migration_(African_American)#/media/File:GreatMigration1910to1970-UrbanPopulation.png

The Great Migration

The Great Migration was the movement of over six million Blacks from the rural South to the urban Northeast, Midwest, and West in two waves between 1916 and 1970. The Great Migration was one of the largest and most rapid mass internal movements in history. As they significantly reshaped the demographics of several U.S. regions, these waves of migration reflect another chapter in land dispossession and agrarian cultural loss.

After the Civil War, Blacks accrued about 15 million acres of land in the Southeast. Congress under President Lincoln authorized setting aside abandoned land for formerly enslaved people, but this promise of "40 acres and a mule" was never fulfilled. The Federal Homestead Acts (1862–1916) that gave more than 160 million acres of land, mostly west of the Mississippi River, were intended to assist women, immigrants, and Blacks to participate in settlement, but the main beneficiaries were white male settlers and corporations (Horst, 2019). Whatever land Blacks acquired was largely and systematically taken away between Reconstruction (1865–1877) and the New Deal (1933–1939) due to practices such as forced sales and discriminatory lending by the U.S. government (Daniel, 2013). "The dispossession of black agricultural land resulted in the loss of hundreds of billions of dollars of [B]lack wealth…contributing to the large wealth gap between white and black families that exists today" (Newkirk, 2019, p. 85). This

dynamic underpins the contemporary conversation about Black land reparations. The renewed call for land reparations dates back to the federal government's failed promise to provide 40 acres and a mule to freed slaves after the Civil War (Collier, 2018).

Beginning in 1910 and intensifying between 1916 and 1930, the Black population increased by about 40 percent in Northern states, mostly in the major cities where many were recruited for industrial jobs. Migrants of color came to New England cities not just from the South, but from the Caribbean, Africa, Cape Verde, and rural New England (New England Historical Society, n.d.). For Blacks, the migration meant leaving what had always been their largely agrarian economic and social base in the South and finding a new one (Lemann, 1991). In the 1930s and 1940s, the increasing mechanization of agriculture brought to an end the institution of sharecropping that had existed since the Civil War, forcing many landless Black farmers off the land. As the U.S. government invested billions of dollars in white farmers, it extracted wealth from Black farmers as they forfeited their property and left.

A second Great Migration, starting in 1940, brought an additional 5 million people north and west. By 1970, 80 percent of Blacks were living in cities nationwide. As dramatist August Wilson stated, "we were a land-based agrarian people from Africa. We were uprooted … and spent 200 years developing our culture … and then we … attempted to transplant this culture to the pavements of the industrialized North. It was a transplant that didn't take" (Wilson quoted in Rothstein, 1990, p. 8). These Black urban neighborhoods were "redlined," which resulted in lower property values and neighborhood decline. It is no coincidence that more than 18,000 urban community gardens across the country are located "predominantly in neighborhoods once redlined" (Penniman, 2018, p. 206).

Nationally, the peak of Black land ownership was in the early 1900s. In 1920, 14 percent of U.S. farmers were Black; they owned over 16 million acres. By 1997, fewer than 20,000 farmers were Black, and they owned only about 2 million acres (Gilbert et al., 2002). The 2012 Census of Agriculture reveals that white landowners control 95 to 98 percent of U.S. farmland, and nearly 100 percent in New England and New York (USDA Census of Agriculture, 2017). In terms of farm operators, in 2012 there were 588 "Black or African American" farmers (the category term used by USDA) in the Northeast states, representing 0.3 percent of all Northeast farmers (USDA Census of Agriculture, 2012). The 2017 Census of Agriculture shows an increase in the number of Black producers to 1,036—still an extremely paltry number. Two researchers questioned this increase, showing that the USDA inflated these numbers to depict a more positive portrait of the agency's civil rights record (Rosenberg & Stucki, 2019). Furthermore, the authors state that people of color are much more likely to be farm laborers than farm operators, and continue to be the object of discriminatory practices. Furthermore, people of color are much more likely to be farm laborers than farm operators, and continue to be the object of discriminatory practices.

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From this history, Blacks bring a deep and complex relationship to land. While not all Blacks long for their agrarian roots, as realities are much more nuanced, nevertheless land ownership and agrarianism are associated with emancipation, power, wealth-building, stability, opportunity, freedom, and opposition to racism (Touzeau, 2019).

Farmworkers

According to Cuello (2020), the present U.S. food system would not exist without its labor force. In the 1600s, indentured servants were brought from England to work in the fields. When they did not provide sufficient labor, African people were enslaved and brought to the U.S. After the Mexican-American War, tens of thousands of migrant workers from Mexico crossed into the U.S. for temporary jobs. During World War I, the first guest worker visa program was created to allow more Mexican workers into the U.S. In the 1930s, labor laws were passed to protect workers, but they excluded farmworkers. In the 1950s, the temporary guest worker visa program was made official. While most workers who cross the southern border work in California and the South, the Northeast also relies on migrant and permanent farmworkers from Latin America. Today, up to 75 percent of the nation's farmworkers are undocumented (Cuello, 2020). Increasingly, they come from Asia and Africa. They may work in field crops, livestock, orchards, and dairy, as well as processing facilities such as slaughterhouses.

Historical dangers and labor abuses faced by farmworkers, from chemicals and hazardous work sites to unsanitary living conditions, continue despite an increasing awareness of mistreatment and inequities. Dr. Teresa Mares, who studies farmworkers in the Vermont dairy industry, noted that "Despite the significance of farmworkers in upholding the national agricultural economy, the economic conditions of farmworkers remain substandard" (Mares, 2019, p. 17). In her upcoming book, Dr. Lori Flores examines Latino food workers in the Northeast U.S. from the 1940 to the present. "From agricultural fields to processing factories to restaurants … Latino people have historically and currently powered the U.S. food industry in ways that often go unacknowledged" (Flores, 2021, para. 3). Many Latino farmworkers come from agrarian backgrounds, many from Indigenous communities, and some wish to have their own land and farm enterprises.

Food systems thinking in the Northeast

As stated earlier in this chapter, the concept of "region" has long informed food system work in the Northeast. A 1991 project conducted by the Northeast Network for Food, Agriculture and Health examined food security, food production, and farmland loss in the Northeast region—issues as timely today as three decades ago. One project goal was to coalesce local groups into regional networks of task forces (Clary et al., 1991). Some of these functioned for several years.

NESAWG's founding mission statement (1992) proclaimed, "NESAWG is a regional network of member organizations and individuals working together to create a more sustainable and

secure *regional food system* [emphasis added]—one that is economically viable, environmentally sound and socially just, and produces safe and healthful food" (NESAWG Articles of Association, 1992). At NESAWG's first conference in 1992, an observer from another region noted that NESAWG's food system–wide platform could be an important model for the country, because the scope of its work went far beyond "just farms." In 1995, NESAWG hosted a cross-sector Northeast Leadership Congress and shortly thereafter disseminated its *Northeast Farms to Food* guide. In 1998 NESAWG published a set of white papers by eighteen leading food system thinkers from various backgrounds, perspectives, and disciplines.

In the late 1990s, about 20 senators representing Northeast states organized to redress what they saw as years of bias against the region's farming interests in federal policy. Vermont Senator Patrick Leahy spearheaded the so-called Eggplant Caucus to assure Northeast producers a better seat at the federal table. Victories included programs for specialty crop farmers, adjustments to federal crop insurance programs, and eligibility for conservation and emergency payments. In 2007, NESAWG's Northeast Ag Works! project focused on the impact of federal policy on the region. It built strong policy arguments regarding the importance of regionalism (Hance et al., 2006) and built consensus around a Northeast agenda for the 2008 farm bill. (See the policy checklist tool, "Are We Being Served?" in the Appendix.)

Since then, local and regional food system initiatives have flourished in the region, many of which are featured in NESAWG's annual "It Takes a Region" annual conference that brings together over 300 participants from all sectors across the Northeast. Within the region, networks such as Food Solutions New England (six states) and the Chesapeake Foodshed Network (six states and Washington, D.C.) use their multistate region as their organizing framework. It is not coincidental that the Northeast has led the nation in regional food systems thinking, as the region's large progressive consumer/citizen constituency has made for effective partnerships with other food system stakeholders (although not without challenges). The regional orientation has been purposeful and supported by farsighted and generous philanthropic donors, some of whom have invested in this report.

Since then, local and regional food system initiatives have flourished in the region, many of which are featured in NESAWG's annual "It Takes a Region" conference.

Furthermore, over the last decade many research efforts have substantially increased the amount of useful information about the Northeast region's food security and food systems. Prominent among them is the Enhancing Food Security in the Northeast Project (EFSNE) (Penn State College of Agricultural Sciences, n.d.). EFSNE was a unique interdisciplinary, multi-institutional, complex-systems project addressing many different components of food security in the Northeast, and, more specifically, the socioeconomic and biophysical boundaries of and opportunities for regional food system expansion. The project's long-term goal was to assess whether greater reliance on regionally produced food can improve food access for low-income communities throughout the region as well as benefit farmers, actors in

food supply chains, and others in the food system. The primary objective was to increase the understanding of the mechanisms necessary to more broadly enhance food security through mainstream markets in the region, with a special emphasis on low-income communities, a criterion of the USDA Agriculture and Food Research Initiative proposal that funded the effort (Clancy et al., 2017; Palmer et al., 2017). Over seven years (2011–2017), the EFSNE team used a market basket of eight foods to study the following:

1. What regional production looks like at the present time and the capacity for producing more in the future;

2. Which regionally produced foods are now found in supermarkets in low-income areas;

3. What the supply chains look like for these foods, in order to identify where the leverage points might be along the chain to increase the amounts going into supermarkets in low-income areas;

4. Who the purchasers are and what their purchasing patterns for these foods are in the stores that were studied in nine locations around the region (Clancy et al., 2017).

At its completion, the project had over 80 discrete components. The researchers worked with multiple datasets and used quantitative and qualitative methods to study:

1. Shopper food purchases, demographic data, and other information relevant to the food environment;

2. Supply chains of the market basket foods;

3. Viability of the supermarkets;

4. Community members' recognition of the concept of "regional foods" and food systems;

5. (a) How agricultural land is used in the Northeast;
   (b) the projected effects of climate change on food production;
   (c) the variety and amounts of foods produced; and
   (d) the relationship between food consumption and agricultural output.

The EFSNE production team also located, described, and analyzed the urban, peri-urban, and rural zones around specific urban centers in the project. We share EFSNE findings throughout this report.

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This brief portrait of the Northeast region's history and characteristics enables an appreciation of the constraints and potential of the region's food systems to meet more of the food demands and aspirations of its population. It also points to a food system built in part on the theft of land, exploitation of labor, and the persistence of structural racism. We argue that, in the context of this complex profile, the Northeast has been—and continues to be—a leader in regional food systems thinking. Next, we take a deeper look at the attributes and dimensions of regional food systems and how they could play out across U.S. regions.

V. REGIONAL FOOD SYSTEM ATTRIBUTES

Introduction

As stated in previous chapters, a regional food system includes 'local' but functions at a larger, more comprehensive scale. We argue that land, water and other inputs, farm scale and type, crop options, and market access are best addressed at the regional level. In the past decade a growing literature on regional food systems theory and efforts has supported these claims.

In earlier chapters we offered a definition of 'regional food systems,' some history and background on regionalism, and an overview of the Northeast. In this chapter we lay out what we consider to be the main attributes or characteristics of regional food systems wherever they are found.

Ten to fifteen years ago, most studies examining regionalized food systems saw them as forming in response to, and as alternatives to, problems with conventional farming. In this view, industrialized farming systems are energy- and chemical-intensive, utilize GMO seeds, support large, concentrated animal operations, and degrade soil and water quality, among other problems. Donald et al. (2010) described four approaches that have been developed to describe and suggest answers to the problems engendered by conventional agri-food systems. Two of these approaches are most applicable to this report:

1. An ecological perspective that gives greater attention to the spatial organization of food systems and emphasizes population density, urban and rural social organization, regional environmental conditions, and marketing infrastructure; and

2. An inequality approach elicited by the abuses brought about by certain types of corporate behavior that are antidemocratic and emphasizing the need to preserve family farming and community-based food systems because they are essential to democracy and civil society.

We agree with Donald (2010) and her colleagues that, unlike its local and global counterparts, the concept of a region provides a "clearer conceptual terminology" (p. 174) for a system that adequately describes the complex flows, webs, processes, and relationships of present-day food systems, rather than the more rigid structures and systems that are often associated with both conventional global agri-food systems and highly localized ones. They suggest that a balance needs to be struck between localization and globalization in order to promote the use of fairly traded products from developing countries. We would apply that concept of balance to domestic trade as well.

We would, however, go further than Donald et al. to expand their "inequality approach" to all aspects of the food system, and to give greater attention to the history and impacts of structural racism and inequity on communities of color and other oppressed communities.

The definition of an ideal regional food system that we proposed in the 2010 working paper is presented and reaffirmed here:

> *An ideal regional food system is one in which as much food as possible to meet the entire population's food needs is fairly produced, processed, distributed, and purchased at multiple levels and scales within the region, resulting in maximum resilience, minimum importation, and significant, equitable economic and social return to everyone in the region.*

Twelve attributes of ideal regional food systems

In terms of the above discussion and definition, we present twelve attributes of what we envision as ideal regional food systems.

Ideal regional food systems:

1. **Produce a volume and variety of foods** to meet as many of the dietary needs and preferences of the population as possible within the resource capacity of the region. (This is the definition of self-reliance.)

2. **Do not seek or claim self-sufficiency,** defined as when all food needs are met within specified geographic bounds. This is not the 100-mile diet or locavore orthodoxy.

3. **Are "beyond local."** Local food systems are strong on relationships and identity, but tend to be limited in volume, availability, product range, and affordability. Regional food systems provide more volume and range of products and more market options than local systems. They rely less on relationships and identity but can embed information useful to consumers about the product through branding and labeling.

4. **Acknowledge inequality and systemic oppression in the present system, and seek regionally relevant solutions** that address the unique needs of marginalized

food system sectors and communities and other groups subject to discrimination and inequity.

5. **Emphasize differentiated products**. Most mainstream food systems are strong on volume, "cheapness," and certain efficiencies of scale. They function best at national and global levels. But they tend to sacrifice quality, environmental stewardship, and equity, diversity and inclusion for farmers and other workers. Regionally focused food systems may be able to offer higher quality products, differentiated by place and/or other attributes, and more equity for producers and other workers in the food chain than conventional systems. However, this does not mean that there is no conventional production in regional food systems nor that conventional producers are not land stewards. Regional food systems have a wide variety of farm types, scales, supply chains, and market outlets to meet food demands.

6. **Have attributes of both conventional and alternative systems.** 'Regional' is an alternative framework to the polarized 'local-global' dichotomy in that it includes both but proposes neither as 'the solution.' Regional supply chains may be hybrids of conventional and alternative operations.

7. **Connect with both local and national/global levels.** As Zurek and colleagues (2018) point out, there is no European Union food system per se; it is a set of local, regional, national, and global interconnected systems and dynamics. The same can be said for the scales of food systems in the U.S. They include commodity production and national and global trade as necessary options for some producers and some products, and to the extent that is necessary to provide consumers with a desired and available range and volume of products. Regional food systems provide significant volumes of a broad spectrum of "good" foods through many institutional and retail outlets.

8. **Reject one-size-fits-all national agriculture and food policies.** Most of these policies still primarily accommodate the interests of traditional commodity-producing states, rather than the interests of states with more midsized and small farms with diversified agriculture.

9. **Are not just about geography.** Like 'local,' they are about scale, markets, and values. The optimal or appropriate scale is a cornerstone of a regionalist approach, from farm equipment to processing facilities to retail space. Market systems should deliver an appropriate range of food broadly and affordably, in which all participants in the food chain are treated equitably. Cultural humility and awareness are critical when looking at regionalist practices.

10. **Work to provide more good food options** to the mass market of consumers. Operating at a regional scale so as to maintain significant volumes of products in mainstream markets may work to reduce both costs to supply chain players and prices to consumers. Volumes will differ depending on the characteristics of each region.

11. **Encourage decentralization where appropriate.** Decentralization can pertain to political, administrative, fiscal, market, and physical dimensions.

12. **Develop new institutions and forms of governance**, particularly at regional levels, that would greatly strengthen inclusiveness and fairness in food systems at all levels.

VI. REGIONAL FOOD SYSTEM DIMENSIONS

Introduction

In this chapter, we explore what we refer to as the dimensions—the aspects or features—of regional food systems. Recognizing that people define regions in different ways, we believe that the dimensions discussed here are useful descriptive and analytic tools regardless of a region's scale or boundaries.

This report reflects both how regionally focused food systems are currently observed and reported, and our imagining of what ideal well-functioning regionally focused food systems could look like. Here, we use Northeast food systems as our main example and explore their dimensions in greater detail than the overview in Chapter IV. We also reference national data, especially where regional and/or state data are not available, because we think they provide useful context for regional thinking and action. We believe it is important to understand the potential of regional food systems across the country, as well as their current conditions, in order to effectively target planning and resources toward their development. It is also critical to appreciate the interconnected nature of their dimensions and to recognize and build from synergistic connections among them.

We posit that resilience, diversity, and sustainability—all fundamental to systems thinking—are central to a regional food systems framework. After we discuss these overarching themes, we turn to the six dimensions discussed in this chapter:

- Food needs and supply;
- Natural resource sustainability;
- Economic development;
- Infrastructure;

- Social justice; and
- Human and political capacity.

Resilience, diversity, and sustainability

Three cornerstones of secure food systems at any scale are resilience, diversity, and sustainability. These three phenomena complement and overlap each other and are often discussed together. Here, we tease them apart.

Resilience

Food system resilience means having a low vulnerability to both acute and insidious disruptions in food production, supply, and access, and an increased capacity to withstand or adapt to disruption (Ruhf, 2015). Resilience in agri-food systems has been extensively discussed (e.g., Berardi et al., 2011; Lengnick, 2015 and 2022; Tagtow & Roberts, 2011). Tendall et al. (2015) define it as the "dynamic capacity to continue to achieve goals despite disturbances and shocks" (p. 18). A National Research Council (NRC) committee (2012) defines it as "the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events" (p. 2). Meuwissen et al. (2019) offer three system capacities that are crucial to understanding food systems resilience: robustness, adaptability and transformation. Resilience is at the forefront of food security planning, especially as the impacts of climate change on food systems become better understood. Climate change "will entail multiple exposures to overlapping and interacting stressors on food systems" (Miller et al., 2013, p. 169), many of which have already been experienced in the Northeast. The coronavirus pandemic reveals equally disturbing impacts of public health crises on food systems at all scales.

Resilience is described in a variety of ways. One we find particularly useful is Harris and Spiegel's (2019) adaptation of Rodin's (2011) five characteristics of resilience for food systems and their list of practical examples of each characteristic.

1. **Awareness—The knowledge of assets, liabilities and vulnerabilities.** E.g., the agriculture census, weather tracking, market price information, and production research.

2. **Diversity—Different sources of capacity, and redundant elements.** E.g., storage capacity, spare capacity (meaning ability to produce more if necessary) to respond to short-term or unexpected demand, supply chain options, diverse capitals (financial, natural), diversified income sources, and redundant food system components.

3. **Integration—Coordination of functions across systems, transparent communication.** E.g., coordination between different bodies of government, integration of regional and global economies, coordinated management of regulatory mechanisms for pasture, water, farmlands, and forests.

4. S**elf-regulation—A system regulating itself without extreme malfunction.** E.g., local (or regional, we authors note) capacity for governance and access to financing, planning for ecosystems management, climate adaptation strategies, and food chain traceability.

5. **Adaptability—Adapting to changing circumstances, flexibility.** E.g., diversification of agricultural systems, training on new technologies.

6. **Inclusivity** (added by Harris and Spiegel)—**Broad consultation and engagement of communities, equitable access to resources.** E.g., consultative planning processes, inclusive labor policies, equitable access to land and equitable land tenure.

In *Resilient Agriculture*, Lengnick (2015) explains that two types of resilience can be managed as adaptation mechanisms in complex systems. General resilience is the coping capacity of the whole system and includes three system behaviors: response, recovery, and transformation. They improve the ability of the system to cope with and recover from stresses in conditions of high uncertainty and complexity (Meuwissen et al., 2019); examples are drought-resistant crop varieties and soil management strategies. Specified resilience is resilience to a specific disturbance by a specific component of the system, such as the resilience of a particular pasture to seasonal drought. Ensuring both forms of resilience requires actors across food supply chains to address the economic, ecological, and social dimensions of the system.

Two adaptation strategies are important components of resilience and adaptive management. Resistance strategies protect existing systems from climate effects; for example, changing equipment or irrigation practices. Recovery strategies, described above, improve the ability of the system to recover from climate shocks (Lengnick, 2015).

Resilience is a property of networks along with tipping points and asymmetry (Hynes et al., 2020). Networks are a hallmark of food systems writ large at a regional scale. Witnessing and anticipating profound changes, we believe that the regional scale is well positioned to withstand disruption and promote resilience in the agri-food system. Regionalization has the potential to maintain food security in the face of unexpected conditions such as extreme weather, public health concerns, rapid increases in fuel prices, or drastic changes in institutional support, such as water subsidies or farm bill programs (Neff et al., 2011, in Miller et al., 2013). Regional entities also have the capacity to support farms of all sizes in order to produce optimal levels of production that can accommodate regionally adapted, diversified diets (Schipanski et al., 2016). Similarly, efficient region-scaled economic activity and infrastructure along the food chain may be better able to withstand and adapt to disruption. Regional food systems can foster resilience in several ways:

- Reducing dependence on food imported from outside the region by sourcing food from multiple scales of distribution and diverse markets within the region;

- Enabling more efficient, nimble and stable regional supply chains (compared to global ones), including shorter transport distances;

- Enhancing a substantial, productive land base and related natural resources, capitalizing on a region's assets such as water, transportation networks, and consumers;

- Training food systems actors on how to ensure general and specific resilience to climate change and other shocks;

- Fostering more rapid innovation in and across supply chains;

- Providing sound, efficient, and appropriately scaled infrastructure and institutions, including diversified distribution networks; and

- Promoting cooperation and collaboration among food system sectors and among governments, commerce, and civil society within and across states.

In other words, "The region is an effective scale to respond to disruption in that it addresses supply (volume and diversity) better than local; is more nimble and flexible than nationally and globally sourced food (even accounting for global supply chain 'substitution'); and effectively fosters relationships, communication and trust which are foundational for responding to change (disruption)" (Ruhf, 2015, p. 650). Just as important, a region's rural-urban connections and place-based interconnectedness of interests are uniquely well positioned to organize for resilience by more efficiently responding to disruption than either local or national scales can.

Diversity

In this discussion, we use a broad definition of diversity that incorporates ecological and biological diversity, social and economic diversity, and diversity in agriculture. The Michigan Good Food Charter (Colasanti et al., 2010) lists ways in which food systems should be as diverse as possible, including scales, products, production strategies, food producers, markets and ownership models, food access, and hunger relief resources. To that list should be added soils, climates, cultures, institutions, and biodiversity. Biodiversity in particular is beginning to matter a good deal in the face of climate change. Research around the world shows that biodiversity significantly contributes to resilience (FAO, 2019b) and that a combination of biodiversity-increasing strategies tends to produce less damage from hurricanes and droughts to diversified farms than to monoculture farms (Altieri et al., 2015; Mijatovic et al., 2012). On a regional scale, agricultural biodiversity involves farms growing and supporting a range of crops and species. At the farm level, crop diversity means farmers employing practices such as crop variety and rotation (Miller et al., 2013).

Two forms of diversity are important for resilience. Functional diversity is many different kinds of species in an ecosystem contributing to energy flow and nutrient cycling. At

the human level, it also encompasses the different sectors and professions that carry out processes that keep food systems functioning. Response diversity is the ability of a system to continue operating across a wide range of conditions to ensure the productivity of the system, a state often achieved by developing highly diverse systems of crops and animals (Lengnick, 2015).

With a broader than local geographic range, it is not surprising that a region's production base—especially if it crosses growing zones—offers more types of farms, soils, climates, and crops than smaller, local scales. This gives the advantage of mitigating acute disruption in any single area while increasing the overall sustainability of production. Greater diversity inherently provides a larger number of options and allows for more flexibility in responses; it supports the capacity for innovation in a complex dynamic system (Lengnick, 2015). In system terms, diversity should be accompanied by redundancy, a significant enabler of food security in the face of events such as floods, droughts, crop failures, and transportation slowdowns.

A region's production base… offers more types of farms, soils, climates, and crops than smaller, local scales.

Just as various sizes and types of stones are used to produce a firmer roadbed, multiple scales of farms, firms, markets, and infrastructures interact to build food system resilience. Ecological, economic, and population diversity can be nurtured to increase management options. Diversity supports economic health, with rural livelihoods and well-being strongly dependent on the diversity of ecosystems and the opportunities they provide (Paronson-Ensor & Saunders, 2011). It also spreads financial risk across enterprises on a farm (Lengnick, 2015) and across other nodes in the food supply chain. Diversity in multiple forms builds resiliency and better serves regional markets, with benefits at the farm management level as well as other places in a supply chain.

Sustainability

Agricultural sustainability is a complex, dynamic concept that is inherently political, as different groups differently emphasize each of its goals: meeting human food and fiber needs; enhancing environmental quality and the resource base; sustaining the economic viability of agriculture; and enhancing the quality of life of farmers, farmworkers, and society as a whole (Institute of Medicine, 2010). We believe that the same political principle applies more broadly to food system sustainability, that a particular meaning of sustainability is context-specific and should be clearly defined in any research or action project. Furthermore, sustainability should be measured not as a particular end state, but rather as a process that moves farming and food systems along a trajectory towards greater sustainability (Institute of Medicine, 2010).

The literature on sustainability at a regional level in the U.S. is sparse, but over 35 years ago Lowrance, Hendrix, and Odum (1986) offered an innovative way to incorporate different

concepts of sustainability by analyzing agriculture as a hierarchical system, as families of subsystems arranged in a hierarchical manner. They identified four subsystems—agronomic, ecological, microeconomic, and macroeconomic—and argued that agronomic constraints are most important at the field scale, microeconomic constraints are dominant at the farm scale, ecological constraints dominate at the watershed or landscape scales, and macroeconomic constraints are dominant at the regional and national scales.

An IOM panel in 2010 championed a landscape/regional approach to sustainability but was concerned that the data needed to develop it were sparse. The same year, Dale and colleagues argued that the principles and processes of human-managed emerging ecosystems needed to be better understood particularly at a regional scale, which may contain a mix of agriculture, forests, cities, and other land uses (Dale et al., 2010). They also examined the regional-scale effects of the emerging production of bioenergy, arguing that regional dimensions should get special attention as they had been often neglected despite having many effects on all aspects of sustainability. We believe that this is the case not just when considering bioenergy production but for any type of production in a region, and agree that management decisions should be made in hierarchical fashion, as prescribed by Lowrance, Hendrix and Odum (1986), which will facilitate developing management objectives for regional ecosystems.

Food systems contain many of the basic characteristics of ecosystems, such as food webs, energy flows, nutrient capacity cycles, and multiple geophysical and social drivers (Bene et al., 2018). Generally, disciplines have not merged their foci to study food system sustainability comprehensively, and thus have frequently failed to recognize it as a complex system with multiple feedbacks. In later chapters we discuss some of the challenges resulting from this failure.

Food needs and supply

Our examination of food needs and supply in a regional framework includes a review of the basic concepts of *food security* and *regional food self-reliance*, as well as a review of production capacity, including urban agriculture.

Food security and self-reliance

Determining the parameters and critical components of a food system at any scale traditionally has started with examining a population's food needs versus the available food supply. This is carried out by gauging the nutrient requirements of each individual in the targeted area that are satisfied through various dietary practices. Then, data sets and formulas are utilized to calculate the amounts of foods produced in the specified area. The comparison of needs to supply is one of the ways researchers can begin to analyze the "degree to which U.S. regions can satisfy the food needs of their resident populations" (Griffin et al., 2015, p. 1) and the extent to which the relationships between need and supply may indicate dimensions of food security. Food security is a term that over time has assumed multiple meanings that need to be

differentiated in order to conduct a comprehensive analysis of food systems. It was originally defined in 1974 as "availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and offset fluctuations in production and prices" (FAO, 2003, Ch. 2, p. 2). Between 1974 and 1996 thinking about the issue became more complex, leading to a modified definition: "food security, at the individual, household, national, regional and global levels [is achieved] when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO, 2003, Ch. 2, p. 2).

In 1990 a second meaning emerged that defined food security as access by low-income households and marginalized communities to an adequate and healthful diet (U.S. House of Representatives, 1990). This meaning became an important component of the concept of community food security (Anderson & Cook, 1999), "a condition in which all community residents obtain a safe, culturally acceptable, nutritionally adequate diet through a sustainable food system that maximizes community self-reliance and social justice" (Hamm & Bellows, 2003, p. 37).

A third meaning, household food security, was implemented in the 1995 Food Security Supplement to the Current Population Survey (NRC, 2006), which aimed to acquire information from households about their access to affordable food, food expenditures, and use of food and nutrition assistance programs (USDA-ERS, 2020a). The EFSNE project utilized these three definitions in its study of regional food security in the Northeast.

Compared with food security, self-reliance is a concept that considers the food needs of the population simultaneously with agricultural production. It is fairly easy to calculate dietary needs, although the calculation can be made more useful and complex by modeling a variety of diets—for example, vegetarian—and including cultural needs and preferences. The next step is calculating the number of acres of cropland and pasture, and the supplies of fresh- and saltwater seafood, that are required to produce the diet under present or future circumstances.

Self-reliance is a concept that considers the food needs of the population simultaneously with agricultural production.

We can draw on a number of studies that offer useful parameters about what portion of its food needs the Northeast region can supply. All point to a similar conclusion: because of its large population and relatively small agricultural land base, the region cannot meet large amounts of most of its food needs on current cropland and pasture. Early research on state food supplies was conducted throughout the 1980s in the Northeast states and one Western state (Haughton, 1982; Herrin & Gussow, 1989). Between 1981 and 1984, food systems studies were done in 26 states under the aegis of the Cornucopia Project of Rodale Press. The objectives were "to preserve farms and farmland, increase self-reliance, and develop secure food systems" (Cornucopia Project, 1981a, p. 2). The studies examined information and data sets on multiple food system components: acres of farmland, farm numbers, size,

ownership, debt, and inputs, the state of food industry sectors, and food availability. The intent was "to see how well states feed themselves, how much of their food money crosses their borders, how healthy their land is, and how prosperous their farmers are" (Cornucopia Project, 1984, p. 1). Each state report in the Cornucopia Project offered recommendations to state and local governments, farmers and consumers, the food industry, and the research community on how to increase self-reliance through various means such as farmland protection, sustainable farming practices, direct marketing, and programs and policies at the state and local level (Cornucopia Project, 1981b). Nine Northeast states were part of the exercise, and two-thirds of them were among the ten highest food importers in the country: Massachusetts (93% imported), Rhode Island (93%), New Jersey (86%), New York (77%), Delaware (74%), and Maine (73%). Vermont had the lowest score in the Northeast, at 42% imports (Cornucopia, 1984).

Thirty years later, the Enhancing Food Security in the Northeast (EFSNE) project researchers used a variety of methods to think more holistically about the region's present production and future production capacity that depend on the composition of the diet. For their regional self-reliance (RSR) analysis, the researchers calculated the baseline for current agricultural production in the region, and the relationship between food consumption and agricultural output in a general net balance way—the amount of food produced in a region compared to how much the population consumes. The baseline is not meant to imply that what was produced in the region was actually consumed in the region (Griffin et al., 2015, 2018), which is true for all the studies described in this section, since "little regional food production can be currently attributed to local food consumption" (Kremer & Schreuder, 2012, p. 183). When the EFSNE project calculated the percentages of regionally produced foods in the 11 supermarkets in the low-income locations in the study, the numbers ranged from 100% for fluid milk to 77% for apples, to 40% for potatoes and cabbage (Park et al., 2018).

The EFSNE production team calculated the Northeast RSR for apples at 81%, for potatoes 30%, for cabbage 105%, and for dairy 76% (fluid milk equivalent). Analyzing the carrying capacity— the maximum number of individuals that a given environment can sustain over time without destroying or degrading the environment (Rios, 2019)— of the Northeast, researchers determined the land requirements of 10 diet scenarios ranging from the current American diet to one in which 100% of the meat source is beef. The carrying capacity estimates, based on per capita dietary requirements and regional population, are that 28% of the population can be fed with product from within the region based on a lacto-ovo vegetarian diet; 23% with a vegan diet; 17% with the current diet; and 14% with a diet in which 100% of the meat in the diet is supplied by beef (Griffin et al., 2018).

In 2007, researchers investigating the same question in particular sub-regions reported that the New York land base could support about 20% of the state's population with a diet similar in meat content to the diet at the time (Peters et al., 2007). A 2009 study of

New York City's 200-mile radius foodshed attempted to determine how large the foodshed needed to be to provide 100% of the city's food needs. The boundary of the foodshed ranges from Boston to the District of Columbia. The analysis showed that all or parts of the food production of 10 states were required to meet New York City's demand (Conard & Ackerman, 2010).

At about the same time, the Greater Philadelphia 100-mile radius foodshed (70 counties in five states), was calculated to contain 60% of the crop and pasture land needed to feed the Greater Philadelphia population (Delaware Valley Regional Planning Commission, 2010). The first two studies calculated the land base requirements per capita utilizing a figure of 1.23 acres, while the Greater Philadelphia study utilized a land requirement figure of 0.4 acres, so the results are quite different. The assumptions behind the two calculations would need to be examined more closely in order to decide which offers the more accurate picture of the food needs of the region.

In a later Philadelphia study, Kremer and Schreuder (2012) analyzed three foodshed scenarios for the city itself, a 50-mile radius, and a 100-mile radius, using the current agricultural production in the region as the baseline. They estimated the dietary requirements utilizing current consumption as well as the aspirational Dietary Guidelines for Americans (DGA), and found that all the foodsheds could supply the fruit, vegetable, meat, and dairy requirements for the city's population, but not the larger region's demands. For all food groups the deficiencies in food production range from 143% in the current local foodshed (the 37-county area from which food flows to the city) to 342% in the 100-mile foodshed, indicating that "The quantity of food grown is not sufficient to provide the population of the region" (Kremer & Schreuder, 2012, p. 187). The steepest shortages are for fruits and vegetables. In the case of meat and poultry, a current consumption shortage exists in all the foodsheds (the city, the 50-mile and the 100-mile areas). Utilizing consumption measures based on the DGA results in a closer match between production and consumption requirements.

Looking across the studies, those done at the subregion scale support the findings of the regional research projects documenting the situation in the Northeast of a large urban population and a small arable land base. This is critical information that allows those working on local or regional food systems to understand the parameters of the food available to feed the population from each scale—local, regional, national, and global sources.

Other regions such as the Midwest and the West may be able to meet larger proportions of their food demands (Hu et al., 2011; Zumkher & Campbell, 2015). In 1989 Herrin and Gussow utilized data from Montana to explore "regional diets" and examine the feasibility of adopting more localized diets. They calculated the state's present and prior self-reliance for fresh fruits and vegetables and fluid milk, and estimated consumption of other commodities by assuming that the states' per capita food consumption data were the same as the national data. From these and other analyses they calculated that 66% of Montana's

food supply was imported in 1985 (Herrin & Gussow, 1989). A recent study (Kurtz et al., 2020) has modeled the biophysical capacity of U.S. regional food systems, taking into account agricultural land area, productivity, population, and seven diet scenarios from the present diet to a vegan diet. The researchers estimated foodshed sizes for 378 U.S. metropolitan centers when considering three land types: cultivated cropland, perennial forage cropland, and grazing land. Foodsheds were measured by the weighted average source distance of each diet for each metro area.

The larger foodsheds (greater than 500 kilometers or about 310 miles) predominated in the Northeast, along the Eastern Seaboard, and in the Southwest. The study also calculated that foodshed sizes would decrease if people ate fewer animal-based foods.

An estimate of the extent to which current and recommended fruit and vegetable consumption could be met at the national and regional levels was completed in 2020, concluding that all mainland U.S. regions could meet both current and recommended needs (McCarthy, 2021). However, this would require fully substituting other fruits for tropical and semi-tropical fruits, and the Northeast region would need to utilize 22% of current cropland to meet current intake and 42% to meet recommended intake. The amount of cropland currently used for produce production in the Northeast is 5%. Other regions have quite different results, especially the West and the Northwest, which could meet produce demand with much smaller percentages.

Finally, using Northeast examples, we share a typology that lays out six distinct roles that a multi-state region might play in supplying food (Peters et al., 2019). They are:

- A national production center (cabbage)
- A seasonally important supplier (blueberries)
- Regional production and distribution is the primary scale for supplying a food (fluid milk)
- The product occupies an agro-ecological niche (beef)
- A product is a co-product of another industry in the region (ground beef from culled dairy cows)
- A product is marketed explicitly as a regional product (maple syrup)

The typology helps to clarify the relationship of regional production to national and global production, and to understand the way the regional system works. Also, when crop and animal diversity is lost it is hard to replace and this lowers the functionality and resilience of a system. Seeing the different roles can also help to guide new investments in regional food production and supply chains.

Distinguishing the definitions of food security from self-reliance, as we have done here, is important to understand the complexity of regional food systems. Regional self-reliance refers to the percentage of the food demands of a region that can be met by its own production. Calculations of these percentages have been conducted for 40 years in the U.S. for particular foods and for whole diets. In general, studies show that the Northeast and its component states can support varying percentages of the population's needs, depending on the size of the target region, its major urban areas, the number of states involved, and the composition of the diets analyzed. An estimate of a reasonable self-reliance percentage is given in Chapter VII.

Urban and peri-urban agriculture and infrastructure

None of the above analyses include urban agriculture in their calculations. Urban agriculture initiatives are increasing, and they have a moderate but important role in supplying food for a region's urban populations. Two definitions of urban agriculture are in common use. Golden (2013) defines it as "production, beyond that which is strictly for home consumption or educational purposes, distribution, and marketing of food and other products within the cores of metro areas and their edges" (p. 1, adapted from American Planning Association, 2011). Examples of urban agriculture entities provided by the APA are community and other gardens that extend beyond home consumption and education, urban farms supplying farmers markets, community supported agriculture serving urban customers, and farms in nearby peri-urban areas (Golden, 2013). The second definition of urban agriculture focuses more narrowly on community, home, and market gardens located within urban areas and does not include production outside urban boundaries (Nogeire-McRae et al., 2018). This definition is more useful in pinpointing residents who are farmers and gardeners as well as those who experience the various benefits in their neighborhoods. Many studies have found both benefits and limitations of urban agriculture, but its impacts are still poorly understood (Nogeire-McRae et al., 2018).

Urban agriculture initiatives have a moderate but important role in supplying food for a region's urban populations.

Benefits of urban agriculture that have been identified in the U.S. include community building, youth engagement, neighborhood revitalization, increased property values, food education, green space preservation, and ecosystem services such as increased biodiversity, some reduced transportation costs, and water capture and re-utilization (Nogeire-McRae et al., 2018; Santo et al., 2016). Urban production does contribute to the particular food needs and preferences of urban immigrant communities and communities of color However, a number of studies of health and economic benefits show fewer positive findings. Nogeire-McRae et al. (2018) conclude that it is unclear whether urban agriculture provides economic or nutritional benefits to consumers. Among other variables, because the nutritional value and freshness of food depends on how it is handled between harvest and consumption, it is difficult to determine whether, in general, fresh foods produced locally are healthier (Bloom et al., 2018).

The edges of urban areas were not well defined until researchers from the EFSNE project developed a finer gradation of these areas by creating three categories of peri-urban zones between city and rural boundaries (Griffin et al., 2018). Based on the assumption that peri-urban is part of a continuous spectrum from urban core to urban periphery, the analyses of Saberi (2016) and Conard et al. (in Griffin et al., 2018) make it possible for urban and regional planners to work with more specific and realistic boundaries of urban food production and related infrastructure. The findings also reaffirm the importance of protecting peri-urban farmland as well as rural farmland.

The researchers identified three key characteristics of "unplanned and unmanaged" peri-urban areas: how they are zoned, the extent of commuting, and population density. They employed data sets incorporating these three fields from the contiguous counties around five cities. In an illustration of this methodology, the researchers mapped the residential and agricultural areas in the four counties surrounding Baltimore city and designated five zones based on the overlapping of the three characteristics. They discerned three distinct peri-urban zones: Zone 2 (heavy intensity of use), Zone 3 (medium intensity of use), and Zone 4 (low intensity of use). Zone 5 is the rural agricultural area. They then analyzed the distribution of businesses related to agricultural production, processing, wholesale, retail, and storage.

Figure VI A illustrates the distribution of the business categories across the peri-urban zones. The pie chart displays the distribution of the five supply-chain nodes across these zones. In the Baltimore area, more than 50% of agricultural businesses are in zones 2 to 4: production 51%, processing 61%, wholesale 64%, retail 56%, and storage 75% (Griffin et al., 2018).

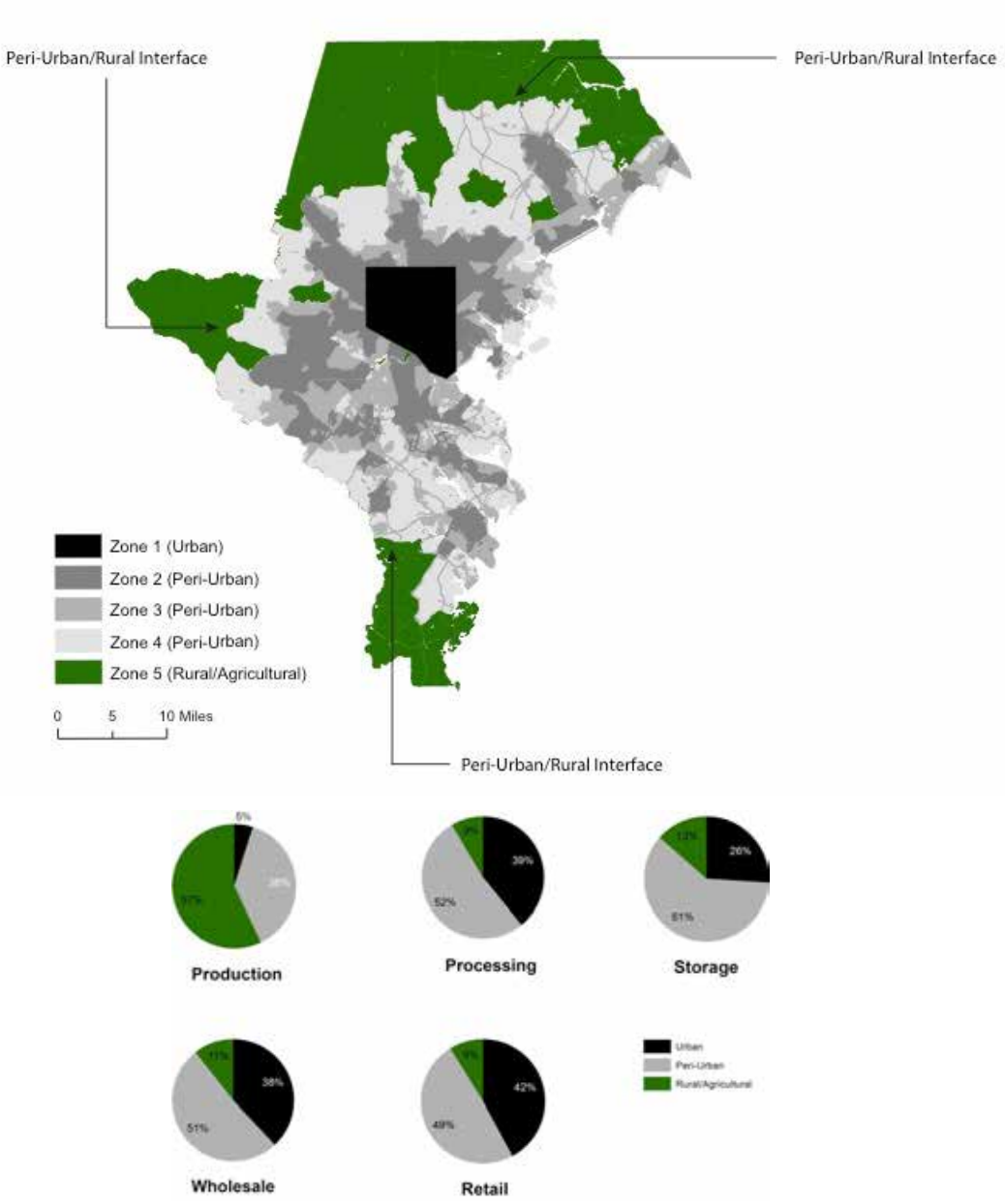

Figure VI A. Distribution of Business Categories in Peri-Urban Zones

From: Griffin et al., 2018 pp. 29-30

As interest increases in growing food in urban areas, land availability and urban supply-chain infrastructure are important elements of a more self-reliant and resilient regional food system. Several studies show that Cleveland could attain small levels of self-reliance of 4% to 18% by food weight (composed of produce, poultry and eggs, and honey) and 2% to 7% by food expenditures (Grewal & Grewal, 2012). Toronto could provide up to 10% of its fresh vegetable demand after significant program and policy changes that would increase access to production space, provide new physical infrastructure and resources for agriculture, integrate local production into the food supply chains, create systems for sharing knowledge, and create

new models for governance coordination and financing (MacRae et al., 2012). In 2013, the Urban Design Lab of Columbia University released a summary of analyses of 2007 data that calculated that there were approximately 5,000 acres of vacant land suitable for growing food in New York City's five boroughs. They determined that if all the acres were farmed they could supply the produce needs of between 103,000 and 160,000 people, equal to .01-.02 % of the population (Ackerman et al., 2013).

For the foreseeable future, food security in the Northeast will depend on local, regional, national, and global sources.

For the foreseeable future, food security in the Northeast will depend on local, regional, national, and global sources. Some local areas may be able to produce a larger volume of some food, but even with more extensive and/or intensive farming and enhanced urban agriculture, given the limitations of geography compared to population, only a few region-scale areas such as California and the Midwest will be able to produce the volume and variety of foods to make them fully self-reliant for their dietary needs. As populations grow, one of the obvious ways to expand volume and variety is to expand the geographic area from which food is sourced in a more sustainable way.

Natural resources

The long-term ability to sustain—and increase—the production of crops and livestock in the Northeast will depend on the commitment of all food system actors, including consumers, to preserve and protect the region's natural resource base. Dramatic and increasingly rapid effects of climate change place it first in our discussion of the natural resource sustainability dimension. We then address land use, farmland preservation, and water supply.

Climate and climate change

According to Lengnick (2015), "Agriculture is a complex biologically regulated system that is linked closely to climate" (p. 88). The current and predicted climate change challenges facing the Northeast that we discuss are based on the Third and Fourth National Climate Assessments conducted by the U.S. Global Change Research Program (USGCRP, 2014, 2018) describing the Northeast as the most heavily forested and densely populated U.S. region. The region is quite varied geographically across rural and urban areas and still has, at this point, four distinct seasons, which provide the economic and cultural foundations for many rural communities as well as connections between rural and urban areas (e.g., as suppliers of Christmas trees and pick-your-own blueberries). It has large expanses of interlinked ecologically and agriculturally important areas, and rich marine and freshwater fisheries (Horton et al., 2014; USGCRP, 2018). Climate change is expected to pose serious problems to these sectors in the Northeast through the largest increase in temperatures in the contiguous U.S. (USGCRP, 2018).

Climate change is not experienced in the same way across the U.S. because regional topography interacts with the global climate system to create regional patterns of climate change effects (Lengnick, 2015). Thus, "the directional effects (upward or downward) of climate change on agricultural production are likely to vary by crop and region" (Griffin et al., 2015, p. 8). The potential effects of climate change on major production centers in the West and Southeast, for example, could dramatically affect water availability, leading to declines in productivity. In turn, this would necessitate increased output in other regions such as the Northeast, or higher importation into certain regions.

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Since the 1990s, the Northeast has experienced a 70% increase in the frequency of extreme precipitation events—more than any other region in the country (USGCRP, 2018). The region will also experience more shifts in temperature, ocean acidification, storm surges, flooding, and erosion (USGCRP, 2018). Researchers state that climate variability may affect human migration patterns to and from the Northeast due to the effects of droughts and floods on farm viability and land uses, as well as migration between urban and rural areas because of temperature extremes and the vulnerability of infrastructure to storm damage (USGCRP, 2018). It is important to note that the impacts of climate change are uneven, with low-income people and communities of color bearing the brunt (Chavez & Lane, 2021).

Climate adaptations include:

- Careful site selection.
- New crop and variety selections, including varieties with longer growing seasons and with higher yields and/or drought and pest tolerance, and more perennial crops.
- Integrating animals into the farm.
- Practices that build soil organic matter, increase water-holding capacity, rely on more resilient varieties, and improve soil structure (these include cover crops and no-till systems).
- Regionally appropriate technologies such as heaters, wind protection tunnels, state-of-the-art irrigation systems, high tunnels, and changes in pruning strategies.
- Additional protections from heat stress on animals, such as structures.

Climate and crops. The Northeast region has a diverse climate with temperatures generally decreasing from south to north, with distance from the coast, and at higher elevations (USGCRP, 2014). Around the turn of the twenty-first century more variable temperatures, summer drought, and novel plant diseases began affecting production and led to crop losses in the region (Lengnick, 2015; Wolfe et al., 2018).

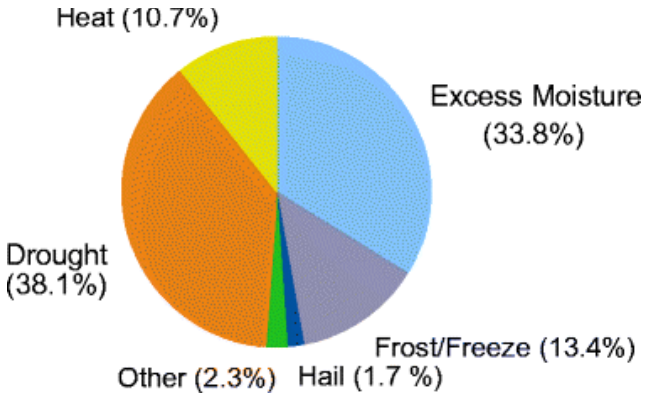

Figure VI B. Primary weather-related crop loss data reported to USDA-FSA, averaged across all crops for the Northeast, 2013–2016

Source: Wolfe et al., 2018.

Excessive rain causes crop losses, decreased yields, increased plant disease, soil erosion and compaction, and increased runoff of agricultural chemicals, manure, and sediment (see Figure VI B). It also delays plantings, which can result in a shorter growing season. It is predicted that increased temperatures will lead to longer frost-free periods, but this potential benefit could be offset by late planting problems because of prolonged spring rains (Wolfe et al., 2018). Also, there is greater flood risk from heavy rains, especially in valleys and in the region's southern coastal areas where sea levels are rising (USGCRP, 2018).

Despite the prediction that the Northeast will continue to have adequate water supplies, seasonal droughts are predicted during the summer months, and there may be insufficient water during growing seasons. Many of the most valuable tree crops in the Northeast are in danger because of heat stress that affects yields, and premature blooming followed by spring frost (Wolfe et al., 2018). Apple growers in New York state have already experienced significant losses from climate change (Newburger, 2019). Early blooming, severe winds, and hail and rain have destroyed many orchards, leading farmers to experiment with new breeds and capital-intensive technologies like wind machines, irrigation, trellising, and hail netting to adapt to and mitigate the adverse effects. Winter annual crops like wheat require exposure to low temperatures to shift to reproductive growth in the spring. But the number of cold days is changing dramatically, causing problems for many growers (Lengnick, 2015).

Climate and livestock. Hristrov et al. (2017) catalog the probable climate effects on livestock in the Northeast. Dairy products are the top commodity in the Northeast in terms of farm receipts (32%), so the emphasis is on dairy cattle. Increased temperatures and humidity are projected to decrease milk production, increase forage productivity (depending on the crop), and decrease the protein content of milk. Heat stress will also likely contribute to a consolidation of smaller dairy farms into fewer and larger farms as increased disease and lowered fertility increase costs. About half of Northeast field crops and pastures are for animal feed (USDA Climate Hubs, n.d.), so the planting problems discussed above will affect the viability of these farms.

Climate and fisheries. In general, warmer ocean temperatures, rising sea levels, and ocean acidification are threatening fishing and aquaculture through changes in marine ecosystems, increasing phytoplankton blooms and altering the timing of fish reproduction. Change can also affect the economic activity and social cohesion of fishing communities. Fish and seafood stocks are already moving northward, and species composition has changed substantially in some areas. The New England lobster fishery was negatively affected by increased sea temperatures in 2012—a harbinger of future problems, according to experts (USGCRP, 2018). Climate projections indicate that in the future the Northeast Continental Shelf will experience more warming than most marine ecosystems in the world, further affecting fisheries, species survival, and fisher livelihoods in the region (USGCRP, 2018).

Climate projections indicate that in the future the Northeast Continental Shelf will experience more warming than most marine ecosystems in the world.

Climate and other components of the supply chain. Little research on the effects of climate change has been conducted in a broader food systems context, i.e., beyond production. However, by 2011 food manufacturers were already reporting climate risks that were being managed, such as the availability of raw material supplies and more disruption and failures in distribution networks due to extreme weather events (Wong & Schuchard, 2011, in Lengnick, 2015). These put urban food supplies at risk (Miller et al., 2013). Highways, ports, railways, and bridges can be destroyed or severely damaged, often for long periods of time, by flooding, powerline destruction, and other causes. Food distribution by truck from wholesalers to retailers creates bottlenecks and an inefficient functioning of food supply chains; large city areas that are dependent on high volumes of imports are especially vulnerable (Miller et al., 2013).

Land and water

This section examines issues related to land: land use planning, the land base and land protection, and land access and tenure. Then water issues are briefly addressed. This report does not go into detail about the fisheries component of food systems. As noted in the introduction and Chapter IV, marine and freshwater fish and shellfish, including aquaculture, are important components of the Northeast's food system. Fisheries supply, supply chains,

environmental concerns, and fisher wellbeing are as critical to the food supply as their corollaries on land.

Farmland must be adequate, appropriate, and available to meet as much of a population's food needs as possible.

Land is the foundation of a food system, beginning with the quantity and quality of the land upon which any food supply is based. As previously noted, land must also be seen in the context of historic land theft and tenure inequities. Complemented by contributions from freshwater and marine fisheries and controlled-environment production (i.e., non-soil production based within enclosed growing structures), farmland must be adequate, appropriate, and available to meet as much of a population's food needs as possible. The Northeast has about 27.1 million acres of land in farms, about 6% of the U.S. total (USDA National Agricultural Statistics Service, 2017). The region benefits from a variety of land characteristics and—at present— sufficient water, leading to a wide range of farm scales, types, and products (refer to Chapter IV for details.) However, as noted previously and elaborated in the next chapter, the region's climate, soil and topography, and urbanization present limitations to food production.

By definition, a region will have a larger absolute land base than a local area for meeting a population's food production needs. But the extant agricultural land base has to be kept for—and in—production to prevent the loss of land to non-agricultural uses and to maximize self-reliance, which requires regional as well as local approaches. Including feed for meat, egg and dairy animals, most Northeastern productive land is used to produce human food (see Chapter IV). Given the carrying capacity of the region's diverse soils and topography, a wide variety of production makes sense, including non-food production. As a largely urbanized region, floriculture and nursery enterprises, for example, are sensible responses to market demand and smart strategies for farm viability. In this largely forested region, many farms include income-producing tree and woodland products. As "products," agri-tourism and on-farm education programs also help sustain many farms. How much of which products are produced, where, for what customers, and with what tradeoffs are reasonable and important topics for investigation.

Land protection and land base. Sustaining a productive regional land base is essential, including land for Indigenous hunting, fishing and gathering. So the question is asked, what is "enough" productive land? There is no simple answer, partly for the reasons discussed above, but it is well-established that as a nation—and particularly in the Northeast—productive farmland is being lost (Freedgood et al., 2020), and with it our capacity to improve regional self-reliance. The Northeast has nearly 25% of the U.S. population, but only about 3% of its cropland (Griffin et al., 2018). In New England, for example, six million acres in production a century ago have shrunk to less than two million—5% of the region's land base and less than a quarter of an acre per person (American Farmland Trust (AFT), 2017).

Despite significant farmland protection efforts, the 2017 Census of Agriculture reported a 2% drop nationally in farm acreage from the prior census, with the largest proportional decreases in five Northeast states (RI, CT, NH, ME, and MA; four of these had losses above 10%). Northeastern farmland has decreased by nearly 60% since 1929, compared to a 7% decline nationally, with New York and Pennsylvania accounting for the greatest net loss (Griffin et al., 2015).

In response to the urbanizing pressures of the last several decades, the Northeast has been a leader in farmland preservation, particularly in the purchase of development rights (PDR) to protect good quality farmland from development. More recent innovations to agricultural PDR programs, led by the Northeast, have augmented the basic protection objective with add-ons intended to secure future affordability, require active farming, and (with exceptions) limit the ownership of protected parcels to farmers.

According to AFT (2017), over 1,692,600 acres have been protected in the 12 Northeast states by public (state and local) Purchase of Agricultural Conservation Easement (PACE) programs, accounting for over 57% of U.S. acres protected by public programs. In addition to these governmental activities, the Northeast features an extremely active private land protection movement. With nearly 650 land trusts, the region accounts for almost 50% of land trusts in the nation. Of those, about 100 have protected over 425,000 acres of farmland through easements or fee purchase. AFT noted a 45% increase in protected farmland between 2012 and 2017, mainly through private fee and easement purchases, with 39% protected through donations (AFT, 2017). However, less than one-third of respondents to a national AFT survey of land trusts that prioritize farmland protection said that farm and ranch land account for more than half of their acquisitions (AFT, 2017). Only nine land trusts account for two-thirds of protected farm and ranch land. Of the top ten trusts holding agricultural easements, three are in the Northeast: Vermont Land Trust, Lancaster (PA) Farmland Trust, and Duchess (NY) Land Conservancy.

It has been argued that we must not only sustain and protect current productive farmland but also expand it to better meet regional food needs (e.g., Donahue et al., 2014). Strategies to reclaim land for production, although not all of these are considered best practices, include clearing trees, brush, and invasive plants, pushing back ingrown field edges, improving drainage, planting in buffers and other sensitive areas, and bringing marginal (poorer soils, slopes) land into more intensive production. For example, Connecticut has a state grant program to restore marginal and abandoned farmland (Connecticut Department of Agriculture, n.d.). The growing interest in expanding the production base by reclaiming or restoring productive land has met some controversy. With the caveats to be discussed in Chapter VII, some restoration and conversion initiatives, along with urban and peri-urban land use accommodations for food production, could advance regional food security, especially if, for reasons discussed above, decisions to reclaim and expand land for production are made at a regional level.

Land access. Farm access, tenure, and transfer and succession are top issues in every U.S. region, and every region has its unique approach to them. A resilient food system depends on the generational turnover of farms, the successful entry of new farmers, and adequate tenure security to care for the land and reap its rewards. The Northeast is attractive to young farmers, many of whom are drawn to direct markets and higher value, to growing diversified crops on smaller parcels in peri-urban areas for strategic business reasons, as well as to quality-of-life preferences. However, it is particularly challenging to enter farming in the Northeast because average farmland values are about four times the national average (USDA-NASS, 2018), with peri-urban acreage far higher due to strong competition from non-farm uses as well as from within the farming community.

An increasing number of organizations, in the Northeast as well as nationally, focus on land challenges such as improving affordability, helping farmers find suitable farm property, and negotiating leases. A range of opinion exists about land tenure and ownership. For some, private land ownership means power, and is crucial to wealth generation. Others advocate for "alternative," "community," "cooperative," or "common" ownership as opposed to individual "private" ownership, for shared rights, or to "decommodify" land entirely.

""Land justice" is essential to a social justice agenda in the food system. Discussions about land rights must take into account the perspectives, values and experiences of Black, Indigenous, and other exploited and displaced communities. While a 2020 U.S. Senate bill specifically addresses Black land inequities, Penniman (2018) suggests that as wholesale reparations from the federal government are unlikely, individuals, organizations and communities can take reparation actions themselves. Soul Fire Farm's reparations map (Soul Fire Farm, 2021) shows examples of these reparation actions, including several in the Northeast. About 13 farms have been given or leased to people of color as part of land reparations in recent years. Examples of organizations working on land access include Hudson Valley (NY) Farm Link Network, Southside Community Land Trust (RI), Land For Good (New England), Northeast Farmers of Color, Agrarian Trust, National Young Farmers Coalition, Renewing the Countryside (MN), NDN Collective, and California Farm Link.

"Land justice" is essential to a social justice agenda in the food system.

The obverse aspect of land access is farm transfer. Land held by aging farmers needs to stay in active farming to sustain the productive land base and enable the next generation to farm. Older farmers in every U.S. region face significant succession and transfer obstacles; few farmers have a succession plan in place, and many do not have a family or other identified successor. Nationally, about 25% of farm transfers are between unrelated parties (USDA-NASS, 2014), and the majority of farmland is acquired from a non-relative (USDA-ERS, 2013). Research by AFT and Land For Good showed that over 90% of New England and NY farmers do not have a young operator (defined in this instance as a farmer under 45) working with them (AFT, 2016), making succession particularly

challenging for them despite the apparent abundance of farm seekers who want to farm in the region.

Northeast farmers, like their counterparts in other regions, tend to use land owned by others. In fact, nationally, nearly 90% of farm landlords are not farmers. The percentage of tenancy is slightly lower in the Northeast than in other regions. Nationally, about 30% of operators rent some or all the land that they farm; in the Northeast, the average is about 27%, with an average 7% renting all their land (USDA-NASS, 2017a). Given the Northeast's limited and expensive land base, the region's non-farming landowners are a vital component of the region's food system. Advocates and service providers are reaching out to private as well as institutional and public land holders of all kinds and sizes of agriculturally capable properties in order to increase land availability and improve transactions. See, for example, Mary Buchanan's (2020) research on leasing institutional lands in Connecticut.

Water resources and management. As stated above, the Northeast will continue to have sufficient water supplies overall, although subject to unpredictable fluctuations and extreme events—a better scenario than for many other parts of the U.S. However, the number of watersheds where demand for potable water exceeds supply is expected to increase under most climate change scenarios (Tavernia et al., 2013; USGCRP, 2018). For example, the 2018 Northeast climate assessment reports that the New York City reservoir system shows high resilience and reliability, but this is not true for the primary water supply of Washington D.C., the Potomac River (USGCRP, 2018).

As discussed above, climate change will affect water resources in many ways. Higher temperatures will alter the timing and amount of stream flows; reduce snowpack, which impedes replenishment of groundwater; increase the frequency of short-term droughts in summer and fall; and increase the number of extremely hot days, which will in turn increase water demand substantially (Frumhoff et al., 2007). Most municipal and regional entities have developed water management plans with assistance from a number of government agencies (e.g., the Forest Service, the USGS, EPA), and nonprofit organizations (e.g., the Northeast-Midwest Institute, the Northeast Regional Climate Center). The National Integrated Drought Information System (NIDIS) has built a drought early warning system (DEWS) to understand water and drought impacts and how to prepare for and manage them (NIDIS, 2020). These efforts and many others like them will become even more complicated and necessary as climate change intensifies.

Economic development

In this section we explore the economic dimensions of more regionally focused food systems. We address economic impact analyses, food systems planning, regional supply chains, trade and commerce, workforce, business models and access to capital.

Economic development and regions

Economic development can be understood in several ways, and at scales from community to society. Because terminology and scale are critical to this report, we first look at some definitions. *Traditional economic development* refers to the process by which the economic well-being and quality of life of a target population (of any scale) are improved according to targeted goals and objectives. In his definition of economic development, Seidman refers to processes to apply human and other assets to improve economic well-being for a community or region (2005); in this report, community and region are distinguished as different scales.

Community development focuses on building a broad range of community assets (social, cultural, natural, and political capital), institutions, and capacity through community organizing. *Community economic development* is a synthesis of community development and economic development, often focused on underserved groups and communities. Community economic development actively elicits community involvement and engages local resources around, for example, poverty, housing, and/or jobs. These two concepts clearly function at the local, community scale. *Rural economic development*, also known as rural development, promotes economic wellbeing and quality of life for people in rural areas, without specific reference to scale.

Therefore, *regional economic development* means improving the economic, political, and social welfare of a region, however defined. Regional economic development evolved from the recognition that local communities are often inefficient in obtaining and deploying resources, and frequently wind up competing for the same scarce resources. It is well recognized by professionals that much economic development is already at a regional scale, for example, waste management, transportation infrastructure, utilities and factory siting, emergency and health services, and tourism. According to the International Economic Development Council (Welch, 2017), a major advantage of the regional approach to economic development is that communities can achieve more by pooling and leveraging resources, thus increasing coordination and exercising a stronger voice to maximize political influence. Crucially, successful regional economic development strategies link rural, suburban, and urban areas around sharing resources, marketing, creating businesses and job, attracting capital, and building capacity. Our contention is that food system development is implicit in all these dimensions.

Successful regional economic development strategies link rural, suburban, and urban areas.

Economic impact analyses

Much has been written about the economic impacts of "local foods" (e.g., Rahe et al., 2019; Rossi et al., 2017; Schmit et al., 2019; Shideler & Watson, 2019). Impact analyses depend on definitions, and just as the conflation of local and regional is confusing in boundary setting and research, such is also the case with impact research. For their analyses of the economic impact of local food, Low and Vogel (2011) used USDA Agricultural Resource Management

Survey (ARMS) data to analyze direct-to-consumer and intermediated (defined by the authors as direct-to-local grocer/restaurant/other retail) marketing channels as reported in the Census of Agriculture. How intermediated is defined is important to how the economic impact is calculated. Others studying the impact of local foods use foods produced within a geographic area as the definition regardless of how the product is marketed (Rossi et al., 2017).

Echoing concerns stated above, the conflation of local and regional leads to an important division between estimates of economic impact analyses in the research literature" (Rossi et al., 2017, p. 556). What is being measured? What are the offsets or opportunity costs (the benefits given up when choosing one alternative over another) in a larger, regional economy? Measuring impacts based only on local marketing methods may exclude the economic benefits of wholesale markets to a region's farms. Several studies, for example, measure the "imprint on economic activity, but not the net contribution to sales, income or employment to the area" (Rossi et al., 2017, p. 557). A group of economists and other researchers convened to "address the current state and future direction of economic analysis with regard to local and regional food systems" agreed that "without distinguishing local from regional, more nuanced and useful conclusions are not possible. Looking at local gains without considering the regionalized opportunity costs… produces conclusions disproportionate to net regional productivity gains" (Pirog, 2013, p. 1, 2–3).

A research study done at a regional scale avoided these problems. In 2010, Swenson investigated the potential for local produce production in six states in the Upper Midwest (Illinois, Indiana, Iowa, Michigan, Minnesota, and Wisconsin). In one part of this study, state boundaries were not a "delimiting factor" (Swenson, 2010, p. 4). Swenson estimated the potential farm-level sales that could be made from any county in the region to any metropolitan area within the region or within 150 miles of the region's boundaries that had a population of 250,000 or more. These assumptions were based on the presumption that local food production can be the most sensible and profitable when it is done "in relatively close proximity to dense urban demand" (2010, p. 1).

Swenson assessed the total economic value of fruit and vegetable production derived from complex models that include acreage and sales allocations, and other factors appropriate for each state based on demand. Of the 535 counties in the six states, 53% would have fewer than 250 acres of produce production, and 10% had the potential of utilizing 1,000 acres or more across the state. Over 57% of the counties would have gross farm sales under $1 million; 3.2% would reach sales over $5 million. Of the six states, Illinois would have the highest total sales because of its metropolitan population and high crop production score of fruits and vegetables. Iowa would have the lowest sales because of its less dense population and greater distance from metro areas. Swenson concluded that it was incumbent on land-grant universities and state agencies to "conduct farm level and regional level research that more adequately advises policy development so that scarce public resources are used wisely" (2011, p. 31).

Recently, researchers in New Hampshire, Vermont and Maine conducted a study similar to Swenson's in which they estimated the capacity of 40 counties in the three states to produce about 50 different vegetables and melons to meet consumption needs in the counties (Werner et al., 2019). What they did not do, as Swenson's study did, was focus on farmland acres across state lines, so in their calculations all production and consumption data were contained within one of the three states. The authors defined out-of-state producers as "local" if they were operating within 50 miles of where their products were sold. The results were that the highest county and state capacities for vegetable and melon production were in Maine, due to the large amounts of farmland per capita in a few counties, especially Aroostook, with the capacity to meet 60% of consumption needs. Vermont is next with capacities ranging from 30 to 50%, and New Hampshire has the lowest capacity, with several counties holding fairly small amounts of acreage per capita.

Local food systems (mainly direct markets) have generally been found to have limited economic importance.

Boys and Hughes (2013) utilized the perspective of regional economics on local food systems by evaluating the influence of location and distance on economic activity. They found that, as discussed earlier, local food systems (mainly direct markets) have generally been found to have limited economic importance. They noted that much of the research has not considered what sales are displaced by "local" sales and the effect this has on all partners, from farmers to retailers, and on economic returns. The authors also describe a number of mechanisms by which local food systems could foster economic growth which have not been confirmed yet. These include more research on the effects of efforts such as aggregation; whether one marketing channel encourages the development of other channels; is the demand high enough in an area to allow local food systems to be successful; and do they give a local area a competitive advantage in attracting talent to the area in order to gain greater economic returns.

Other activities related to local, and in a few cases regional, economic development include the Sacramento and Bay Area regions of California, which have developed food plans and carried out some activities at regional levels. The Sacramento Area Council of Governments (SACOG) is an association of local governments in the six-county Sacramento area that provides transportation planning and funding, and serves as a forum for regional issues. It calculated the potential economic impact of increased SNAP participation in the region (SACOG, 2016), and studied specialty crop clusters and their multiplier effects in the regional economy (MacEwan et al., 2016; SACOG, 2016). A Bay Area strategic plan produced by Sustainable Agriculture Education (SAGE) and the American Farmland Trust for the Association of Bay Area Governments Comprehensive Economic Development Strategy included the conduct of a "region-wide economic impact analysis for agricultural production and food sector industries to demonstrate direct and indirect economic contributions and set a baseline for measuring progress" (SAGE, 2017, p. 31). Some of these projects represent regionwide research and possible

institutional changes, but others appear mainly to be ways to allow people throughout the region working on food systems activities to keep each other informed of work being done at the local level.

The goal of *The Economics of Local Food Systems Toolkit* (USDA Agricultural Marketing Service, 2016, updated 2017) is to "guide and enhance the capacity of local organizations to make more deliberate and credible measurements of local and regional economic activity and ancillary benefits" (p. 1). The Toolkit and Jablonski and Thilmany McFadden (2019) refer to "local" and "community food systems," focusing on single community, or multi-county activities (only one of which is designated as regional) with two state-level examples (Maryland and Vermont). A website contains a number of examples of work undertaken with the Toolkit as a way to engage more local stakeholders in food planning (USDA-AMS, 2016); some of the strategies could be useful to those developing regional efforts.

Experts agree that the distinction between local and regional must be made in order to understand economic impacts. Yet there are few regional impact studies, and resources such as the LFS toolkit are needed at a regional scale. In general, research shows that there are expected significant differences among states in a region as to their produce production capacity, and that sales across state lines increase farmer incomes. Research also emphasizes the need to investigate opportunity costs and the displacement of sales in an area by local sales.

Experts agree that the distinction between local and regional must be made in order to understand economic impacts.

Food systems planning

As a professional discipline, planning includes topics such as land use, transportation, housing, economic growth (including industry and sometimes agriculture), energy, recreation, water, and environment. Themes of sustainability, growth management (smart growth), and regulation (e.g., zoning) run through most planning initiatives, many of which are done at the local level. Regional planning addresses land use, infrastructure and growth across an area larger than a single city or town. Sometimes regional planning covers several states or parts of states.

It has been more than 20 years since contemporary planners turned their attention to food systems (Clancy, 1992; 2003; Pothukuchi & Kaufman, 2000). The American Planning Association (APA) defines food system planning as "concerned with improving a community's food system," and a food system narrowly as "generally understood to be the chain of activities connecting food production, processing, distribution, consumption, and waste management," (APA, n.d., para. 1) although food systems have many components in addition to these that define supply chains. For Growing Food Connections, a USDA-funded project, food system planning is "a set of interconnected planning and policy activities that strengthen a *community's* [emphasis added] food system…wherein local and regional governments develop and implement policies…to address opportunities and challenges faced by the community's [emphasis added] food system" (Wills, 2017, para. 1–2).

Policy recommendations are to "support comprehensive food planning processes at the community and regional levels".

Regional planning agencies (RPA) are a fruitful arena for regional food systems work. RPAs are strategically valuable because they are sufficiently local in scope for community engagement while also spurring regional thinking and action. In the *APA Policy Guide on Community and Regional Food Planning*, two of seven policy recommendations to guide regional planner roles and activities are to "support comprehensive food planning processes at the community and regional levels" and "support strengthening the local and regional economy by promoting local and regional food systems" (APA, 2007, para. 6). At a substate regional level, RPAs work on regionalized services including collective purchasing, school districts, public health, waste, energy, climate, smart growth, economic development, and public works. Substate food planning initiatives are "critical to the success of a strong regional food system" (McCabe & Burke, 2013, p.560).

A 2021 review of 47 regional plans including comprehensive, development, sustainability and transportation plans examined the extent to which such plans addressed food equity beyond symptoms such as the dearth of supermarkets in low-income areas (Mui, et al., 2021). Employing six dimensions, the reviewers found that the plans were uneven in addressing food equity. The most frequently employed dimension was the cultural preferences for food (43%), and the least frequent was social equity in the food system (7.5 percent) (Mui et al., 2021.) They observed that "regional plans are not prioritizing issues that affect… marginalized groups within regional food systems" (p.7). They concluded that regional plans have fallen short in promoting food equity" but that a "regional framework can also offer solutions for food inequities (p. 2). The authors recommend that more regional plans "prioritize strategies that advance social equity in the food system" (p. 13).

In the Northeast one of the plans included in this survey was prepared by the Delaware Valley Regional Planning Commission which committed to working with food systems over 10 years ago (DVRPC, 2010). The Greater Philadelphia Food System Study encompassed its nine-county bi-state purview (Philadelphia and New Jersey) and 100-mile food shed consisting of 70 counties in five states. (Delaware, Maryland, New Jersey, New York and Pennsylvania). The staff and consultants analyzed agricultural resources, food distribution, the food economy, and conducted stakeholder interviews. It subsequently published a report that included multiple recommendations and policy reforms (DVRPC, 2010) but has not done more work in this area for a while. The Metropolitan Area Planning Commission (Massachusetts) (MAPC) worked with 13 Boston area communities on best practices for agricultural land use and food systems planning (MAPC, 2014). The Chicago region's metropolitan planning association developed a regional food plan that encompasses seven counties and over 280 communities (Cohen et al., 2017).

A region is a crucial unit of analysis for mapping land use and growth patterns and trends, assessing markets, and promoting smart-growth initiatives. Regional planning can

transcend understandable but often short-sighted, parochial advocacy. Although local land use decisions are important for getting community buy-in and identifying priority areas for preservation and agriculture economic development, as well as other important and often competing uses (e.g., housing, recreation, water supply), the most efficient siting of a processing facility or food hub might be across state borders. Given limited funding, saving the "last farm in town" might be less prudent in the long run than using such funds to protect larger or better-quality but less sentimentally attractive tracts, with some exceptions such as for an immigrant farming program. Furthermore, a regional approach can best address multi-community and multi-state priority areas or bioregions and develop comprehensive land use and economic development plans. Regional food systems planners can integrate local interests, even across state lines, to assess the overall best location for a wholesale distribution center, for example.

Nearly 20 years ago, experts at a conference on regional economic policy were arguing strongly that policymakers should encourage more regional partnering among rural firms, communities, and governments (Drabenstott & Sheaff, 2002). A regional development approach was touted as the logical way to achieve synergies across sectors; it was asserted that regions could be self-defined as economic regions or natural resource or cultural regions that share strong common interests. At the conference, regional entities such as the Appalachian Regional Commission (ARC) and Upper Great Lakes Commission, the Delta Authority, and the Four Corners Region were acknowledged as excellent examples of partnering and regional collaboration (Drabenstott & Sheaff, 2002). The report *Strengthening Economic Resilience in Appalachia* (ARC, 2019) offers a number of sets of best practices: use a systems approach to develop a long-term vision and foster regional collaboration; develop networks of communities, both local and regional; look across regions to determine what levers can grow economic resilience; and connect to regional markets for sales of products and services. Another planning project in the Appalachian region, also sponsored by the ARC, includes parts of 13 states and focuses on strengthening local and regional food economies (Karen Karp & Partners, 2021). Pertinent to our report, descriptions of this project include both local and regional features, but the terms are not distinguished from each other.

Creative planning projects have inspired locales and states to think, plan and regulate around food systems. A number of states, including Massachusetts, Vermont, Maryland, and Maine in the Northeast, have developed some version of a state food plan, charter, strategy, or "map." State political boundaries define the geographic limits of these plans; they do not consider the larger regional context.

Several multi-state food system assessments or studies are noteworthy in their embrace of regionalism, but they are not food plans. These include the Greater Philadelphia Food System Study conducted by the Delaware Valley Regional Planning Commission (DVRPC, 2010) discussed above; Food Solutions New England (Donahue et al., 2014) that presents a "vision" for six abutting states and embraces regional thinking with activity areas in networking,

regional policy coordination, equity leadership development and communications; and the report *Good Food for All: An Assessment of Food System Efforts in the Chesapeake Foodshed* that takes initial "landscape analysis" steps toward building "an equitable, sustainable, and thriving regional food economy in the Chesapeake Bay watershed" (Arabella Advisors, 2016, p. 1).

Regional supply chains

A thriving regional food system should comprise multiple market options for farms of all sizes, including local markets as well as broader regional supply chains and access to national and export markets. This would provide farmers with more market opportunities that play out through various supply chain structures, as well as provide more product for a region's population.

In emphasizing the importance of new supply chain approaches to rural development, Marsden and his colleagues in Great Britain (2002) touted the benefits of short food supply chains that "short circuit" (p. 426) long and complex industrial chains. Short food supply chains (SFSC) circumvent long chains not necessarily by lessening the number of times the food is handled or the distance it travels (Marsden et al., 2002; Park et al., 2018), but by embedding information about the production on its label. Marsden, Banks and Bristow identified three main types of alternative chains:

1. **Face-to-face**: personal interactions, such as farmers' markets or farm stands;

2. **Spatial proximity**: consumers are aware of local or regional origin at point of sale, such as by signs in supermarkets; and

3. **Spatially extended**: value about the product and place of production is translated to consumers outside the region (for example, Vidalia onions) by providing information on the label about the production location and information sought by consumers.

However, later iterations of thinking about SFSCs in Europe focus more on local and direct markets perceived as consumer-producer partnerships (e.g., CSAs), on-farm direct sales, and off-farm direct sales, or with minimum intermediaries (Holloway & Kneafsey, 2017). In fact, EU regulations now stipulate that SFSCs only refer to chains with no more than one intermediary (Kneafsey, 2017). In our report, "spatial proximity" and "spatially extended" refer to regional activities.

In a regional food system, consumers will not always "know their farmer" face-to-face. They may purchase products that they recognize, that is, in a spatially proximate manner. However, a product can "be relationally or culturally meaningful to the consumer" (Clark et al., 2020, p.12) and not be spatially proximate. A regional food system is based in "place," as is a local food system, but place is conceived more broadly, as we discussed in Chapter II. Products may be differentiated and may receive a premium associated with place-based branding that

plays to the competitive advantages of a locale, as well as for specific product attributes, such as grass-fed, integrated pest management (IPM), and organic. Boys and Hughes (2013) assert that scaling up often will require more processing and shipping: "Under what situations do local food systems (businesses) have the potential to evolve into larger, more processing-oriented and/or export-oriented efforts with strong branding campaigns?" (p. 149). Place-based branding can apply to various geographic areas and scales, from the very local to multiple states: for example, Lancaster County, New England, or the Great Lakes. However, even if food from regional supply chains is not identified as such, supply chain players may benefit (e.g., through increased supply, dependability) from these arrangements.

Central to regional thinking and regional food systems are the key characteristics of scale and volume. Regionally focused supply chains offer not only greater volume of products than local; they are also economic engines for mid-size farms. Within the overall structure of U.S. agriculture, mid-size farms are the most threatened sector of producers (Agriculture of the Middle, n.d.). Farms "of the middle" don't fit most direct markets due to their higher volumes or types of products and yet are too small to compete in global commodity markets. In all regions, these farms, generally defined as having a gross cash farm income of $350,000-$999,999 (USDA-ERS, 2018), are failing in greater numbers than the very small and very large farms. There were fewer midsize farms in 2017 than in 2012 (USDA-NASS, 2019). They now make up 5.3% of U.S. farms, 21.5% of farm production, and 22.6% of land operated as farms (Whitt, et al. 2020). Considered the "heart of American agriculture," these farms and enterprises are under the greatest threat (Kirschenmann et al., 2004).

Farms of the middle provide critical economic and cultural contributions to many rural and peri-urban communities and "represent a key component in maintaining a diverse, decentralized, and resilient structure of agriculture" (Stevenson, et al., 2014, p. 4). Values-based supply chains (VBSC) are another approach to region-scale marketing that arose in reaction to the plight of midscale farms and other supply-chain actors. VBSCs provide marketing options at a regional level for mid-scale producers and support certain environmental, economic, and social values that are attached

Supply chain terminology

Supply chain: The sequence of processes involved in the production and distribution of a commodity.

Food supply chain: Simply put, a supply chain for food.

Value chain: Comprises all the business activities that add value to a product in the market. (O'Byrne, n.d.).

Value-added: Refers to changes made along a supply chain that add value to a product at each step such as turning wheat into bread, packaging, delivery to stores or the characteristics of a product that enhance its value to the consumer (such as organic, antibiotic-free).

Values-based supply chain: Describes a business model that places values associated with the business relationships within the supply chain (such as strategic partnerships that feature high levels of trust and transparency) (Stevenson & Pirog, 2013).

to the identity of the producer and/or production practices, and that carry through the entire chain (Lev et al., 2015; Ostrom et al., 2017; Stevenson & Pirog, 2008). The goals of VBSCs are to provide greater economic stability for producers and others along a supply chain (Hardesty et al., 2014), provide high quality regional food to consumers (Feenstra & Hardesty, 2016), and foster the development of regional food systems and rural economies (Hardesty et al., 2014). Mid-sized farms are uniquely positioned to participate in VBSCs and significantly contribute to regional food supplies.

A Northeast Sustainable Agriculture Working Group (NESAWG) study of Northeast value chains researched 35 entities that connected to at least two other supply chain "links" (i.e. not direct to consumer) and handled significant volume (Clancy & Ruhf, 2010). These entities performed multiple functions, mainly as distributors or processors. About half the cases were described as "hybrid"—they combined alternative (for example, "local" or values-based) and mainstream (national and international) businesses. A hybrid model appears to be "a pragmatic way to deal with the lack of food supply infrastructure in many places" (Clancy & Ruhf, 2010, p. 10) and to scale up value-added products to enter larger markets (Clark et al., 2020).

Local food systems are assumed to benefit farmers by cutting out the middleman. However, cutting out a local middleman can limit market access and diminish the local multiplier effect, as well as greatly increase the workload of producers (King et al., 2010). Farms that participate in both direct and intermediated—defined as a supply chain that reaches consumers through one or more intermediaries (King et al., 2014)—marketing channels reported higher rates of profitability, indicating that this marketing strategy may be more reliable for farms of any scale (Shideler et al., 2018) and may produce greater economic returns to a wider geographic area. Clark and Inwood (2016) argue that midsized producers, especially those using sustainable farming methods, may particularly benefit from access to regional distributors, markets and supply chains, and other regional efficiencies. As metro regions continue to grow, the need for regional food supply chains to organize around midsize businesses and startup food entrepreneurs will increase. The typology above, described by Peters et al. (2019), can help producers and supply chain partners understand the options available to them.

A study of foodservice management companies (FSMC) that supply institutions in fields such as education and health care showed that their buying patterns have a tremendous impact on the food system, especially in the Northeast with its abundance of such institutions. According to a Farm to Institution New England report on FSMCs (Obadia, 2015), there are over 200 such entities in the U.S. FSMC demand for regional foods can encourage farmers to increase their acreages, enter into longer supply chain arrangements, and initiate new food enterprises. In fact, several FSMCs are integrating—and touting—local and regional suppliers into their purchasing profiles (Obadia, 2015). Furthermore, some retailers have started to use the term 'regional' in labeling their fresh produce to more transparently identify foods that are clearly at a further distance beyond what consumers would consider 'local' (Palmer et al., 2017).

Trade and commerce

Regional food economies also include trade, the importing and exporting of products across domestic regions and globally. Trade is critical for utilizing the production advantages of certain states: for example, of milk production in Vermont, which far exceeds the state population's need, 73% is exported (Timmons et al., 2008). Furthermore, EFSNE researchers determined that fluid milk is already a strongly regionalized commodity in the Northeast (Nicholson et al., 2015), supported in large part by migrant farmworkers (Mares, 2019). As pointed out earlier, few areas can be self-sufficient, so trade, including national and to some extent global, must bring many products into the Northeast, which is able to support a smaller percentage of its food needs than other regions. Interregional trade can enhance a region's agri-food economy while meeting its population's food needs.

At the present time two phenomena bear close scrutiny. First, some foods that states produce go out of the state, while the same food is imported into the state (for example, apples in New York). Second, many foods that can be grown in many places, and in some cases were grown, are not currently grown there (for example, fresh broccoli and cabbage). The major reason is that processors moved out of the region and purchased commodities from producers closer to the new facilities. For many years, people in the Northeast have discussed import substitution, a strategy that replaces some agricultural imports to encourage more local or regional production for local or regional consumption and exploring it further would be useful. However, there are limits to the volume of import substitution and good reasons to export.

On the other hand, "while it may be in a region's interest to promote import substitution, if all regions do this, they could be collectively worse off, as this would imply that they would no longer have markets for food products that they export out of the region" (Pirog, 2013, p. 2). To the extent that import substitution is feasible, "regional income enhancements associated with local food growth would come at the expense of production and realized incomes elsewhere" (Swenson, 2011, p. 2). The key is to strike a balance.

While it may be in a region's interest to promote import substitution, if all regions do this, they could be collectively worse off.

Another example of enhanced regional production is a model developed by Yeh et al. (2017) to determine the optimal locations and seasons for increased production of fresh cabbage. According to the model, New York in the fall season would be the optimal supply location/season for acreage expansion. About half of the additional demand for cabbage in the Northeast could be met in this scenario, and New York could supply cabbage to other regions in the fall.

Regional food systems may offer unique opportunities to promote domestic fair trade (DFT). According to the Center for Integrated Agricultural Systems at the University of Wisconsin-Madison, "indicators of success for regional food production include labor availability, fair working conditions and adequate income for all who move food from field to market, particularly hired labor" (2014, para 1). DFT adapts the principles of

international fair trade, such as rights and fair treatment of labor (wages, safety), equality and opportunity, Indigenous peoples' rights, and fair pricing, to the domestic regional and local economic spheres (Domestic Fair Trade Association, n.d.). Research into regionally focused values-based supply chains has shown that many in fact do incorporate DFT principles [DFTA], n.d.). The Vermont-based, worker-driven Milk With Dignity (MD) Program of Migrant Justice commits to MD standards for the human rights of farmworkers in participating dairy supply chains.

Domestic trade is ultimately governed by the Commerce Clause of the U.S. Constitution. As inferred from the Commerce Clause, the Dormant Commerce Clause Doctrine (DCCD) rules that states may not enact legislation that interferes with interstate commerce. In the food systems arena, the DCCD has been used to invalidate discriminatory taxes and other mechanisms that privilege "local agriculture" over products from out of state. From the perspective of the orthodox local food movement, the DCCD undermines states' ability to support "local" farmers and food businesses. Several Supreme Court cases have used the DCCD to thwart states' efforts to favor local food production, processing, and distribution (Erchull, 2014). It has been argued that the standards used by the courts involving the DCCD and food have been applied more rigorously than in other industry sectors, and with "unpredictable results" (Erchull, 2014, p. 384). From the regional perspective, in disallowing geographic preference the DCCD in fact supports regional (across state lines) food buying and selling.

Workforce and labor

The food system workforce consists of a wide range of positions, including farmers and farmworkers, processing facility line workers, fisher folk, chefs and restaurant workers, cafeteria workers, and grocery store clerks. Allied workforce members include food safety inspectors, truck drivers, and production input suppliers. The National Association of State Departments of Agriculture predicts that given the aging workforce, more than 5.35 million jobs will need to be filled in agri-food sectors (NASDA, 2021). According to the Food Chain Workers Alliance, over 21 million people work in the U.S. food system; at 14% of the nation's workforce, this makes it the "largest employment sector in the country" (FCWA, 2016, p. 1). The food system sector grew 13% from 2010 to 2016. The subsectors that FCWA includes in food system work are agriculture, food processing, transportation and distribution, retail, and food service/restaurants. In 2008 food service workers totaled 6 million nationally (Henderson & Spula, 2011). In the most recent analyses of employment and the employment growth rate in the food manufacturing and processing sector in the Northeast between 1998 and 2016, the largest numbers of jobs were in Pennsylvania (53,000), New York (40,000), and New Jersey (24,355). The highest growth rates occurred in New York, Vermont, and New Hampshire. Several of the 12 Northeast states suffered

Given the aging workforce, more than 5.35 million jobs will need to be filled in agri-food sectors.

declines in this sector, with the greatest in West Virginia (a 2.57% decrease) (U.S. Cluster Mapping Project, 2018a).

The agricultural workforce is largely composed of self-employed farm operators and their (often unpaid) family members and hired workers. A recent report on farm labor provides an update on the U.S. agriculture workforce (USDA-ERS, 2020). In 2019 there were 1.18 million hired farmworkers. About 83% of hired workers are laborers, and 17% are managers and supervisors. About 75% of hired farmworkers are immigrants, and about half of those are unauthorized (Farmworker Justice, 2019). Data are hard to interpret, as some sources such as the U.S. Department of Labor's National Agricultural Workers Survey do not include dairy, poultry, and livestock workers or those holding H-2A guest worker visas (Farmworker Justice, 2019).

In the 12 Northeast states, there are approximately 223,000 hired farmworkers (U.S. Census of Agriculture, 2017) although the "exact number is difficult to determine since most N.E. [Northeast] farm work is seasonal …and workers may move from farm to farm" (Henderson & Spula, 2011). An important exception to this is workers on dairy farms. This is roughly 9% of the 2.4 million hired farmworkers in the U.S. As many as 70% of farmworkers on the larger Northeast farms may have been undocumented 10 years ago (Henderson & Spula, 2011, p. 4). Less than 20% were "migrant," meaning that they traveled at least 75 miles to obtain a farm job. The seasonal nature of work on Northeast farms (except for dairy farms) makes it less attractive or feasible for migrants to maintain steady employment.

The types and enterprise scales of farmers in the workforce are of particular relevance to regional food system economic development. With the nationwide population of aging farmers, bringing the next generation of producers of all scales into the workforce is critical in all regions. As noted earlier in this report, many new farmers are attracted to the direct markets available throughout the Northeast region, as well as in other highly developed areas. Despite the attraction, and the significant contributions of direct marketing to producers and consumers alike, direct-to-consumer sales in the Northeast are a very small part (about 1-3%) of total agricultural sales. In fact, some point out that direct sales have declined (O'Hara & Benson, 2019). CSA subscriptions are falling off, along with a noticeable "downturn of customers at farmers' markets" (Furbish, 2018, para 21). (The long-term impacts of the COVID-19 pandemic on direct-to-consumer and other markets remain to be seen.)

The types and enterprise scales of farmers in the workforce are of particular relevance to regional food system economic development.

Stagnant and downward trends in direct-to-consumer sales may reflect an increase in local food available through conventional wholesale and intermediated regional supply chains. Established farmers should inform entering farmers about market options, operation scale, and location. If they seriously intend to farm viably, they may need to build operations that are not solely, or at all, reliant on direct markets. While we affirm that local-to-consumer

transactions are important, larger volumes through wholesale supply chains are by far the bulk of agricultural sales, and what are needed to build regional self-reliance.

Business models

Long-standing as well as new business models can help promote regional economic development and assist food supply chain members in developing stronger collaborations in the food arena. One of the newer models is values-based supply chains, described above. Three others are described here.

Business clusters. Business clusters are concentrations of firms and institutions, specialized suppliers, and related industries "in a particular field that compete but also cooperate in producing similar products" (Porter, 2000, in Boys & Hughes, 2013, p. 15). They generally develop due to unique local historical or geographical factors. Participating firms are in relative proximity, compete in similar markets, but also cooperate to enhance their technical skills and market access. They also support the growth and development of new businesses and work together to respond to new market needs.

The agri-food business cluster model (Goetz et al., 2004) involves existing and potential synergies. Clusters have been formed around traditional commodities (e.g., dairy, wine), agricultural practices (e.g., organic farming), and social and ethical networks (e.g., women, Latino).There are several regional clusters of food businesses in the Northeast, in the Harrisburg PA, Boston MA, Burlington VT, New York City, and Washington DC regions, several of which cross state lines (US Cluster Mapping Project, 2018b)). Clusters can be "important for regional development, competitiveness, and innovation" (Brasier et al., 2007, p. 3), but Hughes and Boys (2015) note that forming clusters in rural areas is difficult. In 2014 researchers at Colorado State University described the emergence of an agricultural innovation cluster in the Colorado Front Range (17 counties in the southern portion of the Rocky Mountains containing most of the major cities in the state (Chriestenson & Thilmany, 2020). The study aimed "to consider overlapping interests across the entire integrated value chain of agriculture" (Graff et al., 2014, p. i.) and explored many of the assets already in place, identified the main categories of businesses where innovations were occurring, and recommended steps to encourage the growth of the cluster.

Horizontal collaborative networks. A horizontal collaborative network business model is built on network theory. Involving small and medium-sized enterprises (SMEs), this model is advantageous to regions and has been the subject of a great deal of study in the last two decades. The networks are similar to agri-food business clusters in the exchange of knowledge and increased innovation, but more strongly feature the development of network perspectives in which collaborative, innovative products are representations of both individual SME goals and the network goals (Brekken et al., 2018). Innovation may be in the extension of present markets or services, or in the development of products for new markets. The networks illustrate a cooperative spirit in that new products represent both the individual

enterprise's goals and those of the network. There are useful instances from Europe (e.g., dairy networks in Ireland and Scotland) and the U.S. (a cheese network in Wisconsin) that demonstrate the importance of assistance from regional governance agencies in their development ((McAdam, et al., 2016).

There are useful instances [of horizontal collaborative networks] that demonstrate the importance of assistance from regional governance agencies in their development.

Regional food networks. Regional food networks (RFNs) can be informal or formal networks of economic development, public health, nonprofit, local government, and other organizations that develop targeted regional food-related priorities. The informal networks help communities and organizations to better align programs and contribute to common goals across the state or region (Community Food Strategies, 2016a, b). Examples are the Regional Food System Working Group of Iowa, which has been functioning since 2003 (Iowa State University n.d.), and Community Food Strategies which supports and develops food councils throughout North Carolina, some of which are organized at a regional level (2022). A more formal use of the RFN concept is to describe local and midsized food system efforts that encompass a larger land base, broader natural resources, more diverse production capacity, and larger markets than local food systems (Brekken et al., 2018).

The RFN concept is built on work related to regional horizontal networks in Europe and the U.S. (McAdam et al., 2016), agriculture of the middle principles (Lyson et al., 2008), and many of the elements described in the original Ruhf and Clancy paper (2010). An integrated RFN refers to the connectedness of the supply chain actors consisting of consumers, multiple other actors that interact with a supply chain, and the natural environment that reacts to farming practices. Feedback loops occur between all parts of the system. In Oregon, the RFN concept has been studied within a framework called the New Natural Resource Economy that "recognizes the importance of very small community focused, multifunctional businesses that create new markets and products with an emphasis on environmental stewardship" (Duncan et al., 2018, p. 1).

Access to capital and related support

Multiple programs and initiatives have developed over the past 30 years to improve access to financial capital and related support for "sustainable" farmers, distributors, and other members of food supply chains. Although an RSF Foundation Social Finance report states that "sustainable food systems are inherently regional" (Foley et al., 2012, p. 28), most such capital and assistance are directed to small farms and businesses at the local level. In the literature on access to capital, lending, equity financing, government and philanthropic grants, and non-traditional funding schemes are sometimes undifferentiated. Further, local and regional are often conflated. These two factors make some projects and survey findings ambiguous. However, we have identified several programs and reports that address the

regional scale. In Chapter VII we describe challenges in food systems funding and where there appears to be the most need for lenders, investors, grant providers, and others to step up their activities to support regional food systems.

Small and midsize farmers along with local and regional supply chain players express similar needs for capital and related support such as financial technical assistance, business planning, and entrepreneurship training (Brannen & Simons, 2014; Foley et al., 2012). The greatest need identified for midsize farms is for capital for farm infrastructure and regional supply chain development (Oregon Cascade West Council of Governments, 2016). Other identified needs are for business development incentives such as grants and low-interest loans (Joannides et al., 2013; and Foley et al., 2012), and capital to purchase or lease land (Foley et al., 2012). Most conventional funding sources such as banks have been reluctant to lend to less conventional agri-food businesses because they are unfamiliar to them or consider them too small or too risky (Brannen & Simons, 2014; Joannides et al., 2013; Phillips & Wallace, 2017; Storton & Astone, 2019). Farmers and agri-food entrepreneurs from marginalized communities also have particular needs for capital, given discriminatory lending practices

Most conventional funding sources such as banks have been reluctant to lend to less conventional agri-food businesses.

Technical assistance and training gaps have been acknowledged by investors and other funders (Brannen & Simons, 2014). Many entities have tried to fill these significant needs for capital and assistance with different types of loans, grants, and other financial instruments targeted to supply chain participants, along with funding for organizations that provide assistance to farm and food businesses (Foley et al., 2012). Financing tools for food systems initiatives include both conventional and innovative, nontraditional methods. Conventional approaches include government and philanthropic grants. Most government agri-food grants come from the USDA (e.g., Rural Business Development, Regional Food Systems Partnerships, and Value- Added Producer Grants [now part of the Local Agriculture Market Program]). The Council of Development Finance Agencies lists several financing tools and case studies providing assistance to small and mid-size farms at local and regional scales (Rittner, Rowland & Miller, 2019). Private foundations have contributed substantial amounts to local and regional food systems development. A second category is composed of loans and loan guarantees from commercial and community banks, government (e.g., Business and Industry Guaranteed Loans, and FSA operating and real estate loans), and the Farm Credit network of independent lending cooperatives. The third major category is investment capital, including early-stage funding such as seed capital, angel investing, venture capital, and so-called patient capital and social (also known as socially responsible) investing (e.g., RSF Social Finance).

There are also newer, creative methods of deploying capital, such as impact investing by the non-grantmaking side of foundations. In addition, there are entities that combine

multiple sources, such as grants and investment capital, in their operations. Crowdfunding should be mentioned for its potential to spur innovation at the regional level. In investment crowdfunding, businesses sell ownership stakes online to unaccredited individuals in the form of equity or debt, a tool that became possible due to the 2013 JOBS Act. Another crowdfunding tool is donation- based funding, where donors contribute to a total amount for a new project without the expectation of a return, except perhaps a token good or service.

Crowdfunding should be mentioned for its potential to spur innovation at the regional level.

Notwithstanding the dearth of sources of financial capital and related assistance for region-scale food system projects, we identified types and examples of entities that support the development of regional food systems across the U.S. The majority are located in the Northeast and Pacific Northwest, perhaps because there are more philanthropic funders working in this arena in these regions. It is significant that several of these entities employ a hybrid approach—multiple forms of capital under one entity. This may be a particularly fruitful structure for regional work.

- Government grants and loan programs (also at federal and state levels). These include USDA agencies (Agricultural Marketing Service, Rural Development, Farm Services Agency and the National Institute of Food and Agriculture); the Economic Development Administration; state departments of agriculture; and specifically regional sources (e.g., the Appalachian Regional Commission).

- Private foundations, many of which are part of Sustainable Agriculture and Food System Funders (SAFSF), an affinity group for philanthropic grant-makers and mission-based investors such as private, community, and corporate foundations, government agencies, investment entities, and individual donors and investors.

- The Cascadian Foodshed Financing Project, a collaboration of foundations, nongovernmental organizations, and individual impact investors with the goal of growing the Pacific Northwest regional food economy.

- Development finance agencies, public or quasi-public/private entities that support economic development through direct and indirect financing programs. Some have the authority to provide development finance programs across multijurisdictional boundaries. An example is the Michigan Good Food Fund, a revolving loan fund that specifically funds regional supply chains.

- Managed funds such as the PVGrows Investment Fund, which provides financing and technical assistance to farm and food businesses in western Massachusetts. The fund pools three types of investments: community (nonaccredited) investors, patient capital (accredited and other qualified investors), and risk capital, funded by foundations.

- Thread Fund in the Pacific Northwest, whose goal is "a viable network of regionally-based enterprises that succeed by supporting each other's businesses and values-based goals" (Thread Fund, 2019, para.3) by deploying financial and philanthropic capital.

- Private equity companies such as Iroquois Valley Farms, a real estate investment trust, which is a corporation that pools shareholders' socially responsible investments to purchase farmland which is then leased to farmers. The purpose of IVF is to encourage organic farming, mainly in the Midwest, but it has invested in farms in 14 states, including several in the Northeast.

- Slow Money Institute is an umbrella nonprofit organization that has catalyzed investment through 27 local chapters, including in the Northeast in Massachusetts, Maine, New York, Pennsylvania, and Vermont. Over 700 food enterprises to date have used Slow Money peer-to-peer lending, investment clubs, microloans and low-interest loans.

- Facilitators of access to multiple financial and technical assistance sources. For example, the Blueprint is a farm and food business assistance network serving all the New England states and part of New York. Other examples include Eco-trust, Oregon Cascades West Council of Governments, and the New England-based Carrot Project, which collaborates on and facilitates loans through various lending entities, including as a trustee for Kiva, a crowd-lending platform (The Carrot Project, n.d.).

- Federal Reserve Banks, which convened a series of meetings on regional food systems and community development to share lessons about and encourage investing in regional food systems (Brainard, 2017). "In order to take advantage of new business opportunities in the regional food sector, entrepreneurs need access to capital, specialized knowledge, and general business skills. Unfortunately, one or more of these is often missing from historically marginalized communities" (Brainard, 2017, pp. 1–2).

We have argued in this section that a hallmark of a regionally focused food system is that more economic returns stay within the region. We believe that governments and economic development agencies that reach beyond traditional political boundaries and cooperate on studying, funding, siting, and managing food system-related economic development initiatives across multiple county and state lines would see improved economic returns. These include cost savings through, among other things, lower capital requirements, full use of processing and distributing transportation efficiencies, and appropriate infrastructure.

Infrastructure

Previous sections of this chapter discuss infrastructure related to food production. These include production on rural and metro-area farms in the Northeast, both calculated and modeled; farmland and other land uses and availability; water supply; and the projected effects of climate change on production. Also described are measures of regional economic activity

from farm production, including market channels for direct and intermediated sales, and characteristics of mid-sized farms. This section describes current food systems infrastructures in general terms. We also address several emerging and evolving regional-scale infrastructure components and models that cross supply chain sectors. Challenges to improving infrastructure are laid out more fully in Chapter VII. In this section we go into more detail on the supply chain components that follow production.

At least three types of infrastructure play key roles in the success of food systems, all of which present challenges to the development of sustainable and resilient regional food systems. They include the privately owned infrastructure of a business that wants it to function well and be suited to the goals of the business; publicly owned infrastructure, such as roads, bridges, water systems, utilities, and internet connections, which plays a critical role in moving food from farm to market, the disrepair of which has increased the difficulties of maintaining a smooth and reliable flow of food in much of the country; and public, private, and public-private infrastructure, such as manufacturing plants, terminal markets, warehouses, and cold storage, that determines the sustainability and resilience of a system.

At least three types of infrastructure play key roles in the success of food systems, all of which present challenges to the development of sustainable and resilient regional food systems.

"Creating a resilient, regional food system means scaling up the volume of food grown and processed, and identifying or creating the infrastructure required to aggregate, distribute and market food across the region" (University of Wisconsin-Madison Center for Integrated Agricultural Systems, 2010, p. 3; see also Hinrichs, 2013). While much emphasis has been placed on the dearth of infrastructure to support local food initiatives, less attention has been paid to comparable needs at the regional level. (This is partly a manifestation of confounding the two.) In his published letter to a newly elected President Obama, author and food advocate Michael Pollan urged "re-regionalizing the food system" by, among other strategies, building appropriate infrastructure and distribution networks and "regionalizing federal food procurement" (Pollan, 2008, para. 40, 47). The optimal scale, location, and design of new and revitalized infrastructure of all types depend on multiple factors, which is why economic development and resource planning at the regional level are essential for a fully realized regional food system. Because of differences in size and complexity, one would expect more capital available for agri-food ventures at the regional rather than local level, and a higher total accrual of economic returns.

Processing and manufacturing

Processing and manufacturing are major segments of food supply chains. However, the amount of information about these sectors is rather meager compared to other supply chain nodes. In an extensive study of the potential for sustainable economic development in the food sector, a team of researchers (Pansing et al., 2013) first conducted a comprehensive literature review and produced a set of case studies of food systems across the country. They

then developed a roadmap "focusing on leverage points in the food system that are within the ability of cities to change" (Pansing et al. Part One, 2013, p. v). They reported that processing was among the most promising supply chain segments in terms of potential high economic returns and job creation (Pansing et al. Part Two, 2013). These benefits accrued locally to cities; however, more research is needed to determine whether they apply on a regional scale. We also note that in July 2021 the USDA offered $500 million to meat processers at all scales (very small to large) to rebuild capacity, make food systems more resilient to shocks, and deliver greater value to growers and workers both locally and regionally (USDA press release, 2021). It is also true that the country's largest meatpacking companies failed to put adequate COVID mitigation measures in place, resulting in high rates of illness and death among plant workers (Chadde, 2021), most of whom are from communities of color.

After World War II, consolidation trends led to increases in the size of farms, food processors, and wholesale, distribution, and retail operations. Consolidation continues in the sector, leading to larger plant sizes and fewer but larger companies (USDA-ERS, 2019). In 2016, food manufacturing accounted for 16% of the value of all U.S. manufacturing (USDA- ERS, 2019), comprising about 35,000 food processing plants across the country, with the largest numbers in California and New York (Martinez, 2017). Meat processing was the largest single component (24%), followed by dairy (13%) and beverages (13%).

The Northeast is quite different from other regions in the country, making it hard to compare, but some information is necessary for the region to understand its situation better. From 1954 to 1982, the number of food processing firms in the Northeast decreased by 60% while the average firm size increased. This was the greatest percentage decline in the number of food processors in the U.S. (Francis & Petrullus, 1988, in Blair, 1991).

While aggregating the data on processing plants across the 300 Northeast counties is beyond the scope of this report, in 2007 the Northeast had 15% of U.S. employment in the food processing sector (Eshelman & Clancy, 2015). The center of food manufacturing in the Northeast is the Scranton/Wilkes-Barre/Hazleton metro area, due in part to having the lowest operating costs of any area in the Northeast, along with a skilled labor force and easy access to major transportation routes on the East Coast (Penn's Northeast, 2016). In 2016 the area ranked tenth out of 24 U.S. regions in processing volume.

Under the umbrella of processing and manufacturing are several other business activities of importance to building regional food systems.

Under the umbrella of processing and manufacturing are several other business activities of importance to building regional food systems. One of these is food networks that are "alternatives" to traditional or conventional businesses: alternative food networks (AFNs). One of the themes of AFNs that are all related to short supply chains is proximity or local provenance (Michel-Villareal et al., 2018). In fact, most AFNs are described as if they are consonant only with local food systems. But this overlooks the fact that there are multiple, diverse actors in food systems with

goals of sustainability and resiliency at larger scales (e.g., regional) and more extensive infrastructures (Lamine, 2014).

The second set of business activities is found in the facilities and expert advisors who provide assistance to the developers of alternative processing and manufacturing businesses. While they service many entrepreneurs who wish to remain small and local, they also serve entrepreneurs who want to scale up in volume and extend their territory, as well as other businesses which are perhaps not fully "alternative" but are still striving for systems that are more progressive on social, economic, and environmental dimensions.

Another development that is an alternative to conventional business is the use of shared-use kitchens. These are certified commercial kitchens in which individuals or businesses prepare value-added food products, paying an hourly, daily, or monthly rate (Myran, 2018). More than 600 for-profit and nonprofit shared-use facilities were operating in the U.S. in 2019, up from 200 in 2015 (Econsult Solutions, 2020), the majority in urban areas. A survey of shared use kitchens (with a fairly low response rate of 30%), found that most respondents report success: 82% showed increased revenue, and 84% were breaking even or making money in 2016. Most shared-use kitchen clients sell at a local level, but 52% sell online and 44% sell wholesale to distributors (Econsult Solutions, 2020); it is likely that those sales go into larger regional markets.

One-third of the shared facilities surveyed were kitchen or culinary incubators that are a type of shared-use kitchen that serves emerging and early-stage nontraditional food enterprises (New Venture Advisors, 2018). These facilities rent space, often at below market rates, and—unlike other shared kitchens—provide production, marketing, and/or distribution support services to start-up food businesses so they do not have to invest in facilities and equipment. A 2016 report from the Center for Agricultural Economy on three counties in northeast Vermont presented examples of successful incubators in the area, such as the Vermont Food Ventures Center.

Two other avenues for alternate businesses are artisanal (hand-made) and specialty food businesses that have sprung up in the Northeast and across the country over the past several decades, including many examples of on-farm processing of dairy products, as well as new breweries and cideries and successful meat slaughtering and processing enterprises (Center for an Agricultural Economy, 2016). There do not appear to be any recent analyses of these entities in the Northeast, but their numbers are said to be growing (Anderson, 2019). Unfortunately, the terms 'artisanal' and 'handcrafted' are becoming overused by large and small food companies so that it is difficult to tell what the terms mean without more information about the production process of a particular food (Hise, 2016).

A final example of a business activity in the "hybrid" space (a mix of alternative and conventional supply chains) is the use of co-packers.

A final example of a business activity in the "hybrid" space (a mix of alternative and conventional supply chains) is the use of co-packers, established food companies that process and package a new product. The cost is higher than doing it in-house but provides expertise and saves time (Penn State Extension, 2020). There are small co-packers in most states and several websites that provide lists of them (for example, Penn State Extension and the Cornell Food Venture Center). The latter site contains combined listings of shared use kitchens and small co-packers in a number of Northeast states.

Wholesale, distribution, and food hubs

Unfortunately, there is some confusion as to the meanings and uses of wholesale and distribution as the terms are often used interchangeably. A distribution channel is the path a product travels from the producer to the end consumer. Wholesalers, distributors, and retailers are frequent intermediaries in this channel. In many cases, experts do not separate food wholesaling from food distribution, using the term wholesale distribution. Furthermore, in what is called self-distribution, manufacturers may ship directly to a retailer rather than via a distributor. There are approximately 35,000 food wholesale distributors in the U.S. (Dun & Bradstreet, 2020). These include 16,000 foodservice distributors like Sysco that we have not covered in this report.

Food distributors are manufacturers' direct point of contact for prospective buyers (Cole, 2019). They buy goods from producers at a steeper discount than the regular wholesale price, and then deliver directly to retail food businesses as well as food wholesalers (Medium. com, 2019). They often have a business relationship with the manufacturers they represent (Gartenstein, 2020), and are categorized in three ways: full-line distributors that handle a broad array of food products; specialty distributors for products such as frozen foods, fresh fruits and vegetables, and dairy products; and miscellaneous distributors that primarily do wholesale distribution of dry groceries such as canned foods, coffee, and bread (USDA-ERS, 2019).

A wholesaler is a business that sells food products to other businesses. There are three basic types: a market wholesaler who buys groceries and other products from manufacturers and resells them to retailers; manufacturer's sales offices maintained by grocery manufacturers to market their own product; and brokers and agents who buy or sell for a commission as a representative for others (USDA-ERS, 2019). Spot markets (direct buyer and seller transactions for immediate delivery) used to be common (in 2004 they were still almost 60% of commodity transactions), but have been mostly replaced by production and marketing contracts (MacDonald et al., 2004). In a production contract a farm operator is paid a fee by the contractor for services rendered in the production of a commodity. The contractor for a marketing contract controls assets and production practices and pays the farmer for the farm output. Wholesale food terminal markets composed mainly of distributors were also wide- spread in the twentieth century, and some persist. The Hunt's Point Cooperative market is the largest in the world serving

New York City's food purveyors. The majority of the clients served are independent restaurants, followed by chain supermarkets and bodegas (NYC Economic Development Corporation, 2016).

Some years ago, most of the large U.S. supermarket chains began to turn to self-distribution, building their own infrastructure for product acquisition and distribution. C&S Wholesale Grocers, headquartered in New Hampshire, is the largest food wholesaler in the U.S. as well as in the mid-Atlantic and Northeast market area; this might change as their largest customer, Ahold Delhaize, has moved to a self-distribution model as described below; Giant and Stop and Shop will complete the same move in 2023 (2020). C&S supplies retailers such as Tops and many other New York City and Northeast supermarket chains. The second largest wholesale operator in the region is Wakefern Food Corporation of New Jersey. Several years ago, United Natural Foods Inc. (Rhode Island), a long-time natural, organic and specialty-food distributor, acquired the full-service wholesaler Supervalu to become the third-largest distributor in the region (Food Trade News, 2020a). Despite much consolidation in the wholesale industry, family-owned grocer wholesalers "remain an important part of the landscape" (Food Trade News, 2020, p. 2). Buzzuto's (Connecticut) serviced about 1,180 independent stores in 2020 (Food Trade News, 2020). The Associated Grocers of New England services more than 600 stores in New England and parts of New York and Pennsylvania (2019).

Despite much consolidation in the wholesale industry, family-owned grocer wholesalers "remain an important part of the landscape."

Within this shifting landscape, a new version of wholesale distribution has developed over the last several decades, involving food hubs. A food hub is defined by USDA as a "business or organization that actively manages the aggregation, distribution, and marketing of source-identified food products primarily from local and regional producers to strengthen their ability to satisfy wholesale, retail, and institutional demand" (Barham et al., 2012, p.4). Barham et al. (2012) further note that "regional food hubs are increasingly filling a market niche that the current food distribution system is not adequately addressing—the aggregation and distribution of food products from small and mid-sized producers into local and regional wholesale market channels." (p. 11). Note that regional is not defined.

Regional food hubs (as well as local hubs) provide scale-appropriate facilities to support wholesale markets for smaller and some midsized farms. By aggregating product, food hubs create advantageous economies of size and offer access to markets for some smaller farms that find it difficult to engage with larger wholesale distributors. In some cases, they can also catalyze enterprise diversification (King et al., 2010). Some hubs also have the goal of improving equitable food access in low-income communities (Hoey, 2018).

The USDA Agricultural Marketing Service identified 360 food hubs in the U.S. (Feldstein & Barham, 2017). About 25% are in Northeast states. The USDA *AMS Regional Food Hub Resource*

Guide (2012) refers to regional food hubs but does not distinguish them from 'local' hubs, another example of conflation. About 40% are privately held, 32% are nonprofits, and 21% are cooperatives. (The remaining 7% are publicly held or "informal.") About 36% use farm-to-consumer as their market model. Another 42% use farm-to-business or farm- to-institution; the remaining 22% use a hybrid approach, employing both models. A 2017 national survey of food hubs showed that 119 responding hubs (30 in the Northeast, not including Delaware, Maryland, and West Virginia) employed over 1,800 staff. Hubs create more jobs, become more profitable as they mature, and often scale up over time to sell to larger wholesale customers. They source from an average of 78 suppliers. Over 80% say ensuring that producers and suppliers receive a fair price is part of their mission (Colasanti et al., 2018). A national study reported that the aggregate survival rate of food hubs since 2005 was much higher than the survival rate of all types of businesses: 88% versus 53% (Feldstein & Barham., 2017).

Equitable food access is a reasonable goal only if the hubs can maintain their own financial stability.

However, in a recent study of 12 Michigan food hubs (Hoey, 2018), researchers determined that the impact of hubs trying to address food access issues is small and uncertain because it is difficult to ensure the hub's own financial stability while it attempts to serve low-income communities. They concluded that equitable food access is a reasonable goal only if the hubs can maintain their own financial stability (Hoey, 2018), without grants or foundation support.

A more recent study finds that there already appears to be more than the optimal number of U.S. food hubs (Cleary et al., 2019), which calls into question how many of them will remain viable. The authors used several economic models to estimate the population necessary for each hub to at least cover its variable costs (the breakeven market size). They used several sources to construct a measure of the number of food hubs per county across the country as of August 2016. They accounted for the size of the population in each county, and also assumed that food hubs enter a market (county) when they know they will break even—which may not be a calculation done by hubs that have grants or philanthropic support. The models determined that a county needed a population size that is about twice as large as the average U.S. county to support one food hub. A subsequent food hub startup in a county diffuses the revenue available even more. The analysis shows that fewer than 4% of the counties in the U.S. have the population to support two or more hubs.

Transportation

Before World War II, regional food systems were dominant in the U.S. (Miller, 2021; Miller et al., 2016). After the war, refrigerated trucks and the federal highway system made long-distance transportation possible and economical. When fuel prices started to increase in the 1970s, shippers and carriers worked to maximize distribution efficiency (Miller et al., 2016).

At the same time, distributors and grocery chains built their own terminals. Although most cities had public food terminals at the time, they gave over the function to private distribution

centers. By the 1990s, big box stores such as Walmart and Target on city outskirts lowered fuel costs by having shorter delivery routes. That meant that more consumers now incurred the cost of driving to stores selling lower-priced foods. This infrastructure limited food access in urban areas once served by small local businesses (Miller et al., 2016).

A salient reason for a more regionally focused food system is to reduce food miles, the distance food travels from its production to the end purchaser. Regionalized food systems are more likely to be fuel-efficient than conventional, national systems, and more likely to reduce transportation-related emissions (King et al., 2010; Miller et al., 2016). Yet "although food transported in local and regional food systems may travel fewer miles and use less fossil fuel to reach the consumer, one cannot assume that these systems are more energy efficient compared to the conventional food system" (Pirog et al., 2001, p. 22). Furthermore, "the vast majority of greenhouse gas emissions attributed to foods, especially animal products, are from the production phase. Thus, in most cases, the types of foods people eat and how those foods are produced are more important than how far they travel" (Fitch & Santo, 2016, p. 13).

As indicated earlier, food hubs dealing with small and midsize food producers have multiplied to aggregate and extend the more local infrastructure, with mixed results. At the same time, many regional trucking companies have closed, and much of the supply chain infrastructure serving regional markets has declined or been fragmented (Day-Farnsworth & Miller, 2014). Building scale-appropriate distribution infrastructure began over 25 years ago. As more producers scale up their operations, supply chains have lengthened and the need for better distribution and more efficient transportation has increased (Day-Farnsworth & Morales, 2011). The challenges to accomplish this are formidable; these are discussed in Chapter VII.

Purchasing

The food purchasing sector comprises two elements. First is the food retail industry: food sales at retail outlets such as grocery stores, mass merchandisers, drug stores, and convenience stores, as well as foodservice facilities, i.e., sources of food not purchased for preparation at home. The second element is procurement: food purchased by government, organizations, and institutions.

Retail. The academic and practitioner literature on the retail food segment is fairly sparse; most available information is from the trade press. For the supply chain segments in the regional/local/alternative arena, information about the retail sector is extremely spare, except about the accessibility and availability of retail food stores in low-income areas. Terminology in the retail sector is complex and can be confusing. For example, the terms 'supermarket' and 'grocery store' are used interchangeably by most actors in the sector, including the agricultural economists who study retail operations and structure. However, others define them as different, stating that supermarkets are grocery stores that are larger

in scale, carry a wider variety of items, and often have a number of departments such as flowers and pharmacies (Campbell, n.d).

Retail plays a key role in supply chains. Retail food options change rapidly, requiring store owners at every scale to pay close attention to consumer preferences and work to meet them (Howard et al., 2017). The EFSNE project identified retailers, along with wholesalers, as the supply chain segments with the biggest roles to play in advancing regional food availability (Palmer et al., 2017). They are important in part because they already understand the regional concept, make at least some purchasing decisions with regional concerns in mind and have begun to label their products that way.

In the eight major Northeast retail grocery market areas, the largest share, 43%, is held by the Ahold Delhaize Stop & Shop brand in Connecticut, Massachusetts, and Vermont (Park, 2019). Ahold Delhaize, a global company based in the Netherlands, also holds a 35% share in Maryland, the District of Columbia, and Northern Virginia. Wegmans, a family-owned chain, is presently expanding along the eastern seaboard into southern states. Currently the company holds a 33% share in western New York and northern Pennsylvania. Consumer ratings based on 13 factors show that Wegmans is the second most highly rated retail food company in the U.S., with Market Basket, also a Northeast chain, at number five (Stanger, 2019). Ahold Delhaize brands in the Northeast include Food Lion, Giant Food, Giant/Martin's, Hannaford, Stop & Shop, and Peapod. The company, the fourth largest food retailer in the U.S., stated in 2018 that it can take advantage of a "very fragmented East Coast market" (Redman, 2018, para. 7) of which it holds a 19% share across the entire region; 11 other competitors have at least 2% shares, but none more than 10%.

In December 2019, Ahold Delhaize announced plans to transition its supply chain network into a fully integrated, self-distribution model, acquiring warehouses from C&S Wholesale and leasing others (Food Trade News, 2019). The company said it would pursue optimal facility locations near its stores to enable local product expansion and increased product freshness. Changes will "enable us to deepen relationships with vendors and better position our company's distribution centers and the communities they serve" (Food Trade News, 2019, para. 9). However, the company appears to be focusing more on jobs creation in its stores as its connection to local communities rather than on the benefits that might be brought to farmers or other supply chain actors.

Independently owned stores are variously defined as those whose owners operate fewer than four or in some cases fewer than ten stores. Because they are usually family-owned, some larger chains, such as Wegmans, are referred to as independents (Martin, 2018).

Independents still play critical roles in both urban and rural areas where they may be the only store. A study of independent grocery stores and supermarkets determined that in 2015 independents generated 11% of U.S. grocery sales. Supermarkets (defined as stores with at least $2 million in sales) accounted for 58% of independent store sales,

and superettes (sales between $1 million and $2 million) had 27% of sales (Cho & Volpe, 2017). Unfortunately, this research did not disaggregate data by region, but did state that in 44% of U.S. counties at least one-half of food retailers were independent, primarily in the West, Great Plains, and the Northeast. Independent stores in the Northeast, such as Stew Leonard's, Fairway, and ShopRite, are also doing well despite competition from large corporate European brands such as Lidl and Aldi, as well as the giants Walmart and Kroger (Dudlicek, 2019).

The EFSNE project studied 11 independent supermarkets. It was no surprise that most did not have their own distribution centers. The majority used large grocery wholesalers and filled in with orders from smaller distributors, wholesalers, and manufacturers. Two stores self- distributed and maintained their own warehouses. It was clear that many of the independent stores had a lot of flexibility to develop product assortments tailored to their customers.These stores significantly outperformed the average U.S. supermarket in weekly sales, sales per square foot, and sales per full-time employees (Park et al., 2018). Independent stores that find ways to stay viable could be very important in terms of their position in regional supply chains.

Building and strengthening food supply chains at a regional level cannot be successful unless all the actors in the chain understand how each piece works and how collaboration occurs across the chain. Because the dynamics of retailing and procurement are so complex, other chain participants need to understand the supply chain from the buyer perspective if they are to be successful. A well-functioning regional food system will include sales to both conventional and alternative entities, and large chains as well as smaller independent retailers. It functions well only if there are trust-based relationships between the retailers and their suppliers (Abatekassa & Peterson, 2011), built and based on a clear understanding of food retail industry structure and function.

Building and strengthening food supply chains at a regional level cannot be successful unless all the actors in the chain understand how each piece works and how collaboration occurs across the chain.

Procurement. Procurement describes how and from whom food is purchased by agencies, organizations, and institutions. It offers an opportunity for the public and private sectors to use their substantial purchasing power to create more equitable—and regionalized— food systems. Food procurement is complex, due to federal, state, and local government jurisdictions, and various regional and cultural differences that do not align supply with demand (Fitch & Santo, 2016). Although there is no single method or policy framework to achieve desired outcomes, procurement has been a fruitful avenue to promote certain values in sourcing, such as geographic preference. In fact, "changing whole systems of food provisioning at institutional levels may be more effective than targeting individuals through labeling schemes" (Barnett et al., 2005, in Palmer et al., 2017, p. 201).

Notwithstanding the constitutional sanctity of the Dormant Commerce Clause Doctrine (DCCD), the federal government does not unilaterally prohibit geographic preference. A key example of this in food systems is in the area of procurement. The 2008 Farm Bill authorized federal child nutrition programs to use geographic preference to procure "locally grown," unprocessed food products "to the maximum extent practicable and appropriate" (USDA Office of Community Food Systems, 2017, para 1). It is left to participating school districts to define 'local,' which can vary widely, including more than one state as well as within a state. In fact, out-of-state products are not explicitly prohibited from being considered 'local' until and unless a court finds the result is discriminatory, thus triggering the DCCD (Denning et al., 2010). In school procurement, schools apply geographic preference in various ways, using extra points or a tiered approach in which certain geographic criteria must be met to obtain a higher (first tier) score. School districts that "think regionally" can actually act regionally by taking advantage of this authority. How many districts use the local preference discretion to reach beyond state lines to procure food products is unknown.

"Healthy" food procurement policies based on values such as environmental impact, animal welfare, nutrition, treatment of workers, and geographic preference have been adopted by thousands of school districts, state agencies, colleges, corporations, and public and private hospitals (Denning et al., 2010; Fitch & Santo, 2016; USDA-Food and Nutrition Service, 2018). For example, the Good Food Purchasing Program provides a score-based framework for institutions to direct their buying power toward five core values: local economies, environmental sustainability, valued workforce, animal welfare, and nutrition. The local economies core value "support[s] small and midsized agricultural and food processing operations within the local area or region" (Center for Good Food Purchasing, 2020, Local Economies, para. 1). There is no operational definition of "local area or region," although most of the participating institutions in this program refer to local economies and local food. The Yale Sustainable Food Project (Turenne, 2009) has tiered guidelines that rank regionally grown organic, regionally grown (outside Connecticut) ecological and regionally grown small-scale conventional vegetables, second to comparably grown produce from within Connecticut. Similarly, the Northeast Organic Farming Association of Vermont (NOFA-VT) has a three-tiered, "as local as possible" purchasing strategy that awards points for ultra-local (Tier 1), in-state plus 30 miles from the state border (Tier 2), and regional (Northeast) (Tier 3). NOFA-VT encourages institutions to augment their local purchases with regional procurement to develop supply chains and markets in all three tiers "simultaneously" (NOFA- VT, 2015).

In their study of institutional food procurement, Fitch and Santo (2016) use "regional" as "inclusive of the term 'local,' [signifying] that various scales and geographies are levied to supply a significant portion of the food needs of a geographical region" (p. 1). They note that institutional foodservice management, which, along with procurement, can include menu planning, price negotiation, regulatory compliance, and infrastructure maintenance, is "big business" (p. 1) and, like other links in the food chain, increasingly concentrated. The top three foodservice management companies (Sodexo, Aramark, and Compass Group PLC)

service about 45% of North American institutional foodservice outlets (Fitch & Santo, 2016). Several national broadline and foodservice distributors, including SYSCO, Sodexo, and Bon Appétit, are making progress toward a sustainability framework that includes an emphasis on regional procurement. Bon Appétit has expressed a significant commitment to this scale so far. In addition, entities such as the National Farm to School Network, Real Food Challenge, School Food FOCUS, Health Care without Harm, and Farm to Institution New England have successfully pushed back against increasing concentration in foodservice management and distribution.

Benefits of regional procurement include more reliable and adequate supply, economic revitalization, access to infrastructure, access to markets for midsize farms, and more robust regional supply chains. Shifting institutional procurement toward medium-sized regionally oriented farms that have the capacity to meet institutional demand may counter concentration trends and strengthen community well-being (Fitch & Santo, 2016). Fitch and Santo (2016) also acknowledge the challenges of assessing the impact of institutional food procurement on a regional economy. These and other challenges will be discussed in Chapter VII.

Social justice

Social justice, broadly meaning the fair and equitable distribution of political, economic, and social rights and opportunities in a society, is a foundational value in sustainable food systems development. Like diversity and resilience, the central social justice concerns of access and equity arch across the dimensions discussed in this chapter. The socio-cultural fabric of a region can both contribute to and undermine social justice. Building upon decades of civil rights organizing, the Black Lives Matter movement shines a glaring light on how structural racism negatively affects every aspect of life for certain populations. It has also brought new attention to restorative justice—repairing historic harms—as one aspect of social justice.

Many of the negative social and cultural aspects of current food systems apply across all U.S. regions. Social change activists have worked to address these issues for decades, from concentration of land and production to food access disparities and abusive practices toward farm and food chain workers. The Northeast is not exempt from these issues. A regional perspective creates appreciation for a region's particular historic context, demographics, and cultures, and paves the way for place-appropriate actions to address the manifestations and consequences of racism. The Northeast's multiethnic populations, diverse traditions, and embrace of many cuisines and food cultures, described in Chapter IV, can help shape solutions to injustice.

Regionalism and regional food systems are not in themselves solutions to vast and deeply entrenched economic and social injustices. In some ways, the regional scale is less germane or empowering to a systemic, structural justice agenda than local, state, and national scales, but that does not mean that regional approaches cannot contribute. While this report does

not offer a comprehensive discussion of the social justice issues in food systems, a regional framework, nonetheless, can provide a useful analytic perspective and catalyze action. Here we focus on:

- Food needs, access, and security; and
- Fairness and opportunity for all players in the food system.

Food needs, access, and security

As described previously, food security and community food security underpin much of the work in food systems change. The terms have several meanings, largely centered on food access. This study's definition of food security—"all community residents obtain a safe, culturally acceptable, nutritionally adequate diet through a sustainable food system that maximizes community self-reliance and social justice" (Hamm & Bellows, 2002)—goes beyond food availability and access, as suggested by the term "food desert," by linking them to culture, health, and justice.

The concepts of *food justice, food equity, food apartheid,* and *food sovereignty* shift the focus from security to food rights. These terms are evolving as the understanding and language of food systems and racial justice grows more informed and nuanced. See for example, the Healthy Food Policy Project's definitions and descriptions of these terms (HFPP, 2022). A social justice framework addresses both how food systems affect social inequities, and how social justice can be advanced through food systems change. At all levels, "current food systems are [a] manifestation of the racism and economic disadvantage suffered by communities of color … changing these systems will contribute to building a more positive social structure" (Ventura & Bailkey, 2017, p. 1).

Food justice is defined in various ways. The Institute of Agriculture and Trade Policy's definition is the "right of communities everywhere to produce, process, distribute, access, and eat good food regardless of race, class, gender, ethnicity, citizenship, ability, religion, or community" (Rowe, 2016, para. 6). Just Food, a New York City nonprofit, describes food justice as "communities exercising their right to grow, sell, and eat healthy food. According to Boston University's Community Service Center, the "Food Justice Movement works to ensure universal access to nutritious, affordable, and culturally appropriate food for all, while advocating for the well-being and safety of food producers. The movement aims to address disparities in food access, particularly for communities of color and low-income communities, by examining the structural roots of food systems. It also addresses questions of land ownership, agricultural practices, distribution of technology and resources, workers' rights, and the historical injustices communities of color have faced. Food Justice is closely intertwined with environmental justice and sustainability movements" (Boston University Community Service Center, n.d.).

"Healthy food is …culturally appropriate and grown locally. …People practicing food

justice leads to a strong local food system, self-reliant communities, and a healthy environment" (Rowe, 2016, para. 5). These definitions emphasize rights, specifically at the community level, although the scale of "community" is not defined. In fact, as Rowe has observed, "In many of the [food justice] definitions, the concept of what a community is remains nebulous. We assume that communities are at the local level or within a geographical boundary. … It is not entirely clear which communities [such as communities of color] are exercising their rights, at what scale, and who (or what) gives the communities the 'right' for food" (Rowe, 2016, para. 12).

In contrast to food justice at the community level, food justice has also been defined as "a wide spectrum of efforts that address injustices within the U.S. food system" (Nyéléni, 2015, para. 1). In this framework, food justice is a national concern. The Nyéléni Network for Food Sovereignty goes further, distinguishing "reformist" food justice projects that focus on alleviating the effects of an inequitable food system (food "deserts," market barriers, working conditions) from more "progressive" and "radical" strategies that focus on access to resources (e.g., land, capital), and structural transformations (Nyéléni, 2015, para. 1-3).

Food equity is the expansive concept that all people have the ability and opportunity to grow and to consume healthful, affordable, and culturally significant foods" (Raja, n.d.). Reaching equity requires that regions move to allow marginalized people to benefit from the food system and also identify problems and solutions (Mui et al., 2020).

Food apartheid moves from the food desert concept implying lack of access and assets, to the assertion that food access problems are "the result of intentional and systematic racial and economic oppression" (Beyond-buzzwords.com, 2021). "Food apartheid" is used to highlight the racially discriminatory political structures that past and present impact food access and control.

Quoting the 2007 Declaration of Nyéléni, the first global forum on food sovereignty, in Mali, "*Food sovereignty* is the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems. It puts the aspirations and needs of those who produce, distribute and consume food at the heart of food systems and policies rather than the demands of markets and corporations." (U.S. Food Sovereignty Alliance, n.d.).

Indigenous food sovereignty is a distinct manifestation of food sovereignty principles with an emphasis on the centrality of territory as well as specific cultural values and political aspirations of Indigenous people (Morrison, 2011).

Indigenous food sovereignty is supported by four principles:

1. Indigenous responsibilities to the land are based on reciprocal relationships, are sacred and supersede colonial legislation;

2. Self-determination must at the heart of any food system goals;

3. Indigenous people must be involved in the food system at every level; and

4. Policy and legislative reform is necessary to support Indigenous food sovereignty (Morrison, 2011)

The notion of food sovereignty for Indigenous Peoples is appropriate given that many inhabit and govern sovereign nations within the U.S. The concept becomes more complicated when advocates fail to identify "the profound structural changes needed in the capitalist economy and the liberal state for food sovereignty to feasibly exist" (Edelman, et al., 2014, p. 927).

Put another way, food sovereignty advocates must pay attention to many components, and recognize how multidimensional food sovereignty needs to be. With respect to this report, these include: recognition of rural-urban differences and divides; inclusion of all supply chain actors, not just farmers; inclusion of people and sectors that deal with land, seeds, rural economies, governance, markets, and global, regional and local connections; and addressing chronic hunger and malnutrition. (Edelman et al., 2014).

Participation in social change through food systems may be most tangible at the community level, where individuals can engage in direct ways, and power can rise from the bottom up. Numerous local and community-level food initiatives demonstrate increased food access and community self-reliance along with positive social justice outcomes. Many have empowered citizens at the grassroots: training minority and youth leaders, teaching food gardening and healthy eating to diverse learners, developing local value-added enterprises, and advocating for agriculture-friendly local zoning and other policy reforms. Examples include: Massachusetts Avenue Project (Buffalo, NY); Bliss Meadows (Baltimore, MD), Just Food (NYC), Black Urban Growers (BUGS; NY), Iroquois White Corn Project (NY), Hmong American Farmers Association (Minneapolis), and New Farms for New Americans (VT).

'Regional' can claim a crucial place between these local and global definitions. Gottlieb and Joshi's (2010) definition most aptly resonates with regional thinking: "ensuring that the benefits and risks of where, what and how food is grown and produced, transported and distributed, and accessed and eaten are shared fairly" (p. 6). Regionalism enables us to look beyond a local community to the structural barriers populations face to producing and accessing healthy food, and to the structural injustices embodied in the production, distribution, and consumption of food at a scale that invites collective action and systemic, yet place-based, solutions.

In fact, food justice must be pursued at regional as well as local and national levels. A region that produces sufficient volume and variety in response to diverse needs and desires—and that can get product to local communities—can make a substantial contribution to improving food access for all. Region-scaled food supply chains can help

mitigate the inherent tension between food access for consumers and market access (price) for producers. Thinking regionally, we can understand, and act based on, the distinctions *and* commonalities between the politics of urban "food apartheid" and the realities of rural food unavailability. By taking in the bigger picture, culturally and racially distinct groups can meet their unique food preferences and find common cause with other groups and stakeholders.

In fact, food justice must be pursued at regional as well as local and national levels.

In terms of food needs, a region can produce and process a wider variety and volume of foods than local areas, especially if the region contains a variety of farms, soils, and climates. Because the production base to draw from is more extensive and the types of crops are more diverse than any single community, a region is more likely to approach both supply and variety goals for a population as a whole. However, a larger area does not guarantee this. Multistate expanses of sparsely vegetated rangeland will not realistically produce more variety or volume of foods.

The Northeast's diverse population base seeks valued, culturally appropriate foods. "People use food as a visible marker to tie them to racial, religious, class-based, and ethnic groups. Since eating is a public and social action, what people choose to eat, and with whom they choose to eat, identifies them with a group" (Aaronson, 2014, p. 8). Sometimes so-called ethnic food creates ties across ethnic groups within a community or region. Citing examples of "regional foods that do offer a sense of place," Connecticut-based chef Michel Nischan laments that durable produce and homogenous, cheap, and convenient food have "destroyed the character of the foods that once defined our communities' culturally significant foods" (Nischan, 2004, p. 17).

Diversity of food preferences is a stimulus for the production and marketing of a wide range of farm products, from Brazilian vegetables to halal goat meat. As we posit in this report, the regional scale is more likely to respond to some food preferences and gaps. However, this is not likely to meet all desires for certain diverse foods that need to be imported.

Fairness and opportunity for all food chain participants

In a comprehensive regional food justice framework, the needs and rights of all food system workers are prominent. Although food system worker treatment and working conditions are national issues, and specific labor issues (including wages, health, safety and working conditions, immigration status, training, mobility, and the right to organize) cut across regions, regions have unique food system labor profiles and challenges, some of which invite or require customized solutions. These conditions have been highlighted during the COVID-19 pandemic in, for example, the meatpacking industry (noted above) and with grocery workers whose infection rate was significantly higher than the general population in their respective communities (British Medical Journal, 2020).

"Concentration and vertical integration along food supply chains is credited with improving efficiency, reducing costs, and lowering prices for consumers, but is also implicated in the decline in value of workers' wages (in one survey, only 13.5% of food system workers reported earning a livable wage)" (Fitch & Santo, 2016, p. 4). Overall, the food system sector pays the lowest hourly median wage to frontline workers compared to workers in all other industries (Food Chain Workers Alliance, 2016). Lower-level foodservice workers, many of whom are immigrants of color, women, and LGBTQ+, are paid below-poverty wages and are "likely to suffer human-rights abuses on the job" (Henderson, 2011, p. 3). Nationally, farm laborer wages have remained lower than those in other industries while farm labor scarcity has risen (Barham et al., 2020). Related to wage inequities, farmworkers experience higher rates of household poverty compared to other low-skill workers, along with inadequate social supports such as food, housing, health care, and childcare (Lloyd et al., 2019).

The International Labor Organization's four-pillar rights-based framework for labor addresses employment creation, social protections, standards and rights, and governance and social dialogue. Lloyd and colleagues (2019) have identified three strategies to improve labor conditions in fair trade efforts: negotiation, governance, and coalitions. They point out that coalitions focused on domestic agricultural labor issues are complex and interrelated. Coalitions fill particular niches based in part on the scale they address and the area in which they work. Similarly, governance related to changing labor conditions in the food system occurs at different scales depending on the particular issue. For example, minimum wage reform is at the state and national levels, and private sector supply chain players act regionally to integrate fair trade principles.

Interregional trade is a venue for food system justice. Fair trade addresses the treatment of all workers in the food system. The national Domestic Fair Trade Association (DFTA) translates international fair trade principles into the "domestic, regional and local economic spheres … wherever trade takes place" (DFTA, n.d., Vision and Principles, para. 2). Sixteen DFTA principles include transparency, equality and opportunity, and labor and indigenous people's rights, similar to the ILO pillars. We note that not all labor groups align around standards, transparency, and enforcement. (See for example, Fair World Project, 2021.) Regions may be an appropriate scale to meaningfully pursue "fair wages, fair prices and fair practices" (DFTA, n.d.) and equitable sharing of risks and rewards.

Interregional trade is a venue for food system justice.

FCWA reports a total of 1,312 organizations, mostly local or state-level, that work for or on behalf of food and farmworkers. About 215 are in the 12 Northeast states. Restaurant Opportunities Center United has ten chapters in the Northeast, in NY, PA, and Washington, D.C. CATA, the Farmworkers Support Committee, stands out as a region-scale migrant farmworker and Latino immigrant rights organization in the Mid-Atlantic.

Producers in the Northeast are becoming a more diverse group, although Black, Hispanic/Latino, Asian, Indigenous, and immigrant/refugee farmers (which includes urban growers) still represent a miniscule percentage of the region's producers. Compared to the Northeast's nearly 223,000 white principal operators, 833 are Black or African American, 2,477 are Hispanic and 839 are Asian (USDA Census of Agriculture, 2017). While the number of Black farmers is increasing nationally, they still make up only about 1.4% of U.S. farmers (Touzeau, 2019). American Indian/Alaska Native producers accounted for 2.3% of the country's farmers and ranchers on 6.5% of U.S. total agricultural land, with the majority of these in western and Plains states (USDA Census of Agriculture, 2017). White Americans are most likely to own farmland and benefit from the wealth it generates. From 2012 to 2014, White people made up over 97 percent of non-farming landowners, 96 percent of owner-operators, and 86 percent of tenant operators. They also generated 98 percent of all farm-related income (Horst, 2019). Farmers of color (Black, Asian, Native American, Pacific Islander, and those reporting more than one race) are more likely to be tenants than owners; they also own less land and smaller farms and generate less wealth from farming than their white counterparts (National Young Farmers Coalition, 2020). These groups have been systematically discriminated against in land access and lending.

Latino farmers compose about 2% of non-farming landowners and about 6% of owner-operators and tenant operators (Horst, 2019). In the Northeast, as in other regions, farmers of color experience greater barriers than their white counterparts to accessing training and technical assistance, obtaining credit for land purchases and operating needs, obtaining secure and equitable leases, and benefitting from USDA farm programs. At minimum, more resources should be directed to the region's historically Black colleges and universities (HBCU), defined as any historically black college or university that was established prior to 1964, whose principal mission was, and is, the education of black Americans, and that is accredited by a nationally recognized accrediting agency or association determined by the Secretary of Education. HBCUs in the Northeast are Delaware State University, University of the District of Columbia, University of Maryland Eastern Shore, Bowie State University (MD), Coppin State University (MD), Morgan State (MD), Cheyney University (PA), The Lincoln University (PA), Bluefield State College (WV), West Virginia State University, and The Medgar Evers College (NYC). There are no tribal colleges or universities in the Northeast; support for these institutions in other regions would help build community capacity to engage in the food system.

Every region has its unique history of Indigenous land dispossession, labor abuses, and structural discrimination in accessing land for farming. Like other regions, the Northeast must come to terms with its own history of land theft through slavery and settler colonialism, the Black Codes and convict leasing, sharecropping, the forced migration of Black Americans off the land and to segregated Northern urban centers, discriminatory lending, abusive migrant worker programs, heir property, and redlining. Echoing Malcom X's assertion that "Land is the basis of freedom, justice, and equality" (in Penniman, 2018, p. 1), Ralph Paige of the Federation of Southern Cooperatives said, "Land is the only real

Every region has its unique history of indigenous land dispossession, labor abuses, and structural discrimination in accessing land for farming.

wealth in this country and if [Black people] don't own any then we're out of the picture" (in Penniman, 2018, p. 11). Of importance to contemporary land access struggles, on the one hand, private property ownership is seen as vital to and emblematic of BIPOC power. On the other hand, Black groups were among the first in the U.S. to champion and practice less conventional, collective land holding through cooperatives and Black land trusts. This lineage contributes to ongoing explorations of more socially just land access and tenure among farmers and advocates of all colors. The Northeast Farmers of Color Land Trust is a leader in the region and beyond, joining dialogue about land access and tenure with regional and national groups like Food First, Land For Good, Agrarian Trust, Sustainable Economies Law Center, Equity Trust, and Cultivating Community.

The regional context is instructive: How does a region's history shape current land issues? What contemporary characteristics make a region's land access issues unique or particularly intractable? For example, in the Great Migration, people of color with agrarian roots and aspirations moved to Northeast cities in search of factory work and other livelihoods. Today, some of their descendants are up against land access barriers to realizing their own dreams to produce food—in urban zones, or by navigating formidable obstacles to scaling up on land outside cities. Others are among the dispersed descendant owners of heir property in Southern states.

Human and political capacity

In this section we first discuss the roles of governance and policy in relation to regional food systems. Next, we discuss the capacity of food chain players and service providers. Then we explore how to think and act regionally. Chapter VII will explore related challenges and constraints.

Governance

As food-related issues have multiplied around the globe, calls for food systems transformation have intensified (e.g., Baker et al., 2019; NRC, 2010; van Bers et al., 2016). The erosion of natural resources, climate change, increases in diet-related disease, profound social inequities, and now the pandemic make the need for fundamental changes in food systems even more apparent and urgent. Myriad efforts to develop new food systems continue across the U.S. and elsewhere; we describe many in this report. But in most cases these endeavors are not part of specific and practical long-range plans for collaboration across multiple scales. Such collaborations are necessary to bring about fundamental change in current institutions and to develop new governance to support and guide change.

Governance means the structures, systems, and processes that determine authority, decision-making, and accountability. Governance frameworks apply to societies as well as the public and private sectors within them. Most typically, governance is considered in terms of formal, institutional structures. Different groups will critique, evaluate, and pursue different forms of governance depending on their orientation. *Civil Society and Social Movements in Food System Governance* (Andree et al., 2019) considers how various "sub-movements" such as civic agriculture, food sovereignty, food justice, and community food security orient toward the dominant system. Those focused on "alternative systems" may seek to build new, community-based governance spaces, while reformists are more likely to seek influence in existing formal governance structures. Such framing is critical to governance in all systems in that it defines the purposes and uses of power and authority (Andree et al., 2019), and both types of efforts may be necessary.

"Governance is about the execution of power. Governance processes, whether formal decision-making structures or informal collaborations, are themselves also manifestations of power relations" (Andree et al., 2019, p. 26). The principles of good governance include legitimacy, transparency, accountability, responsiveness, equity, and inclusiveness (e.g., Sheng, n.d). A specific manifestation of good governance will depend on who holds power, who is included, and the orientation toward social change.

We echo Brian Dabson, a champion of regionalism, in his belief in the importance of good governance. In 2010 he urged scale-appropriate, decentralized, and democratic activities that are socially inclusive, and argued that we need to rework the historic government structures that are no longer appropriate to the scale and complexity of today's challenges. Locales "do not have the technical or financial resources to tackle [key] challenges" (p. 2), he stated at a rural regional summit in Vermont. "We need to frame policies for rural and urban development and revitalization in a broader regional context. … Trickle-out effects cannot be guaranteed" (p. 2). Quoting a White House memorandum, Dabson continued, "Many important challenges require a regional approach. Federal investments should promote planning and collaboration across jurisdictional boundaries … Policies need to recognize and embrace the interdependence of all parts of the region" (2010, p. 2). Fluharty (2011) agrees: "The federal government must create a framework that acknowledges and builds upon the growing interdependence of urban, suburban and rural areas and constituencies" (para. 3).

We need to rework the historic government structures that are no longer appropriate to the scale and complexity of today's challenges.

In food systems, governance is "the processes and other constellations that shape decision-making and activities related to food including markets, traditions and networks, and other actors such as businesses and civil society" (van Bers et al., 2016, p. 10). Governance is considered critical to regional food system frameworks because most institutions are "currently fixated on economic growth" (Bosselmann, 2008, p. xiii). In fact, "the current

and foreseeable future of food policy is one which is losing its means of coherent regulation and legitimacy" (Marsden et al., 2018, p. 1301). Public and private institutions can enact laws, regulations and guidelines that create either adverse or favorable conditions in which new food businesses and collaborations can function in a desirable way. Most governance structures so far have not been up to this task (Marsden et al., 2018; van Bers et al., 2016). In an impassioned report to the Northeast Association of State Departments of Agriculture (a regional chapter of the National Association of State Departments of Agriculture), New Jersey Department of Agriculture Public Information Officer Jeff Beach (2004) urged states to "pull together as a region and …enhance efforts being made at the state level. … Long-term viability … will come only with a sense of regional unity, solidarity and reliance on the region's diversity to renew its strength and purpose" (p. 1).

Much of the thinking about food systems governance has its roots in governing for sustainable development. It was determined decades ago that to reach sustainable development goals it would be necessary to "adjust practices of governance in order to ensure that social development succeeds along this sustainable trajectory" (Meadowcroft et al., 2003, p. 5). Researchers and practitioners perceived that this would entail studying the interconnections among economic, social, and environmental problems, looking at the experiences of local and regional areas in building new collaborations, and understanding what was driving and facilitating these new efforts. It would also include examining the lessons learned from the tensions in the application of governance to sustainable development and its complexities (Meadowcroft et al., 2003). Sustainable development governance requires the horizontal integration of policies from different sectors, the vertical integration of different levels of government, enhanced participation by interested parties, reflexivity (the capacity to consider different types of knowledge and values), and the balance of timescales (Steurer, 2009). A similar process guides the evolution of effective governance structures and guidelines for food systems.

Transformative changes in governance are often triggered by a shock or intensifying pressure to change a system. Both have occurred with regard to food systems over the past several decades. The contemporary pandemic and anti-racism movement heighten that urgency while pointing to long-standing systemic deficiencies. As noted by Donkers (2013), "The interaction and the strengthening of the relationship between the social, cultural, ecological and economic diversity and vitality of regions, and locals within a region, on the one hand, and desired regionalism and food provision on the other hand, demand government interference" (p. 188). Governments, which have legislative and executive authority, must engage with the wider array of sectors such as non-profits, civic organizations, business leadership, and others to achieve good regional governance (Wolman et al., 2011).

Governance is important at all scales. In fact, some authors argue that scale and governance should be integrated (Kok & Veldkamp, 2011), mainly because policies have "unforeseen impacts on social-ecological systems at different levels of spatial and temporal scales" (Wiens & Bachelet, 2010, p. 53). Most of the principles that apply to

good governance are similar at every scale. But how they function can be quite different due to geographic size and location, and also due to different levels of economic and social complexity. For example, an environmental issue will have to be addressed based on the specific ecosystem setting..

Most of the principles that apply to good governance are similar at every scale. But how they function can be quite different.

Some regional development organizations (RDOs) and councils of government (COGs) have started to explore how to develop and support regional food system infrastructure, although the numbers are clearly inadequate. The roles that an RDO can play include acting as a convener, developing a robust database, developing formal working groups, performing regional food assessments, creating regional food systems plans, providing technical assistance, and offering guidance on regional state and federal programs available to farmers and others. One of the healthy tensions in developing regional food systems is the relative emphasis on rural versus urban agriculture. While most production will always come from rural and peri-urban operations, debunking the rural-urban divide and replacing it with a continuum helps to honor and invest more proportionately in all forms and locations of food production.

With respect to governance in the private sector and at a relatively small scale, Stevenson and Pirog (2008) point out that a high level of trust and interdependence is a requirement and indicator of a successful values-based supply chain (see elsewhere in this chapter for a discussion of VBSCs). Effective supply chain governance requires the recognition and operationalization of information flow by skilled supply chain leaders who include other decision-makers in their deliberations.

Phil Mount (2012) also addressed governance for local food systems, asserting that to have a systemic effect, local food systems must expand by engaging more consumers or producers or both, and that the success of expansion will depend on the processes through which local food systems are governed because consumers and producers (andwe would add other supply chain actors) have diverse goals and values that underpin their decisions and actions. Therefore, the governance characteristics chosen for a particular local food system, such as consensus or majority rule, need to acknowledge and be able to reconcile the differences among the participants. He points out that reconciliation is a sign of a reflexive approach to governance (DuPuis & Goodman, 2005) that is based on the examination of assumptions and preconceptions and requires negotiation and shared responsibility (Mount, 2011).

The ability of supply chains and other food system players to adopt new governance approaches will take on more salience as local food systems scale up and bring even more players with diverse perspectives and priorities into decision-making. The participation of local governments in regional food system governance is necessary because changes at a regional scale may have a large impact on other spatial arrangements in the area, which requires local buy-in.

Much of Mount's thinking about local food systems governance is fully applicable to developing regional food systems governance as well, but needs certain preconditions to generate success:

- Significant economic and social capital resources that can be mobilized (van Bers et al., 2016).
- Sufficient flexibility, and nimble institutions that allow innovations to work and not be locked into the status quo (van Bers et al., 2016).
- Collective actions taken by groups of people based on collective decision-making that overcomes the conflict between individual and group interests (Department of Geography, Penn State College of Earth Sciences, 2020; van Bers et al., 2016).
- Inclusion of multiple stakeholders (Mount, 2012).
- Careful consideration of who is involved (Donkers, 2013).
- Openness and protection of shared values (Donkers, 2013).
- Spatial coherence across scales that includes co-management because patterns "measured locally do not necessarily hold at a larger scale" (Newman & Dale, 2009, p. 10); for example, across urban and rural boundaries.
- Taking into account power relationships between different institutions and stakeholders (Berger, 2003).

Donkers (2013) observed that formal regional food systems are scarce in Europe and the U.S. Since then, arguments have been advanced for their development; some examples are mentioned at the end of this section. French researchers on agri-food systems have forcefully argued that a territorial (regional) approach is more appropriate to address the reconnections between agriculture, food, environment, and health that existed before industrialization than the larger global and national scales or smaller local scales (Lamine et al., 2019).

Others are finding that more inclusive regional governance structures are needed in which cities and less urban sectors work together (Dubbeling, et al., 2015; Dubbeling & Santini, 2018; Forster & Getz Escudero, 2014; Marsden et al., 2018). A model that has garnered attention over the last two decades is the city region. (See Chapter III for an overview of the city region concept.)

Governance arrangements are the key underpinning of a city region food system approach, developing institutional and other infrastructures to support new kinds of

rural-urban linkages (Jennings et al., 2015). "At its root, the concept of city region food systems is about making the linkages between urban centres and their surrounding rural areas more effective at delivering sustainable socio- economic returns and a range of critical public goods" (Jennings et al., 2015, p. 5). The benefits of city region food systems will only develop by changing the status quo; making those changes means consciously and formally influencing the way that food systems operate. This is difficult due to the profound distinctions between rural and urban development pathways, even though urban and rural areas remain linked by numerous ecological, social, and economic processes (Jennings et al., 2015). New laws and programs are required to actively build regional connections to increase regional self-reliance, land use and access, and farmer and supply chain collaborations (Vaarst et al., 2018).

Developing new or reforming old governance structures is a complex task. First, local and regional governments "need to care about the provenance of their collective communities' food supplies" (Forster & Getz Escudero, 2014, p. 32) and have the vision and determination to maintain their interest. Next is the political will to set up and strengthen multistakeholder structures and avenues for participation in building new structures inside city regions that involve different government departments, local and regional jurisdictions, and stakeholders who link civil society activities and initiatives to more formal food policy and planning (Dubbeling et al., 2015). Examples include the integration of management across scales for tasks such as water and waste handling and collaboration on the flow of capital into food-related economic development projects (Jennings et al., 2015).

Both urban and rural governments ultimately must promote the development of city region food systems. Such support may begin on the rural or urban side, but if institutionalization is the goal, "there should be at least some bridges where policy and practice are adopted by both urban and rural authorities" (Forster & Getz Escudero, 2014, p. 31).

City region systems can approach good governance practices through any of the many issue- based entry points, such as land use, zoning, transportation, public procurement, and market development incentives (Forster & Getz Escudero, 2014). The 2014 Milan Urban Food Policy Pact is another example of an entry point for municipalities and surrounding regions to engage in coherent regional food policy and program initiatives (Blay-Palmer et al., 2018). Through the pact, cities commit to a number of policy changes, including seeking coherence between municipal food-related policies and programs and relevant regional, national, and international policies and processes (Milan Urban Food Policy Pact, 2015). The pact now has 210 signatories, including twelve locations in the U.S. and five in the Northeast: Baltimore, New Haven, New York, Pittsburgh, and Washington, D.C. Much of the efforts expended so far in U.S. cities are at the local level, such as mapping of food access discrepancies, identifying how state and local policies affect the city's food systems, and developing resilience plans. There is an important exception: the Fourth Regional Plan of the tristate area of New York, New Jersey, and Connecticut recommends the creation of a long-term plan for a healthier, more sustainable, and

more equitable food system for the tristate region (Regional Plan Association, 2017). We anticipate that work across the country eventually will expand to focus on larger-scale city region efforts.

Federal policy

Advocates of food systems change routinely come up against industry and commodity interests that privilege certain regions over others. When federal policy favors certain sectors or adopts a one-size-fits-all approach, some regions are likely to benefit more than others: "For a complex set of historical, political, and production-based reasons, federal farm policy has focused primarily on certain [commodity] crops in certain regions. The net result is that the benefits of this policy structure are unevenly distributed among producers, sectors and regions" (Hance et al., 2006, p. 6). With so much competition for scarce funds, it is not surprising that regions with less clout can feel (and are) shortchanged. A regionalist approach assumes that all regions should benefit from federal farm and food policy. Important values—economic, environmental, cultural, and social—are implicit in assuring equitable access to the means and fruits of production in every region. Policies should be based on an assessment of the advantages and challenges of every region. Hance, Ruhf and Hunt (2006) posit five principles that underlie a regionalist approach to policy development:

Policies should be based on an assessment of the advantages and challenges of every region.

1. Policies should be flexible in their application across regions.

2. Policies should be appropriate, addressing a region's specific strengths and needs.

3. Policies should be equitable.

4. Policies should be fair—not advantaging one region over another.

5. Policies should foster regional approaches, solutions, and alliances.

The authors note two types of federal policy tools vis-à-vis regions: programs and policies that target a specific region or regions, and programs and policies that are national but affect regions differently. Furthermore, they point out that the "viability of [targeted] programs is very much dependent on the relative power of the political delegations" (Hance et al, 2006, p. 17) that create and fight for them.

Two decades ago, regional advocacy was championed by the informal Senate Eggplant Caucus (see Chapter IV), organized by Vermont Senator Patrick Leahy, trying to get the needs of often-ignored Northeast agriculture better recognized in federal policy, to "redress… years of discrimination against East Coast agricultural interests in

farm bills" (Morgan, 2001, para. 2). The caucus stressed that Northeast states, whose agricultural interests are different from those of Midwest commodity- producing states, "deserve a seat at the table." The caucus reshaped crop insurance, conservation, and specialty crop programs (Morgan, 2001). For the House of Representatives, the Northeast Agriculture Caucus is comparable, although it is not clear how active (or influential) this caucus currently is. Leading up to the 2007 farm bill, caucus leader Representative Tim Holden (PA) stated, "We must begin discussions in order to develop proposals of importance to Northeast agriculture. We stand a better chance of being heard … when we speak collectively with a united voice to represent the concerns of our constituents in Northeast agricultural communities. [This caucus] educates Members of Congress and their staffs about the important and complex issues facing farmers in the Northeast" (Hance et al. 2006, p. 14). At the same time, as part of its Northeast Ag Works! Project, NESAWG held a Northeast Regional Policy Summit in 2006 that successfully organized a broad base of constituents to develop a Northeast agenda for the 2007 farm bill. This agenda of policy priorities for the Northeast demonstrated what is possible when policymakers and advocates convene around a shared regional identity. Improvements to regional equity and meat inspection regulations are examples.

This agenda of policy priorities for the Northeast demonstrated what is possible when policymakers and advocates convene around a shared regional identity.

Various federal agencies execute policies that have an impact on food systems, including the USDA, FDA, EPA, and HUD. Similarly, numerous legislative committees write and oversee related policy. Here we focus on the USDA, recognizing that comparable analyses can be made across the agencies. The USDA "is helping communities scale up local and regional food systems" (USDA-AMS, n.d., para.1). The USDA identifies 42 programs in land conservation, production, processing, aggregation/distribution, markets/consumers and research, education, and technical assistance programs "based on where you are in the supply chain" (USDA AMS, n.d., para. 1). While many function at the individual farm and local community level, and some (e.g., Specialty Crop Block Grants) are limited to states, (the Specialty Crop Multi-State program overcomes that limit, but with significant disincentives.), some projects can be multi-state (e.g., AFRI, BFRDP, SARE, CIG, CPP, FSMIP). In this list, however, multistate projects are not specifically called for or incentivized. The USDA Sustainable Agriculture Research and Education (SARE) Program is an example of a successful regional approach. This competitive federal grant program is administered out of four SARE regions that shape their own research, education, professional development, and farmer grant programs. Northeast SARE funds projects in the Northeast, mainly exclusively for the Northeast, although projects can have national application.

An example of an effort to redress allocation inequities is the so-called regional equity provision of the 2002 and 2008 Farm Bills, which redirected some conservation program funding to states that historically had received limited amounts. Most of these states were in the Northeast. The provision was not consistently carried out, and a USDA study concluded

that the provision actually reduced the number of acres treated with conservation practices (Nickerson et al., 2012.

Certain region-focused groups promote regional interests in federal policy.

Certain region-focused groups promote regional interests in federal policy. The national Council of State Governments' Eastern Regional Conference (CSG/ERC) has an Agriculture and Rural Development Committee, comprised of the leaders of Northeast state legislative committees. It addresses agriculture policy that promotes Northeast agriculture in state and federal policy. CSG/ERC's committees on health, transportation, energy, and environment touch on food system aspects; there is no committee on food issues.

The National Association of State Departments of Agriculture (NASDA) is composed of state agriculture secretaries, commissioners, and directors. It is divided into four regions. The NASDA Foundation is a nonprofit educational and research organization that serves the NASDA members. "When it comes to the regional food systems approach, state departments of agriculture can play a unique and leading role. Their position as conveners and entities who are already working across state lines can bring significant value to the table on new regional food systems projects," said the NASDA Associate Director of Public Policy (personal communication, December 4, 2019). Furthermore, the Director noted, NASDA demonstrates appreciation of regional differences by inviting regions to identify their own interest areas. In 2019, all four regions identified economic development and land access as "general interests." Climate resiliency, natural disasters, and invasive pests were examples of interests identified by only one or two regions.

In the Northeast, the Northeast Association of States Departments of Agriculture (NEASDA) advocates for its region on federal policy and provides a fruitful forum for states to learn from and collaborate with each other. For example, nongovernmental players such as NESAWG and several philanthropic food system funders have participated in annual NEASDA meetings, addressing topics ranging from food safety to land access. In another example of fruitful advocacy associations, the history of sustainable agriculture working groups (SAWG) began with the Midwest SAWG, whose intention was to bring the interests of Midwest sustainable agriculture constituents to federal farm policy. Southern, Northeast, Western, and California SAWGs followed, each championing its respective region's federal policy agenda (among other activities and purposes). The SAWGs felt a common cause; they communicated with each other and in collaboration with the National Sustainable Agriculture Coalition (NSAC) (and its previous incarnations), advocated for federal farm and food policies that responded equitably to regional concerns such as the regional equity provisions of the NRCS EQIP conservation programs.

The Northeast has a history of mobilizing the region around federal food and farm policy. As mentioned above, in the two years leading up to the 2008 Farm Bill, NESAWG facilitated a formal multisector and multistate process to establish a Northeast Farm Bill

agenda, outlining priorities for the region that advocacy groups were able to champion with unprecedented successful results. For example, the Cooperative Interstate Meat and Poultry Shipment Program is a federal policy from the 2008 Farm Bill that enhances the regional marketing of meat products. Currently, the National Campaign for Sustainable Agriculture and the National Young Farmers Coalition employ regional organizers to help educate and mobilize groups in particular regions concerning the Farm Bill and other federal food system legislation.

The fight for regionalism in federal policy goes on. Grassroots advocacy has improved federal lawmakers' sensitivity to regional differences and needs. Initiatives ranging from the Food Insecurity Nutrition Incentives Program (FINI) to the 2020 Regional Food Systems Partnership Program, to crop insurance reforms to Urban Agriculture and Innovation Production grants, for example, reflect this growing awareness.

The new USDA-AMS Regional Food System Partnership Program holds promise. For example, it provides grants "to plan and develop local or regional food systems" (USDA-AMS, para. 1). The RFSPP defines local and regional food as follows:

> *Local and regional food means food that is raised, produced, aggregated, stored, processed, and distributed in the locality or region where the final product is marketed to consumers, so that the total distance that the product travels between the farm or ranch where the product originates and the point of sale to the end consumer is kept to a minimum, or both the final market and the origin of the product are within the same State, territory, or tribal land. (USDA-AMS, Regional Food System Partnerships FY 2020 Request for Applications, 2020, p. 23)*

The phrase "kept to a minimum" is ambiguous and no guidance is given in the application. It seems that its definition allows for multistate projects.

Of 23 projects funded in the first round of applications in 2020, three were multistate. One was granted to the New England State Food System Planners Partnership. Another was granted to the Northeast Grainshed Partnership (New England, New Jersey, and New York), and the third to a central Appalachia collaborative across six states. The rest target metro areas and individual states. We hope that in future rounds more multistate projects will be advanced and funded. Similarly, revising the rules around the Specialty Crop Multi-State Program might lead to more regional projects.

Food supply chain capacity

Food supply chain capacity is the ability of participants in the food chain to build both the skills needed to engage in and support region-scale initiatives and the power to do so equitably. In this report, we are interested in participants who develop or support sustainable food systems at the region scale or that strengthen regional food systems. In this section, we first

discuss service providers, then capacity building for food supply chain players from producers to sellers and servers.

Support services. It is worth repeating that everyone and every group, including service providers, has a role to play in advancing regional food systems. Support services include a wide range of public and private organizations, firms, and individuals who provide information, technical assistance, capital, and other support to food system actors. Service providers include financial, business, and technical advisors; consultants, educators and trainers in all food chain sectors; input suppliers; land use, environmental, and economic development planners; lenders; and farm and food safety inspectors, among many others. These service providers make up the essential scaffolding to inform, educate, advise, and connect their clients. Some providers work within their institutions and silos; others reach across sectors and disciplines to form multi.-sector service delivery teams and collaborations.

Everyone and every group, including service providers, has a role to play in advancing regional food systems.

Academia and Extension have key places at the regional food system table. There is a long history of collaboration among cooperative extension programs and staff and university researchers across states, even as competition for scarce resources often undermines these impulses. As evidenced in this report, researchers in land-grant universities (LGUs) and other institutions of higher education have made notable contributions to understanding and advancing regional food systems. That said, it is also important to note that over 10 million acres of Indigenous land were taken from tribes and Native Communities and granted to states to create our nation's land grant colleges, whether by becoming campuses or sold for the proceeds to buy other land (Lee & Ahtone, 2020).

The 2016 annual symposium convened by the Chicago Council on Global Affairs brought LGU representatives together to explore the role of LGUs in building resilient food systems (CCGA, 2016). Among the significant roles identified were research using multidisciplinary and integrated approaches, and knowledge dissemination. At the national networking level, the Inter-institutional Network for Food, Agriculture, and Sustainability (INFAS) is composed of over two dozen academic institutions. Its purpose is to accelerate the transition to sustainable food systems and increase food system resilience, including efforts to forge "collaborative solutions across regions" (University of California, Davis, 2020). Four Northeast institutions are members, but more should be encouraged to join. (Kate Clancy, this report's co-author, is an "independent scholar" member.)

Within the Extension community, the eXtension Community, Local & Regional Food Systems Community of Practice is an online forum of over 400 members, with a repository of data and materials on sustainable food systems and food system resilience. It was formed by the EFSNE project with partners from the University of Wisconsin and Ohio State University to provide information and networking opportunities for educators, community-

based practitioners, policy makers, farmers and growers, families, and individuals involved in building equitable, health-promoting, resilient and economically balanced food systems. Michigan State University has a Center for Regional Food Systems and Iowa State University has a Regional Food Systems Working Group. A regional network of Cooperative Extension food safety and produce specialists, educators, and food science faculty from the six New England land-grant universities manages the New England Food Entrepreneurs website and delivers food safety education programs.

The Food Systems Research Center at the University of Vermont (UVM), launched in 2021 as a collaboration between UVM and the USDA Agricultural Research Service, is the first USDA research station that specifically studies local and regional food systems. The center received $11 million in federal funds to "support the Center's work researching all facets of the regional food system, from production agriculture to food security" (University of Vermont, 2021, para. 1). The research focus is small and medium-sized farms in New England and utilizes an integrated approach. The first projects "address the ecological sustainability and economic utility of animal systems, and small farm viability, sustainable production, and human nutrition in plant-based food systems" (USDA ARS, n.d., para.1). Importantly the goal is to integrate the research projects to connect their components.

There are many examples of state-wide groups and networks of providers, from land trust coalitions to food bank associations. Regional service provider networks are important for sharing information (e.g., best practices, new resources, project opportunities) and solving problems pertinent to a larger area. They foster efficient and shared use of resources and build skills through professional development. They recruit and connect new providers and develop collaborative projects. A broad place-based approach is more conducive to tackling problems from a systems perspective rather than within a single locale, discipline, or institution.

Examples of service provider entities and networks in the Northeast attest to the value of thinking and serving regionally. The Blueprint is a relatively new business assistance network that advises farm and food businesses in New England and part of New York. The Northeast Regional Center for Rural Development (NERCRD), with core funding from USDA and the region's land-grant universities, provides research-based information to "help create regional prosperity … in the northeastern United States" (NERCRD, 2021, para. 1). NERCRD was the host entity for the EFSNE Project, the multi-institution research collaboration described above. The Northeastern IPM Center, one of four regional IPM Centers funded by USDA, fosters the development and adoption of integrated pest management across the twelve Northeast states. The center works "to identify and address regional priorities, whether for research, education or outreach" (Northeastern IPM Center, n.d., para. 1). USDA-supported regional cooperative development centers function similarly.

To support the region's beginning farmers, the Northeast Beginning Farmer Learning Network, based at Cornell University, facilitates a regional network of providers who work

with aspiring or beginning farmers. Land For Good's Land Access Projects, funded by the USDA Beginning Farmer and Rancher Development Program, developed a six-state New England collaborative network of professionals engaged in land access and transfer services. LFG also hosts the Farm Transfer Network of New England, a multistate online searchable database of farm succession advisors. The New England Extension Food Safety Consortium is an outreach program of six land-grant universities. Notwithstanding these examples, working regionally presents challenges for service providers; these are discussed in Chapter VII.

Lenders, investors, government grantors, philanthropies, and donors also have important contributions to advancing regional food systems.

Lenders, investors, government grantors, philanthropies, and donors also have important contributions to advancing regional food systems. The private funder sector can be nimbler and more creative in this arena than government. Dabson (2009) appeals directly to these funders: "Encourage initiatives that support regional collaboration focused on micropolitan centers and on their competitive advantage in food systems. … Encourage … exploration of rural-urban interdependence.… Invest in building institutional capacity among planning and service delivery organizations … and invest in improved metrics for measuring the impacts of philanthropic and other investments in rural and regional contexts" (p. 108).

Some place-based philanthropic affinity groups have emerged to support region-scale food systems project, like the Community Food Funders and funders like the John Merck Fund with specific regional food systems program areas. In 2014, the Barr Foundation began to evolve toward a regional approach, which has enabled this foundation to build broad-based support, networks, leadership, and thoughtful constituent engagement. Farm Credit East's AgEnhancement Program offers grants for state and regional projects in eight Northeast states.

Food supply chain players. Like service providers, participants along the food chain need information, connection, and support. Individual supply chain actors from farmers to restaurant owners need help with business planning. They also need opportunities to make deals and build sector influence. The purpose of industry and trade groups is to meet these needs. These groups are not likely to be effective or efficient at the local level. Some, like Restaurant Opportunities Center United, are networks of chapters—some at the local (e.g., New York City) and some at the state (e.g., Michigan) level, woven into a national presence. The New England Apple Association covers six states. The Northeast Dairy Producers Alliance offers resources for organic and transitioning dairy farmers, as well as educators, certifiers, and consumers in this region (NODPA, 2021). The biennial New England Vegetable and Fruit Conference and Trade Show is a collaboration between growers (the New England Vegetable and Berry Growers Association and others) and Extension in seven states to gather growers, advisors, researchers, and industry representatives from within the region and beyond. In 2015 the USDA-AMS Local Food Promotion Program (LFPP) made a grant

to the Natural Capital Investment Fund (renamed Partner Community Capital) to enhance the supply and selection of local produce between wholesale markets in West Virginia, Ohio, and Southwest Virginia. The grant was to reinvent a robust local food economy in West Virginia; in fact, it has served three states in central Appalachia (Partner Community Capital, n.d).

Multisector networks—especially those that bring service providers, food chain players, and citizens together—appear to be particularly effective at the regional level. Future Harvest/ CASA, Food Solutions New England, NESAWG, and the Northeast Organic Farming Association are examples. Local networks such as buy local groups have strong appeal but limited resources and clout. National networks such as NSAC can and do have considerable clout. It is challenging, logistically, and financially, for national groups to mobilize people around a common cause.

Public engagement: thinking and acting regionally

The public interest in and understanding of regional food systems is hard to gauge in part because of the conflation of terms described earlier (see Chapter II). Also, the concept of 'regional' changes according to the context. "Buy Local," not "Buy Regional," has been at the forefront of attention, and the public has had little exposure to the idea of a regional scale and the importance of having multiple scales engaged in a resilient system. This poses a challenge to mounting campaigns for regionally branded foods or optimally located infrastructure. Such a low level of awareness makes it hard to capture the attention of consumers in the marketplace.

The EFSNE Project inquired into how consumers think about regional foods and regional food systems. Researchers conducted seven focus groups with a total of 51 participants in the low-income areas in which the supermarkets participating in the project were located, asking them how they defined their region. Three of the focus groups were conducted with immigrants who mentioned their home country of origin first, and then larger regions in the Northeast such as New England or the Mid-Atlantic (Palmer et al., 2017). Researchers queried community members on how they defined their own region in general, and about regional themes related to food. They did not expect groups to have any consistent response, due to little exposure to the concept of regions. That proved to be the case. People identified the East Coast, New England and the Mid-Atlantic, and contiguous regions such as the Delmarva and the Chesapeake. Others named states or regions within states such as Vermont's Northeast Kingdom. Food and foodways figured prominently in what people associate with a region, such as crabs, apples, or blueberries. Immigrants often spoke about the importance of being able to buy "home country" food, such as tropical fruits, where they now lived.

Recent research shows that institutions are increasingly likely to support and expand regional food supply chains (Fitch & Santo, 2016). Farm-to-institution efforts have long recognized the need to go beyond local levels to find the volumes needed for hospitals, schools, etc. As

Institutions are increasingly likely to support and expand regional food supply chains.

mentioned earlier, retailers have reported that they are using the term "regional" to be more transparent about sources when local supplies are too limited (Palmer et al., 2017). In the same vein, a survey of fresh produce retailers and distributors in Ohio found that regional food systems distribution and retail opportunities are greatest with midsize distributors and retail firms that have adequate infrastructure, serve larger areas, and are most likely to cooperate in supply chain development in the state (Clark & Inwood, 2015).

Some baseline information exists about preferred food sources. When shoppers were asked in an EFSNE project store survey about their preferences regarding food origin, there were differences between the responses of rural and non-rural respondents (Palmer et al., 2017). The latter group expressed a stronger preference for purchasing food grown or raised within a 100-mile radius, while the former group expressed a preference for purchasing food grown/raised within a broader geographic region, a combination of within the state and the neighboring state. Despite less exposure to the concept, 13% of respondents chose the entire Northeast as their preference. This result demonstrates that there is a portion of the population already prone to respond positively to regional labels or campaigns.

Shoppers identify several competing elements that are the most important to them when purchasing food and beverages. Taste, price, healthfulness, convenience, and sustainability were the top five reasons given in U.S. surveys between 2012 and 2016 (Statista Research Department, 2016). After about 30 years of familiarity with the concept, buying local has the highest consumer awareness (46%) among 16 social causes measured in a survey (Nielsen IQ, 2019). It will take some time for "regional" food to rise to that level of consumer awareness, so we believe it is important to continue to educate consumers about the unique benefits of a regionally oriented food system

We have acknowledged that most people are not inclined to "think regionally." According to social movement theory, the extent to which citizens mobilize to action, whether a food purchase or a political protest, depends on how strongly the choice or action resonates—that is, the degree to which it corresponds to everyday life and meaning (Stevenson, et al., 2007). "Knowing your farmer," saving a local farm, fighting for a neighborhood grocery, or starting a community garden are examples of issues that resonate with citizens at the local level.

Where product is aggregated from a region, rather than sold directly within a specific community, consumers may not "know their farmer."

In reality, where product is aggregated from a region, rather than sold directly within a specific community, consumers may not "know their farmer." Organic agriculture, climate change, and anti-racism movements, by contrast, have national salience (albeit with local application). The power and potential of food and farming as motivators of interest in food security, sustainability, and resilience is

its ability to attract citizens at multiple scales and through multiple doors, from anti-hunger to water quality, from obesity prevention to food safety. It encourages people to respond as citizens, not "just" consumers.

Regional thinking invites employing scale for intervention as well as analysis. It encourages inquiry about the appropriate scale for action, and whether it is best to scale up (enlarge) or scale out (replicate). Regionalism helps connect the dots: it fosters systems thinking by looking at relationships, "how a system is influenced by the systems above and below" (Dahlberg, 1993, p. 77). In siting a supermarket, for example, local citizens would (ideally) investigate regional supply and transportation infrastructure. For example, the Groundswell Center for Local Food and Farming is based in Ithaca, New York, part of New York's Finger Lakes region, which is part of New York, which is part of the Northeast. Thus Groundswell's work on land access and reparations is at a larger scale than its place-based training farm.

Public education is essential to help citizens make food systems connections and to stimulate action. Academic programs that are training the next generation of food system change leaders have a critically important pulpit from which to encourage regional thinking. Region-scale projects, along with educational and networking events, are instrumental in heightening the understanding and implementation of regionalism. Local groups can facilitate this awareness as can state food policy councils. And rather than pitting urban against rural, a regional perspective can foster a common cause, for instance, when urban eaters connect with a farmers market or rural CSA farm. It is encouraging to see more and more of these connections.

Acting regionally. Every food system sector and player has a role in promoting regional food systems. All can employ a regional framework when useful to advance food systems goals. Thinking in terms of geography and scale rather than silos encourages more sophisticated analyses and actions, and more inclusive collaboration. "In general, coalition building is critical to regionalism because of the nature of a region. … It means creating new collaborative alignments. … In the end, the story of effective metropolitan regionalism is always going to be the search for cross-cutting issues, a never-ending saga that is the meat and potatoes of those efforts" (Katz, 2000, p. 4). Twenty years ago, sprawl was such an issue. Now, timely issues include energy, climate, public health, and food.

We believe that acting regionally requires:

1. Receptivity to the concepts, advantages, and applicability of regionalism;

2. Appropriate governance from public sectors, supply chains, and private sectors;

3. A commitment to social justice to ensure equal benefits from strengthened regional food systems;

4. Cross-sector coalitions and other types of networks;

5. Thinking strategically, not parochially; and

6. Balancing tensions around efficiency, equity, and competing interests.

A basic premise is that an ideal regional food system considers the needs of all stakeholders in the region. In one approach to meeting needs comprehensively, food system advocates have struggled for decades over what social movement theorists call the "master frame." (e.g., Stevenson et al., 2007.) The master frame is the tent that holds several "subframes" and, ideally, all relevant stakeholders. We know that food system transformation needs a big tent. At the same time, the food system is part of larger social movement master frames such as global sustainability, social justice, and public health. Once through the door, the "food movement" is itself a door to one of several potential master frames such as anti-racism, food sovereignty, and land reform. But this raises many questions. Who is at the table, or not—and why? Which people and sectors are most suited for which conversations? When do more chairs get added? What are the best assemblage and structure to address which problems? Even more to the point, "The job of creating a just and environmentally sound food system cannot be separated from the creation of a just and environmentally sound society" (Magdoff et al., 1998, p. 12).

Within the social movement frame, determining relevant food system stakeholders depends on the region of interest and optimal scale of intervention. For example, stakeholders working on the greater Philadelphia foodshed may overlap to some extent with those working on getting more healthy regional food into New York City. This is fine—and productive—if stakeholders in the two cities see the bigger picture together. Strategies must include areas of interest not historically at the "food and agriculture" table, such as land use; rural, urban and transportation planning; public health; energy; fisheries; and workforce and labor. Stakeholders need to proactively make and improve these connections, stimulate conversations, and pursue joint endeavors. A place-based framework (even if the "region- place" is not immediately resonant) will help disparate sectors find common ground.

Nonprofit groups are instrumental in region-based advocacy. A leading example of this is NESAWG: its 1992 founding documents proclaimed regional food systems as its central organizing principle. The annual NESAWG It Takes a Region conference brings a broad spectrum of groups from twelve states to share and strategize across disciplines, cultures, and geographies. Notwithstanding the arguments and examples in this report, there are significant challenges to adopting regional thinking and actualizing regional food systems. These are discussed in Chapter VII.

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These regional food system dimensions cover a lot of ground. With diversity, resilience, and sustainability as overarching themes, we contend that these dimensions—food needs and

supply, natural resource sustainability, economic development, infrastructure, social justice, and human and political capacity—are intertwined. Workers' rights affect food chain business viability. Farmers' access to land connects to food hubs. When groups like CATA, Northeast Farmers of Color, NOFA, Food Solutions New England, Future Harvest/ CASA, Red Tomato, and NESAWG pull on any one thread, they affect the whole cloth.

VII. CONSTRAINTS AND CHALLENGES

Introduction

Food system exchanges and relationships take place at multiple levels and scales. We argue that regionalizing the food system by focusing on regions has significant promise to meet the goals of sustainable, secure, and resilient food systems. This framework encourages the consideration of scale, geography, and systems thinking that enables deeper exploration of food systems and greater opportunity to develop ones that are truly enduring.

This report is not a treatise on the big picture of food system conditions and challenges, which have been written about extensively. We recognize that combatting inequitable and concentrated power, access, and wealth requires social change actions at every level. The relationships between food systems and climate and public health crises must also be examined across scales. Our focus is on how structural food system issues manifest at the regional scale and how regionalism can contribute to positive change in food systems. In this chapter, we look at many of the challenges and constraints that impede or undercut those potential contributions.

Regionalism and regional approaches will not in themselves ameliorate the deeply embedded structural issues in food systems. Regional food systems, like local food systems, do not necessarily offer or promote greater health, justice, or sustainability than other approaches (Born & Purcell, 2006). Foster (2001) notes scant evidence that regional approaches are better suited than local ones for achieving equity. While regions may be "big enough to surround the problem, but small enough to tailor the solution" (Foster, 2001, p. 4), regionalism confronts formidable philosophical, political, and governance challenges. "Equity regionalism" (Foster, 2021, p. 8) can seek to narrow disparities and redistribute resources within or across a region, but these priorities can conflict with other regionalism purposes such as promoting economic growth and managing environmental conditions.

The fact that regional approaches to food system development are gaining traction bodes well for not only strengthening and refining the concept of regionalism, but also for actually developing regionally focused food system initiatives on the ground based on the cumulative research and experience of a growing number of academics and advocates. Nonetheless, practitioners moving into regional initiatives "are not achieving the results they want, nor is the food system yielding desired benefits" (Cumming et al., 2019, p. 208). Efforts to build regional food systems in northeastern North Carolina, for example, are well-intentioned but show limited efficacy; regional food system development is still poorly understood and inadequately supported (Cumming et al., 2019). Among the challenges cited—and we concur—are inadequate coordination, weak institutions, and the relative invisibility of food chain actors. Lacking charisma, "regional food is harder to sell" (Cumming et al., 2019, p. 208). To these challenges we would add those described by McKinney and Essington, such as unfamiliarity with collaborative processes.

Before we explore challenges and constraints associated with the six dimensions explored in the previous chapter, we look at the influences of the COVID-19 pandemic, the Black Lives Matter movement, and the countervailing forces of dominant food systems.

The COVID-19 pandemic and structural racism. The COVID-19 pandemic has shined a glaring light on many shortcomings regarding how we feed ourselves. As a Rockefeller Foundation report notes, "in many ways, COVID-19 has boiled over long-simmering problems plaguing America's food system" (The Rockefeller Foundation, 2020, p. 2). The pandemic is a "wake-up call to the vulnerability of our food systems" (Gralak et al., 2020, p. e309). Famed chef, food writer and editor Ruth Reichl confessed, "I've been writing about food for 50 years, yet it took the COVID-19 crisis to show me just how much I didn't know…about how our food system really works" (Reichl, 2020, p. 36). On the one hand, initially there were food shortages in supermarkets and food banks; on the other, farmers were dumping milk, eggs, and produce in immense amounts. Unprecedentedly long lines for emergency food assistance have occurred, with 14 million children going hungry (Baur, 2020). Disruptions of long complex supply chains, broken domestic and global transportation links, and failed "just-in-time" delivery systems still occur. "Disruptions in the food supply chain have contributed to increased rates of food hardship during COVID-19" (Food Research and Action Center, 2021, p. 24). The "essential" workforce, from farm and processing workers to truck drivers and grocery clerks, has been severely compromised. Indigenous People and people of color—many of whom already suffered from low wages and poor working conditions—have been affected disproportionately.

Food and farm organizations, state agriculture agencies, and funders responded to the crisis with emergency programs, hotlines, technical assistance, and new projects. Among program responses is the USDA's online "Local Food System Response to COVID-19 Resource Hub," designed to develop and share resources on "local *and regional* [emphasis added] food system responses to COVID-19":

> *The COVID-19 pandemic and associated public health and social distancing mandates caused unprecedented shifts and disruptions for Local and Regional Food Systems (LRFS). Impacts on farm enterprises, value chain stakeholders, market channels, and food system infrastructure are both vast and varied, and require rapid adaptation by all involved. The pandemic has also brought new and heightened attention to our food system, and LRFS may be positioned to significantly increase the scope and scale of their market reach as a result (USDA Agricultural Marketing Service, 2020, para. 1).*

Notwithstanding the absence of "regional" in the program title and several missed opportunities to highlight regional food systems in particular, we concur with USDA's observation that the pandemic is both a crisis and an opportunity for LRFS. We hope that the myriad challenges presented by the pandemic can indeed foster structural changes that uplift regional thinking in food systems.

Analyses of the intersection of the COVID-19 pandemic and food systems in general have cited the vulnerabilities and inequities of current food systems. For example, a set of essays from land grant university professionals took a sobering look at the pandemic's impacts on food systems, from global trade to consumer behavior and from agricultural finance to labor supply to critical knowledge gaps (Nayga & Zilberman, 2020). These knowledge gaps have been exposed by "previously unimaginable disruptions in the food supply chain" (Nayga & Zilberman, 2020, p. 34). Campbell (2021) discussed how COVID-19 affected local government perceptions of local food systems and their role in public health emergencies—a worthy endeavor but a missed opportunity to acknowledge and investigate regional food systems.

A report from the Rockefeller Foundation (2020) called for sweeping food systems reform to address the systemic challenges exposed by the pandemic, identifying "three significant shifts" required (p. 7). They include an integrated nutrition security system and more equitable prosperity throughout supply chains. Of particular significance to our report is the third suggested shift, "reinvigorated regional systems" (p. 7) directed toward increased food chain resilience as the current system has "squeezed out much of the redundancy, flexibility, and resilience needed to weather more extreme shocks to the system, while consolidating ownership, infrastructure, and supply into a highly vertically integrated system" (p. 12). This analysis points to the potential of regional food systems to reduce transportation costs, environmental impacts, and inequitable supply chain relationships, while increasing resilience; all this is our report's central argument. Challenges described by the Rockefeller Foundation report include insufficient investment in infrastructure, balancing food safety with diversity among food chain players, and building financial incentives that promote food chain flexibility and agility.

The coronavirus pandemic has intersected with the Black Lives Matter movement, which also has dramatically exposed the many deep-seated racial disparities in the U.S. Far from being a great equalizer, COVID-19 has disproportionately affected BIPOC populations, in

part due to the prevalence of underlying conditions that afflict many BIPOC, which are in turn a significant consequence of limited access to and ability to pay for healthy food. These are largely structural conditions, not individual choices. The Food Research and Action Center (FRAC) is studying how the impact of the economic and public health crises from COVID-19 have exacerbated pre-existing disparities in health and food security across different populations. FRAC (2021) argues that linkages among COVID-19, health, food insecurity, and poverty are "all influenced by systems of oppression, like structural racism, gender inequity, and classism, making adverse effects and feedback loops stronger among marginalized communities" (p. 4).

COVID-19 disparities are also tied to the fact that BIPOC are overrepresented in "essential" low-wage, high-exposure food system jobs (Alkon et al., 2020) from meatpacking and waste collection to parcel and food delivery to staff at emergency food sites. Researchers affirm that COVID-19 has posed an occupational health risk to front-line food system workers, who are among the most economically vulnerable and at-risk populations (Food Chain Workers Alliance, 2021; Parks et al., 2020).

BIPOC are more likely to suffer from food insecurity and rely on SNAP and emergency and school food programs in greater proportions than white people. As Alkon and colleagues (2020) describe, "residential segregation and gentrification, racism in public health and medical institutions and labor conditions throughout the food sector contribute to racial and economic food- related health disparities" (p. 535). These systemic forces pervade all U.S. regions.

New appreciation for a region's farmers and shorter supply chains will not easily translate into a new food system paradigm.

The overarching challenge related to the pandemic and social injustice is that despite their triggering heightened awareness of the profound flaws in the country's food systems, those flaws remain deeply embedded and intractable. New appreciation for a region's farmers and shorter supply chains will not easily translate into a new, more equitable food system paradigm. Regionalized food systems may increase resilience in the face of future public health crises, but at this point the trade-offs are not known. How can the pandemic calamity and the Black Lives Matter movement be leveraged into opportunity, particularly when, at this point, responses are focused mainly on crisis management? We offer some suggestions in Chapter VIII.

Resilience, diversity, and sustainability

Resilience

Resilience should be a goal of food systems at every scale, especially regional, because it is the scale that can offer the best solutions to challenges such as climate change; equitable economic development; land, water, and energy crises; and public health (Lengnick et al.,

2015; Pollan, 2008). Anticipating and planning for change in order to pursue resilience in regional supply chains is necessary and advantageous for any business that wants to remain viable (Miller et al., 2013). However, it is not clear from our research that pursuing resilience is being taken to heart in most areas.

Resilient systems have many important qualities: conductivity (components are strongly connected and integrated, such as multiple nodes of supply chains), redundancy and back-up reserves, diversity, openness, and reflexivity (seeing the connections between social and ecological systems such as in the governance of a food supply chain), and the ecological integration of environmental and social or economic elements (Worstell & Green, 2017). Researchers have identified some key characteristics that allow communities and supply chains to adapt to uncertainties: flexibility, capacity to organize, capacity to learn and adapt, an asset base that offers a diversity of options within each asset type (for example, natural, social, and financial assets), and equal access to all kinds of assets such as land, credit, loans, ecosystem services, and others (Lengnick et al., 2015).

The challenge is to assess these characteristics and use them to facilitate the development of regional systems. Conscientious assessments need to be done in regions to determine which resilience characteristics have already been met and which need work. Depending on a particular region's scale and assets, it may not have the adequate capacity to assess and develop its own food systems. Ascertaining a region's situation is essential to determine the planning framework for the future.

Defining the scale and boundaries of a particular region is a complex task, driven by its specific purpose(s) and shaped by factors such as policy and markets. In addition, attaining resilience means that the scales above and below the focal scale must be kept in mind because, as we discussed in Chapter III, the policies and processes operating at other scales can have direct influences on the focal scale (Lengnick et al., 2015; Newman & Dale, 2009). This requires systems thinking and collaboration. Short-term fixes of climate-caused or other food systems disruptions are important, but they may not equip the system to overcome longer-term consequences.

Diversity

There is a wealth of knowledge about how to increase diversity and biodiversity in agriculture production. Strategies include polycultures instead of monocultures, integration of animals with crop production, crop rotation, and choices of different crop varieties and animal breeds (Biodiversity International, 2017). These can require more expertise, management skill, and labor, but have large returns in resilience and sustainability. Perhaps a bigger challenge facing increased diversity is developing the knowledge and ability to increase diversity in the other nodes along the supply chain, such as manufacturing and wholesaling.

There is another problematic diversity issue in food systems. Aside from the wide selection of fresh produce, the apparent diversity of food products available in markets is misleading

because so many manufactured products are made from a small number of refined flours, oils, and sugars, including high-fructose corn syrup (Cook, 2017). Only 50 of the crops measured in a global study contribute to the top 90% of calories, protein, and fat consumed (Khoury et al., 2014).

New product development is one of the ways that food companies keep their market share. However, since the 1970s, consumers have become more interested in organic foods, animal welfare, traceability, healthier versions of foods, improved food safety, and foods produced more sustainably. Some manufacturers are responding by modifying their food development and production processes, but there are a lot of misleading and invalid claims being made about the "healthier" versions. More organic and healthy foods are now available, but it will take much more innovation and scaling up to meet what is predicted to be even greater demand for these new and diverse food products (Azanedo et al., 2020).

Diversity in populations, economics, and governance has clear advantages for resilience but can raise tensions.

Diversity in populations, economics, governance, and ways of knowing has clear advantages for resilience but can raise tensions (especially notable in our current political environment). Institutional diversity at a regional scale, composed of "separately constituted bodies with overlapping jurisdictions that do not stand in a hierarchical relationship to each other" (Skelcher, 2004, p. 89), will provide the largest degree of resilience when complex problems have to be addressed (Bristow & Healy, 2014). The challenge is establishing governance structures and processes that foster institutional diversity while modulating tensions.

Sustainability

A number of challenges impede the creation of sustainable food systems. They need to be "more appropriately conceptualized as complex, heterogeneous over space and time, and replete with linear as well as nonlinear feedbacks" (Bene et al., 2018, p. 127). Conceptualization includes clarifying what precisely is meant by such a system, particularly what dimensions of sustainability should be included. Bene et al. argue that at this point, the social—and in some cases economic—dimensions of food systems still do not receive sufficient attention. They believe that the local nature of food systems needs to be more strongly acknowledged to understand needed governance, identify the indicators to measure steps toward sustainability goals, and recognize the centrality of culture to the sustainability concept. We would make the same arguments for a region-specific analysis, rather than local, recognizing that 'local' nests within 'regional,' and that the food supply, economic, environmental, and other issues suggest the regional as a critical scale to advance sustainability.

There are several constraints to sustainability at all scales. Management strategies must be applied at the appropriate levels to be successful (Dale et al., 2010). Unfortunately, "research and extension activities are much more poorly focused at the higher hierarchical levels"

(Lowrance et al., 1986, p. 173) described in Chapter VI. The micro- and macroeconomic scales (of farm businesses at the micro level of management, and concerns such as loan interest rates at the macro level) that are so important at a regional scale have been largely ignored. Hence, the regional scale is still less understood than either larger or smaller scales.

At a landscape or regional level, additive effects occur from agronomic and economic practices on farms in the region, generally leading to environmental degradation (Lowrance et al., 1986). For example, if reduced tillage was applied across a large area, sedimentation in streams or reservoirs could be decreased. An iconic illustration of this is the linkages seen for many decades between fertilizer runoff from Midwest farms and dead zones in the Gulf of Mexico. Despite many efforts to improve the situation, there is a long way to go. One goal of sustainability efforts should be that all land use in a region meets reasonable soil, water, and air-quality criteria (Lowrance et al., 1986).

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Another major challenge to food system improvement is understanding and accepting the trade-offs that can occur among environmental, social, and economic goals (Allen et al., 2018; Dale et al., 2010; National Research Council, 2010). In too many instances, such as with waterways, the social and economic benefits have been given priority, leading to highly damaged water ecosystems. A clear example is the trade-off between resilient and sustainable production in the face of climatic or market volatility that might result in lower yields or profits in some years but better outcomes in subsequent years. The more variable and unpredictable conditions become, the stronger the argument becomes for trading some degree of maximum productivity or efficiency for greater stability (NRC, 2010).

Because food systems are social and ecological phenomena, trade-offs affecting the resilience of systems should be measured along both dimensions. They can be differentiated quantitatively and qualitatively, and when a careful assessment is done the trade-offs between them can be perceived (Allen et al., 2018).

Food needs and supply

Food security and self-reliance

Challenges to household and community food security in the Northeast have been presented in Chapter IV. The overall food security of the region in terms of carrying capacity is discussed in several studies described in the previous chapter. These studies have several limitations, which are discussed below and, importantly, must be understood as aspirational about regional food systems. To achieve the aspirational vision portrayed in these studies, significant improvements will be required: production and distribution practices to preserve natural resources; consumption patterns of the population, especially of livestock that require large pasture and cropping areas and contribute to climate

warming; and knowledge about state and regional parameters such as boundary lines, laws, and regulations, now and in the future.

As described in Chapter VI, the carrying capacity based on current productivity (persons fed per unit of land) of the Northeast ranges from 14% to 28% of the population fed from within the region, depending on the type of diet (Griffin et al., 2018). Taking urban food production into consideration, studies in Toronto and Cleveland (described in more detail in Chapter VI) have calculated that about 10% of each city's fresh produce, poultry, eggs, and honey could be produced using most of their available urban space (Grewal & Grewal, 2011; MacRae et al., 2012).

Because so many programs and policy changes will be required to reach even this level, we believe that, at this time, a conservative number is appropriate for planning purposes for the Northeast region. Taking the midpoint between 17% and 28% calculated by Peters et al. (2018) as approximately 22% and adding a generous 5% from the Toronto and Cleveland analyses gives a projection that about 27% of the needed food supply could be produced within the twelve-state region. Considering that the Northeast states historically have imported up to 95% of their food (see Chapter VI), the new calculation suggests that that number could be reduced to about 75%. This is a significant decrease in importation. However, the constraints imposed by the relatively small amount of arable land in the Northeast compared to its large population remain.

As also described in Chapter VI, researchers have arrived at different land requirement estimates for the average number of acres needed per person per year. The most comprehensive calculation (Peters et al., 2007) puts the acreage at .9 acres per person in New York State for a diet containing 80% of the average U.S. meat consumption at the time of the calculation. More research is needed to gather supportive, replicated, and more granular data on the carrying capacity numbers. One of the biggest and most controversial challenges is whether to increase the acreage available to produce food by clearing forest lands, which pits the climate argument against the production argument.

Furthermore, and notwithstanding their contributions, the studies mentioned in Chapter VI have limitations. They ignore necessary export and import activities, do not consider policies such as zoning that thwart the capacity to produce more food in urban areas, and fail to address farmland preservation. Also, these simplified models do not recognize that subregions necessarily tend to specialize in certain types of agriculture, do not account for present food-processing capacity and distribution infrastructure (or the lack of it), and do not account for economic factors like economies of scale that might benefit both producers in enhancing their long-term viability and consumers who might enjoy lower prices (Peters et al., 2009).

Urban and peri-urban agriculture and infrastructure

As described in Chapter VI, urban agriculture is a vital component of a more resilient food system. Nonetheless, even in the most ambitious vision, urban agriculture in the U.S. is unlikely to substantially meet food needs. Limitations of urban agriculture that have been documented include problems with access to land, the impermanence of land for use as farms or gardens, low interest in gardening in several areas, needed subsidies of urban farms (which may not be sustainable over time), soil contamination, and increased transportation emissions from more short trips to deliver food (Ackerman et al., 2011; Clancy, 2012; Santo et al., 2016). There are also concerns about the potential for gentrification and displacement of residents, usually low-income and people of color, as property values increase in cities (Santo et al., 2016). Furthermore, benefits of urban farming initiatives such as food access and security do not necessarily accrue to neighborhood residents (Rangarajan & Riordan, 2016).

Another important limitation on urban agriculture is that within a 50- or 100-mile radius, a city is likely to incorporate many other large urban areas, which may also define their own regions to include other cities and often multiple states. For example, the New York City Metropolitan Statistical Area (MSA) comprises parts of three states: New York, New Jersey and Pennsylvania, with New York City the largest urbanized area. Philadelphia has its own MSA, comprising parts of three states: Pennsylvania, New Jersey, and Delaware. Foods grown in a region would be delivered to most of these cities, not just those closest to the production area, so utilizing a regional approach to food security challenges would be the best option.

Furthermore, it is instructive to note that among many ways to decrease urban environmental footprints (e.g., greenhouse gas emissions [GHG], water use and land use) the most effective is replacing beef with poultry and pork as meat sources in urban diets and eliminating avoidable household food waste. In itself, increasing urban agriculture has little impact on land, water and GHGs according to research done in two cities in India and two U.S. cities—New York and Minneapolis (Boyer & Ramaswami, 2017).

Vertical farming and other urban growing methods such as indoor agriculture, controlled environment agriculture, and pyramid farms involve high-tech, non–soil-based ways of producing food. Proponents of these methods offer veritable utopian visions of the benefits such food production could provide: reducing food miles, air pollution, water consumption, fertilizer, pesticide and fossil-fuel use, and crop losses, while combating climate change. It also promises increased recycling, food security, food safety, productivity, health, social interactions, local jobs, abundant produce in low-income areas, and improved urban economies (Al-Kodmany, 2018). But there are myriad challenges for the success and contributions of these enterprises. To consider economic bottom lines: startup costs are very high, and concentration and consolidation in all sectors of food systems increase the potential for market volatility, supply bottlenecks, and inconsistent food access. Long-term trends such as urbanization and the rising cost of fuel are driving

concentration throughout the economy, and climate change puts additional pressure on these brittle systems (Miller et al., 2016). As these vertical farms must be profitable to succeed, their locations are likely to be in high-income areas of cities (Al-Kodmany, 2018), not in low-income areas where promises are often made to provide low-cost produce to residents. The best economic use of high-rise buildings in urban areas will continue to be real estate, not farming—until, as a study predicted, the productivity of an indoor farm is 50 times that of a soil-based farm in a rural area (La Rosa et al., 2014).

Furthermore, "the current product of vertical farms is limited in scope and quantities" (Al-Kodmany, 2018, p. 29). Vertical farms are suitable for growing greens and herbs, ornamental and field transplants, and tomatoes and strawberries (Al-Kodmany, 2018; Runkle, 2019) so they will provide only a small percentage of the kilocalories, proteins, and fats required in healthy diets. And indoor farms will only be viable if they develop through the well-planned and managed interdisciplinary coordination of businesses, horticulture, and engineering; determine the potential opportunities and challenges for rural agricultural production in an economy that features widespread urban farming; and develop an urban-rural connectivity to promote job creation and agriculture in rural, peri-urban, and urban locations (USDA Office of the Chief Scientist [OCS], 2019).

Natural resources

Climate and climate change

Climate risk is the potential for uncertain adverse consequences to human or ecological systems due to climate change (Matthews et al., 2021). It is a combination of hazard exposure, the type and intensity of climate change effects likely to occur in a particular place; sensitivity, the degree to which elements of a farm or other food system entity responds to climate change events (Lengnick, 2015); and adaptive capacity, the ability of a system to adjust to damages, take advantage of opportunities, or respond to the consequences of climate hazards (Matthews et al., 2021).

There are many different consequences of climate change with which food supply chain actors have to deal.

There are many different consequences of climate change with which food supply chain actors have to deal. The U.S. agricultural production sector is not only dealing with climate changes such as droughts but also is a net emitter of GHGs, although agriculture is responsible for only 9.6% of total U.S. emissions (U.S. Environmental Protection Agency, 2021). Methane emissions from enteric fermentation in animals (27%) and manure management (10%) accounted for more than a third of methane emissions in the U.S. in 2019 (U.S. EPA, 2021). The largest source of nitrous oxide in agriculture is soil management practices (75%) such as the use of synthetic and organic fertilizers, the growth of nitrogen-fixing crops, and depositions of livestock manure (U.S. EPA, 2021).

With regard to livestock manure management, recent research shows that manure used to fertilize croplands in spring and summer can dramatically increase GHG emissions in winter (Adair et al., 2019).

Carbon dioxide emissions from farming are very low (U.S. EPA, 2021). Agriculture could sequester significant amounts of carbon through land management and land-use changes such as crop rotations, cover crops, returning organic residue to soils, reduced tillage, and agroforestry. Some farmers have adopted these practices, but the percentage of acres planted to cover crops was only 3.9% of U.S. cropland in 2017 (Zulauf & Brown, 2019). Cover crops are grasses and legumes planted after harvest to decrease soil erosion and enhance fertility, as those crops are tilled into the soil before the next planting. Of the top 11 states with the highest share of cropland in cover crops, eight are in the Northeast; of them, the highest percentage is in Maryland (29%). The challenge is finding additional ways of incentivizing, educating about, and integrating best soil management practices to bring about a much larger percentage of cover crop utilization in the Northeast and the rest of the U.S. (NSAC, 2019).

As described in the previous chapter, the Northeast is warming faster and experiencing more increases in precipitation than any other region in the contiguous U.S. (Olson, 2020; USGCRP, 2018), which adds to production risks (Miller et al., 2013). Ironically, the region also will experience more drought at certain times of the year. Predictive models of increasing temperatures and decreasing rainfall show that nine states, including Delaware, Connecticut, and Rhode Island in the Northeast, would experience the greatest negative impacts in productivity (Wang et al., 2019).

The Northeast is warming faster and experiencing more increases in precipitation than any other region in the contiguous U.S..

Regional food systems that can buffer disruptions from climate change are more likely to foster resiliency (Fleisher, 2019). A regional scale is more likely to have such resiliency because of crop diversity, soil characteristics and climates across a broader geopolitical area (Fleisher, 2019). In 2013 regional efforts were mainly focused on community adaptation and agricultural production. Still, adaptations need to occur at many levels: crop, farm, and supply chains, through public- and private-sector investments, and policies and planning at regional and global levels (Miller et al., 2013).

Farmers in the Northeast face other challenges in adapting to the risks of climate change. One is the cost of the investments needed for irrigation and cool storage in places where winter temperatures are higher than what has been considered normal. Another is that most farms and ranchers already operate with low profit margins, and therefore increase their risks when they adopt organic or other practices, which increase resilience because they usually see lower yields through a transition period, which lowers income for two to three years (Olson, 2020; Riensche & Jakhar, 2019). Another issue is unfairly disproportionate allocations from government conservation programs that provide funding for working lands, including the Environmental Quality Incentives Program, the Conservation Security Program, and the

Conservation Stewardship Program. In 2015, the smallest percentage of payments, only 5.9%, went to midsized farms (defined as gross cash farm income of $350,000–$999,999), and 31.4% went to small farms (McFadden & Hoppe, 2017). Of federal programs that indemnify crop insurance premiums, only 11% were payments to midsized farms (McFadden & Hoppe, 2017).

Another challenge is that the costs of government risk management programs are expected to increase as climate changes. In a recent USDA ERS study, all likely U.S. climate scenarios show lower domestic production of corn, soybeans, and wheat as temperature rises. Prices will increase, increasing costs of payments and premiums—an effect found in scenarios in which adaptation has already occurred (Crane-Droesch et al., 2019). Crop insurance also inflates land values, adding to producer costs. However, crop insurance that motivates greater crop and livestock diversity and increases carbon sequestration can reduce GHGs from monoculture corn-soybean production systems (NSAC, 2019).

A further constraint on producers instituting sustainable and resilient systems and practices is the lack of research that could provide more guidance to producers about the adaptation potential of processes such as cultivar development, irrigation, and land-use changes. There has not been adequate testing and development of models and adaptation strategies. One reason is the transdisciplinary nature of this work (Fleisher, 2019; Miller et al., 2013) and the dearth of research on new methods and strategies for farmers and regions by inter- or transdisciplinary teams. This results in farmers not getting many of the tools and practices they need to remain viable. Unfortunately, while research on models that can be applied to broader spatial scales and food systems should be encouraged and supported, appropriations for agricultural research are declining (NSAC, 2020; Rowley, 2020).

Miller and her colleagues (2013) argue strongly that research needs to be focused within bioregions, not at the international or state level because as Berg (in Wahl, 2017) defined it, "bioregions are geographic areas having common characteristics of soil, watersheds, climate, and native plants and animals that exist within the whole planetary biosphere as unique and contributing parts" (p. 5). As described in earlier chapters, a lens of bioregionalism applied by food systems scientists and practitioners working on regional food systems can bring a sense of the agricultural practices adapted to a region (such as a watershed or several states) that share similar soils and climates. Miller et al. (2013) also lament the fact that climate change research has given "virtually no consideration to downstream consequences in the larger food system" (p. 164), such as energy and weather impacts on aggregation and transportation.

Land and water

Land protection and land base. Despite the obstacles to regional thinking, regionalism plays a critical role in land and water protection, use, and management. The limitations to food production in the Northeast due to natural factors such as soils, climate, and topography

have been examined in previous chapters. Much of what was historically farmed has been converted to non-agricultural uses through development or would now be considered marginal land for production, perhaps wetland or forest. Reclaiming marginal lands through major drain or fill projects is not an option. While some argue for clearing forested land for crops, aside from the expense, a drive to increase food production by expanding farmed land "could also make the region vulnerable to … environmental concerns, especially if it means loss of invaluable forests that cleanse water and sequester carbon" (Donahue 2014, p. 8). Land left in a more-or-less "natural" state is also critical for Indigenous Peoples, many of whom derive nutritional and spiritual sustenance from gathering traditional foods that only grow in the wild (Smith et al., 2019). Cropping or pasturing more marginal lands could result in erosion, compromised habitat and riparian areas, and water pollution.

Increasing the land base would require converting marginal land into cropland, with likely lower outputs (Griffin et al., 2015). Because of the requirements for fruit and vegetable production, growing more would likely necessitate converting land currently in field crops rather than marginal land. However, increasing the regional land area devoted to fruit and vegetable production by 50% would represent only 14% of land now used for the three major Northeast crops: corn, soybeans, and wheat (Griffin et al., 2015).

Another cost-benefit trade-off centers on using land for solar and wind energy production. Increasing interest in renewable energy has created tensions around the use of farmland to produce it. Siting such projects on productive land is controversial as groups try to balance the demand for and desirability of alternative energy with needs for farming. However appealing and lucrative, siting of solar and wind "farms" takes potentially valuable land out of production.

American Farmland Trust (Daukas, 2019) discourages the term "farm" for alternative energy production and encourages "smart solar siting" that prioritizes unproductive land, promotes dual use (colocation with active farming), and urges decommissioning guidelines that protect the natural resource base for future uses and judicious zoning that considers both large- and small-scale projects to accommodate a range of site options.

Many groups are committed to stanching the loss of productive land to development. Despite impressive accomplishments by governments and private land conservation organizations, the purchase of development rights (PDR) programs have only a modest impact on threatened farmland overall. Land protection programs are expensive and hard to fund, leaving the vast majority of a region's productive lands vulnerable. Many PDR programs do not require that the land stays in farming or in the hands of farmers, but only that it not be developed. Few land trusts prioritize agricultural land protection; the bulk of their acquired land and easements are not for farming or ranching.

A regional approach to farmland protection has many challenges. Precious resources for PDR programs are closely held and managed at state and local levels, and federal PDR

If increasing regional self-reliance is a goal, then prioritizing areas of a region with particularly productive soils or unique features for agriculture should trump saving that last farm in town.

funding policy is tied to states, not regions. If increasing regional self-reliance is a goal, then prioritizing areas of a region with particularly productive soils or unique features for agriculture should trump saving that last farm in town or adhering to state funding limits. The Connecticut River Valley, Aroostook County in Maine, marl soils in New Jersey, limestone valleys in Pennsylvania and Maryland, and sandy loams in Delaware and the Eastern shore of Maryland, for example, are particularly well-suited to agriculture and should be regional priorities for preservation, along with microclimates suited to specialty crops such as berry bogs and black soil from drained glacier lakes in New York (Blair, 1991). Some states do prioritize areas for protection, but the politics and practicalities of farmland protection may make an actionable broader regional strategy unrealistic.

Land access. Many new farmers want to farm in the Northeast region. Due to relatively high costs and low availability, access to land through purchase or rental is their biggest challenge. Most lease agreements in the Northeast, as elsewhere, are short-term, denying producers desired security. As direct-to-consumer markets soften and the cost of farming in high land value areas increases, more new farmers may need to consider different business models with expanded-scale markets, longer supply chains, and larger production volumes in more rural settings. In other words, next-generation farmers may need to think regionally.

Redressing historic injustices includes targeted efforts to assist these communities in achieving their farming objectives.

Farmers of color, along with immigrants with farming backgrounds, farmworkers, and urban community gardeners who want to start or scale up their own farms, also face structural and attitudinal racism around land acquisition, whether pursuing a loan or negotiating with a landowner (e.g., Penniman, 2018). As discussed earlier, these barriers are deeply rooted in history. Redressing historic injustices includes targeted efforts to assist these communities in achieving their farming objectives. For example, scaling from a city micro-enterprise to larger peri-urban or rural production requires substantial retooling, from production practices to different equipment to reconfigured markets.

On the other side of the land-seeking equation are older farming and non-farming landowners. Farm transfer planning services, including attorneys and other professionals who understand both business transfer processes and the region's farming industry are slim throughout the Northeast. In all regions, it is a huge challenge to get farmers to do timely succession planning, for which very little public or philanthropic support is available. The Northeast has about 18 farm link programs that help connect farm seekers with transitioning farmers and other farmland owners. As to scale, these linking programs range from serving one county to covering a multistate region. Farm link programs are important, but they vary widely in their services and effectiveness in addressing land

transfers (Ruhf, 2019).

Water resources and management. Problems with water supply and water management will be intensifying in the future, even in the relatively water-rich Northeast. Towns and cities draw most of their water supplies from surface systems (lakes and reservoirs). Historically, drought has been relatively infrequent in the Northeast, but its reservoirs may not have the capacity to store adequate water under future drought conditions. Groundwater has become a major source of drinking water in some states, and as more wells have been dug, rivers and streams are drying up. Rising sea levels combined with excessive groundwater pumping in northern coastal areas have produced saltwater intrusion problems (Christian-Smith et al., 2017). Region-focused water resources management entities face formidable challenges in protecting wetlands, adopting practices such as drip irrigation and cover crops, and developing more water storage capacity (Newcomer, 2021).

Economic development

Dominant systems

Dominant food systems are highly concentrated, vertically integrated, industrialized, and commodified, and operate largely irrespective of place and distance, on national and global scales. Consolidation and concentration affect virtually every food sector, from farm inputs to retail. Monopolistic and oligopolistic multinational corporations pursue multiple avenues to maintain their market share, prevent new market entries, and manipulate prices. The local/direct market movement has gained a foothold but would not generally be considered part of any dominant system. Although regional food systems are becoming more discussed by academics, policymakers, and USDA, these experts are far from understanding, let alone embracing, the concept. Regional food systems may be perceived as a challenge to established supply chain players, on the one hand, or as irrelevant on the other. When framed in terms of homeland security, the dominant system—and some policymakers and planners—espouse the centralization of food as safer and more secure. Others argue that an alternative regional approach with greater decentralization and redundancy offers greater security and resilience. In the face of this increasing concentration and centralization in many sectors of the U.S. economy, Homer-Dixon (2005) argues, "we need to encourage distributed and decentralized production of vital goods like energy and food" (para. 8).

Food system consolidation, the shift to fewer and larger farms and firms along the production and marketing chain, and concentration, in which a smaller number of firms controls most of the sales in sectors ranging from contract production and meat processing to supermarkets to inputs, has been written about extensively (e.g., Heffernan et al., 1999; Hendrickson et al. 2017; MacDonald, 2017; MacDonald et al., 2018). Consolidation has been a long-term trend in agriculture, as "no policies currently aim directly at farm structure, nor do any aim to arrest consolidation" (MacDonald et al., 2018,

p. 92). These practices continue because of a lack of antitrust enforcement, insufficient investment in rural communities and emerging agricultural market sectors, uneven access to capital, trade policies that hurt small and midsized operations the most, and other legislative failures (Hendrickson et al., 2013, Hoffman et al., 2017). Concentration reduces competition and narrows market power. It shifts control and resources from decentralized locales, hollows out communities, and abandons workers and infrastructure across supply chains in every region. It can slow growth and increase inequality (MacDonald et al., 2018). In addition, it decreases diversity in ownership, markets, food access, and ecosystems, which translates to reduced resilience (Miller, 2021).

Ironically, another challenge caused by dominant systems is that some large corporate supermarket and fast-food chains started some time ago to make "local and regional" products available and brand them as such. A challenge is to finesse support for efforts in this direction while remaining skeptical and not succumbing to the "green washing." For example, Walmart is marketing itself on buying from local growers, but defining an entire state as "local." A positive outcome is that local growers have access to a sizable market. But the Walmart business model "limits its ability to engage in the bottom-up learning and adaptation to local context necessary for adjusting to the new competitive environment of local food" (Bloom & Hinrichs, 2016, p. 1).

The danger in such "local" marketing campaigns lies in the opportunity for the so-called dominant system to co-opt or dilute authentic local and/or regional product claims so that they lose their distinction and salience. Whatever the strategies adopted by dominant systems, farmers and consumers alike are relatively powerless and, in critical points along the supply chain are "mostly shut out of systems of decision-making" (Hendrickson et al., 2017).

The challenge is for groups with different theories of change not to act at cross purposes or compete for resources and allegiances.

How activists envision their goals affects how they deal with dominant systems. This involves fundamental social change questions about system *reformation* versus *transformation*, which has been debated within food systems work for at least three decades (for example, see an exploration of social movement theory applied to food systems change by Stevenson et al., 2007.) The political agenda of those who wish, in the words of one NESAWG conference presenter, "to take this system down," is likely different from—and at odds with—that of groups who seek reform within existing as well as modified structures, such as promoting hybrid supply chains. The world view that food system activists and engaged citizens adopt as the premise for change will drive their choices of priorities and strategies. The challenge is for groups with different theories of change not to act at cross purposes or compete for resources and allegiances; rather, can they find common cause? It is a big tent.

Formidable challenges remain for producers, consumers, supply chain participants, researchers, planners, and policymakers who seek to reorient food systems work in a more

regional direction. It is worth reiterating that regionalism is not in itself a solution, and regions are not necessarily the most effective scale for every action, but when it is instituted can provide opportunities for entrepreneurs "to concurrently optimize fuel use, food access and sustainable farming practices" (Miller, 2021, p. 11).

Economic impact analyses

The challenge regarding economic impact analyses is that when "regional" and "local" are conflated, issues arise with regard to the estimates of economic impact. The few studies that have been done (described in Chapter VI) show the importance of not confusing local impact with regional impact analyses because there are important differences in results. In regional food systems there is more diversity, greater returns to farmers and to other supply chain actors, greater economic returns, different governance mechanisms, and other impacts.

A framework has been developed to analyze a region's agricultural status through a process of assessing and adding local contributions (Werner et al., 2019). This framework overlooks the possibility that a larger scale can be more than the sum of its parts and can produce larger returns to both local and regional businesses. Local food systems have become an economic development strategy (Jablonski et al., 2017), and generated substantial increases in value added for their local economies compared to conventional production (Rossi et al., 2017). Studies are needed to investigate whether regional food systems increase the value added for their regions.

Another issue is that research so far has not done a good job of "disentangling" the rural economic impact of food systems as distinct from the regional impacts (Jablonski et al., 2019, p. 15). We argue that researchers should also work to distinguish local economic impacts from regional economic impacts. Another problem we see in the literature is that the scale and geographic extent of producers studied is often much larger than the size of what is designated "local"—usually a city or county. This inconsistency makes it difficult to separate local from regional impacts.

Food systems planning

In general, and despite interest on the part of quite a few planners, too little effort has been directed at region-scale food system planning. As discussed in Chapter VI, even when "regional" has been referenced, most of the planning emphasis is at the local level. There is very little mention of a regional context or trade among states. Most local land use decisions are made in a vacuum and without any quantitative analyses of the larger area's food or water demand and supply. In fact, local control that favors development or otherwise directs land uses away from production can undermine a region's food security (Ruhf & Clancy, 2010).

Notwithstanding these acknowledgements of the regional scale, the distinctions between local and regional and the case for larger-scale regional food systems planning are still not well

articulated. The American Planning Association's *Planners Guide to Community and Regional Food Planning* instructs planners on this topic; despite its title, it uses only examples of five cities and one county.

Samina Raja, a regional planning scholar with expertise in food systems, states that while the nearly 40,000 local, regional, and metropolitan (LRM) governments provide a wide range of services, for most,

> *food is not viewed as a public concern by LRM governments.… If we are to aim for more equitable post-COVID food systems, LRM governments across the United States will have to address the deep structural problems in their communities' food systems. … For starters, they will need to remember that food systems are an essential and public infrastructure. Working with their state governments, LRM governments will have to reinvest in their communities' food systems, especially if the federal government continues to abdicate its responsibilities (Raja, 2020, p. 1).*

It has been assumed that strengthening local and regional food systems could be a significant component of rural development. However, most local food systems activities have in fact been conducted in urban areas, serving rural and peri-urban farms and ranches that sell into those markets, but these have resulted in "relatively small, albeit positive, short-term gains accruing to regional economies" (Jablonski et al., 2017, p. 62). Jablonski et al. assert that participation in local and regional markets (they do not distinguish between the two) can benefit small fruit and vegetable growers—those with less than $350,000 in gross annual revenues—but not larger farms. They conclude that research so far has not differentiated rural from urban impacts of local food activities, a gap that needs to be addressed before the overall effects on economic development can be understood.

One of the thornier regional land planning issues concerns historically indigenous lands. Indigenous food sovereignty involves access to land and other natural resources for production (including cropping, grazing, hunting and gathering, and fishing) and traditional food-related practices and ceremonies, as well as food access, security, and consumption choices (Wires & LaRose, 2019). Identifying such lands—which likely stretch across multiple political jurisdictions—and addressing historic dispossession with concrete actions is both a challenge and an opportunity. Strategies include aiding in the repatriation efforts of stolen lands, the acquisition of title to historically tribal land, granting of cultural respect easements, and consultations with Indigenous groups around land uses and permissions. Food systems planning for and by Indigenous groups has increased significantly in the last decade or so. Groups like the U.S. Food Sovereignty Alliance, the Indigenous Food Systems Network, and the Native American Food Sovereignty Alliance Project of the First Nations Development Institute conduct food systems networking, advocacy, training, education and organizing activities, mainly outside the Northeast. It continues to be a severe challenge, nevertheless, for smaller and more scattered indigenous communities to organize around food systems, especially when economic hardship makes other types of development (e.g., casinos) higher priorities.

Regional supply chains

As alternatives to conventional national-level chains, regional midsized chains face numerous constraints. "Small and mid-scale enterprises are crucial to cultivating the balance between diversity and efficiency that is necessary to sustain regional economic flows of products and resources in the face of disturbances" (Goerner et al., 2009, in Miller, 2018, p.3). These disturbances include increased delivery times due to traffic in cities and volatile weather, which causes more flooding problems on roads (Miller, 2018). A major challenge is that the flow of regional supply chains is not well organized. It needs to be planned to take into account seasonal production, transportation routes subject to different topographical and congestion conditions, and the fact that longer chains require more trust and communication than do shorter supply chains (Lengnick et al., 2015; Miller, 2018).

Another strategy to facilitate resilience is to move from simple food supply chains to food supply webs, which have higher diversity and weaker connectivity among parts and therefore more built-in redundancy. In food supply webs, system interconnections are complex and unpredictable from one season to the next (Miller et al., 2013). One example of a food supply web is in the upper Midwest where natural food stores, including but not limited to food co-ops and buying clubs, provide market access to entrepreneurial businesses developing organic, natural, craft, artisan, and local foods. These startup food companies are then able to build strength and capacity to also supply larger grocery stores and supply chains with natural foods (Miller, 2021). As we have described, resilience incorporates the anticipation of unpredictability and requires that food systems actors prepare for it. This requires quite a different mindset than many food systems actors have at this point, moving from linear to systems thinking and becoming more adaptable.

Trade and commerce

As discussed in Chapter VI, states cannot privilege their own state and discriminate against interstate commerce due to the Dormant Commerce Clause Doctrine (DCCD) of the Constitution. Therefore, the DCCD is really more of an obstacle for those who wish to restrict out-of-state food purchases. In fact, state and local governments can craft policies in ways that can claim certain exemptions to the DCCD (Denning et al., 2010), in effect "against" regional purchasing. Ironically, one strategy is to include out-of-state food in a policy's definition of "locally grown."

States have substantial autonomy to legislate and regulate commerce within their states, where not preempted by federal law. The result is "more regional differences in the law and regulation than would occur if there were a single national legal standard" (Fortin, 2016, p. 8). Due to the interconnected nature of the food supply, many food businesses are likely to bump up against interstate commerce. "For instance, use of a single ingredient that was shipped in interstate commerce in a multi-ingredient food would create federal jurisdiction and fall

Supply chain players and regional food system advocates must navigate both state and federal rules, which can be onerous.

within the scope of the federal Food, Drug and Cosmetic Act" (Fortin, 2017, p. 8). Food shipped across state lines must meet both federal and state requirements. While attempting to balance uniformity with the individual needs of states, these layers of requirements have been criticized as burdensome (Fortin, 2017). In developing and strengthening regional food systems, supply chain players and regional food system advocates must navigate both state and federal rules, which can be onerous.

Import substitution, discussed in Chapter VI, is the flip side of interregional trade—that is, producing more of a product within the region to minimize product importation, along with associated burdens, from outside the region. At present, data on and analysis of import substitution is insufficient. More information is needed to calculate realistic expectations and trade-offs of replacing some imported products with increased production within the Northeast. Interregional trade seems like an ideal venue to actualize fair trade principles, and for values-based food chains to commit to them. However, significant barriers thwart the implementation. These include differences among state laws and regulations, unintended consequences of "buy local" preferencing, overarching national laws that disallow more progressive practices, and the complexities of food supply chains.

Workforce and labor

Workforce and labor issues vary by region, but fundamental concerns about worker rights and fair treatment apply nationally. They are articulated and pursued by both local and national groups and networks. In addition, the problem of livable wages, and a shortage of workers in all sectors and all regions remain key challenges for food system employers. As described in Chapter VI, the food system workforce is vast and diverse in its types of workers, working conditions, attitudes, and capacity. Overall, reform efforts are increasing but still woefully inadequate to fully respond to current situations. It is hard to organize this constituency, and there are few examples of organizing at the regional level. At the state level, Vermont's Farm to Plate food system plan stands out in lifting up workforce needs, rights, and training as key components of food systems-based economic development. The plan aims to "increase economic development and jobs in the farm and food sector and improve access to healthy local food for all Vermonters" (Vermont Sustainable Jobs Fund, 2020, para. 3). The plan's issue brief cites unhealthy or unpleasant workplace conditions, transportation barriers, low wages, and exemptions from federal fair labor standards among the bottlenecks and gaps impeding workforce development (Danley, n.d.).

Larger Northeast farms, which are still comparatively small, would not be able to survive without migrant labor. Small farms (defined as employing 10 or fewer employees and not having an active labor camp currently or in the last 12 months) are exempt from enforcement of all Occupational Safety and Health Administration (OSHA) rules, regulations, standards, and orders. (Huseman, 2017). This relieves the vast majority of Northeast farms from certain regulatory burdens, but it also results in no health and safety coverage or on-farm housing inspections for one-third of Northeast farm workers

(Henderson & Spula, 2011). Notwithstanding the work of Migrant Justice in Vermont, there is little organizing for farmworkers in the Northeast (Henderson & Spula, 2011); in today's political climate, workers may be especially reluctant to complain or stand up for better conditions.

Community food security organizations and food policy councils bring diverse groups to the table on issues of food justice and food insecurity, mostly at local and state levels. But farm laborers and food chain workers are still largely marginalized in these forums. In most places they are under-represented and under-engaged in policy development. Despite the importance of the agri-food workforce, relatively few food system initiatives take on the intractable issues of the labor along the food chain. The Food Chain Workers Alliance is doing important work in this arena. It remains to be seen whether the pandemic crisis and the racial justice movement will result in significant change.

With respect to farmers themselves, survival of the business itself is a challenge for most producers, especially in small and midsized operations. Challenges to farm viability exist in nearly every aspect of farm life. Beginning farmers, and especially farmers of color, experience substantial challenges in starting and scaling up their operations, with access to land, capital, and housing as the top challenges they identify. Thinking regionally in the Northeast means fostering urban and peri-urban farming opportunities and improving the viability and attractiveness of more rural, larger-scale production.

With adequate support, the region's midsize "non-direct market" farmers may have a competitive advantage. Land in more rural areas is typically more affordable to rent or buy. But market access and quality of life (including the availability of non-farm income) must be addressed at the regional level. What can be done to entice farmers to set down roots in more rural parts of Maine, New York, or West Virginia, and produce for longer supply chains to feed Boston, New York City, and Washington, D.C.? With beginning farmer training programs proliferating in the Northeast and nationally, it makes sense to encourage farmers to consider all alternatives and to create conditions where those alternatives are competitively attractive. Where farmers settle and thrive will have a significant impact on broader workforce and economic development in all areas of a region.

Business models

Alternatives to conventional models have played a key role in kick-starting local food systems. However, they represent a very small percentage of U.S. food chains; their "promise of social change is still largely nascent" (Brinkley, 2018, p. 5). More important from a regional perspective is the long-term interest in, and actions directed toward, scaling up alternative food networks in ways that maintain their authenticity as well as their sustainability and social justice objectives (Berti, 2020). Each of the business models described in Chapter VI is

Important for a regional perspective is the long-term interest in, and actions directed toward, scaling up alternative food networks.

an example of how food system actors have accomplished this goal. Some of the challenges they face are discussed below.

Business clusters. As with any enterprise, business clusters can change, dissolve, or fail. The most successful clusters arise organically; it is difficult to create a regional cluster from scratch (Donahue et al., 2018). The issues regions face in determining when clusters are likely to be viable include identifying and prioritizing them by looking at factors such as the intensity of inter-firm dependence, development stage, and ability to create employment opportunities; and intervening to improve the clusters' functioning through actions such as resolving information gaps, developing talent, research, infrastructure, and accessing capital (Donahue et al., 2018). Nevertheless, for many U.S. regions, "cluster initiatives may not be the most effective strategy to support regional development" (Donahue et al., 2018, p. 4). Forming clusters is more difficult in rural areas (Boys & Hughes, 2013), although the Sacramento region and other strong production areas in California may be an exception (Shabazian et al., 2016). Clusters may also face serious challenges such as stark reductions in labor supply as in the Sacramento region (Shabazian et al., 2016).

Horizontal collaborative networks. These collaborations can experience a variety of problems. Knowledge exchange among the members of a network is a central construct, and trust has to be developed so as to not limit knowledge-sharing and innovation (McAdam et al., 2016). Groups have to be careful about not letting power imbalances develop, and not letting networking be inhibited through strong competition among its members (Gellynch & Kuhne, 2010). Patience is important, as lengthy processes for reaching group consensus can be trying. People not familiar with collaborative networks may have unrealistic expectations as to how quickly consumer demand may develop for a product (McAdam et al., 2016).

Regional food networks. Creating and sustaining regional food networks is complicated due to interconnecting scales, the sometimes immense variability across regions, and elements such as climate, land use policies, and marketing proficiencies (Duncan et al., 2018). Regional food networks need to exhibit mutually supportive structures and interactions to provide optimal diversity and resilience, but this takes time to develop. Researchers in Oregon found that the strongest barriers to producer participation in a regional food network were costs and time (Duncan et al., 2018). There is often a lack of capital to support innovations. For farmers in regional food networks, absentee ownership is a growing concern, as absentee owners may be less willing to make or share investments in sustainable practices (Brekken, Fiegener, & Duncan, 2018).

Values-based supply chains (VBSCs). A number of papers have explored the development of and challenges facing values-based supply chains (Feenstra & Hardesty, 2016; Hardesty et al., 2014; Lev et al., 2015). Hardesty and her colleagues compiled 23 case studies between 2009 and 2012 by interviewing VBSC leaders who were farmers, distributors, and buyers. They found that most traditional sources of capital, such as banks and development agencies, are not familiar with alternative farming and marketing

enterprises; producers have many concerns regarding food safety, food safety regulations, and compliance costs; smaller producers report that scale- appropriate production equipment, and packing, cooling, and distribution services are difficult to find; and that managerial experience and knowledge are critical to success. Eighty-five interviews were also conducted with funders, industry associates, and business advisors providing technical assistance to VBSCs in California, Oregon, and Colorado. Their responses varied strikingly. Industry associates and business advisors said that infrastructure was the largest challenge to VBSCs, but funders ranked it fourth. The researchers were concerned about this discrepancy because infrastructure investment generally come from funders. Communications and market development ranked second among the industry associates and business advisors, and first with funders. The need for strong communications that convince consumers of the benefits of products, in order to generate demand and willingness to pay, should be obvious, but the VBSCs did not receive high marks on this factor from these observers.

An additional challenge to values-based producers and also to entire VBSCs is economies of scale, which was taken by the researchers to be the result of a lack of appropriately scaled infrastructure and insufficient market development. However, this presents a conundrum because funders and the other experts interviewed believe that the demand projected for products from VBSCs is not large enough to warrant larger facilities (Hardesty et al., 2014).

The internal workings of values-based supply chains also present a number of challenges to finding, determining, and developing necessary processes: appropriate partners and mechanisms for decision-making and building trust; effective strategies for product differentiation, branding, and regional identity; appropriate methods for pricing; consistent environmental standards throughout the supply chain; new leaders to take over from founders; and surviving in diverse economic and climatic conditions (Feenstra & Hardesty, 2016; Lev et al., 2015).

There can also be logistical challenges in conveying information to promote transparency among all the links in supply chains that have multiple producers and processors. For example, how should values such as environmental stewardship and worker welfare benefits be continually communicated to consumers? In addition, supply chains face constraints in what they can charge for their products when consumer expectations do not match price points. Some restaurants and retailers engage in misleading practices, such as claiming that they are sourcing from growers from whom they rarely buy (Feenstra & Hardesty, 2016).

Many VBSCs are hybrid networks of "conventional infrastructure that incorporates progressive values."

We believe that it is important to underscore the fact that many VBSCs are hybrid networks of "conventional infrastructure that incorporates progressive values" (Bloom, 2009, p. 2). These often include nodes composed of conventional transportation companies or processors because building new infrastructure is too costly. (See

Agriculture of the Middle case studies such as Shepherd's Grain [Lev & Stevenson, 2013].) Despite this practical hybridity, the fact that the chains, including their conventional members, adhere to the common values and processes set by the VBSC differentiate them strongly from more mass-food product chains (Berti, 2020; Fleury et al., 2016).

Access to capital and related support

TThere has been insufficient assessment of funding for regional food systems development and how it might differ from funding for local food systems development. We have found a paucity of funding sources for regional endeavors, possibly in part due to the familiar problem of conflating local and regional ones. Many of the examples of grants, loans, and other support from public and private sources enumerated in Chapter VI identify as funding mainly local enterprises and activities rather than regional. It takes a close reading of the data, often not available in reports and on websites, to determine where and how funds are actually being utilized.

Regional projects may be harder to fund because their importance is not adequately understood, the local scale is so ingrained that funders do not see or look for a different scale to complement local work, there are not enough examples of regional attempts and successes to provide a track record for grantors and investors regarding return potential, and as the regional funding arena is slow to emerge, funders do not provide sufficient examples or encouragement. This may be a chicken-and-egg issue: funders are not willing to fund regional collaborations and networks because they do not see enough of them, or they do not see benefits to the larger scale and are not ready to encourage their development. As a consequence, some regional businesses, networks, and supply chains turn to conventional sources of funds, where they are likely to be treated as high-risk investments.

Infrastructure

In Chapter VI, we described three major types of infrastructure: individual businesses; publicly owned, such as roads and utilities; and a combination of public and private, such as processing plants and storage facilities. Overall, regionally scaled infrastructure such as meat, fish, produce and dairy processing and manufacturing, aggregation, warehousing facilities, and distribution networks for larger volumes of regional products is both necessary and inadequate. Insufficient and inappropriate supply-chain infrastructure in all three types is often cited as the biggest barrier to building strong and resilient regional food systems (Day-Farnsworth & Miller, 2014; Dillemuth & Hodgson, 2016; Griffin, 2015; National Association of Development Organizations [NADO] Research Foundation, 2010; NYS-NYC Regional Food Hubs Task Force, 2015). Some years ago, researchers pointed out that "food supply chains lack midscale aggregation and distribution systems that can efficiently move local

Insufficient and inappropriate supply-chain infrastructure…is often cited as the biggest barrier to building strong and resilient regional food systems.

food into mainstream markets" (Center for Integrated Agricultural Systems, 2010, p. 3). These findings lead us to explore infrastructure challenges in greater depth.

Processing and manufacturing

Compared to the production, distribution, and marketing sectors, the national processing sector is understudied. Because so much food processing is under the control of private companies, and processing requirements are not highly regulated (except for food safety and labeling), the research literature is fairly sparse at national and regional levels. As discussed earlier, after World War II trends in consolidation led to increases in the size of food processors and decreases in their numbers. For the most part, the Northeast lost its comparative advantage in food processing due to supply and demand, regional advantages of areas outside the Northeast, changing technologies, government regulations and stimulation, and global trade (Blair, 1991).

Processors have little incentive to locate in the Northeast if costs are lower elsewhere. And its long history as a food processing center actually serves as a disadvantage: factories that are out of date must be replaced to be competitive and meet new environmental regulations. High general costs, the fact that building new plants is easier than refurbishing old plants, and needing processing plants to be nearer the sources of production caused companies to relocate outside the region (Northeast Regional Council, 1987, in Blair, 1991). Between 2004 and 2011, the total Northeast regional food manufacturing output grew by approximately 2%, with food manufacturing shifting to the southern part of the Northeast region: Pennsylvania, Delaware, and Maryland experienced a 4.8% increase, much of that in the latter two states due to poultry processing (Lopez et al., 2014).

Questions that Blair asked in 1991 still apply. What does the Northeast stand to gain and lose by market-driven (as opposed to, for example, environmental or workforce concerns) food production and delivery? Who should absorb the social costs of production and processing? And how do these changes in processing capacity affect rural viability? The apparent lack of growth in many states' food processing sectors and the need to foster employment opportunities and economic growth for farms and fisheries are abiding concerns (Lopez et al., 2014).

In 2018 Farm to Institution New England published The Culinary Incubator Business Model, a white paper on local food processing that addressed multiple challenges faced by operations trying to build processing infrastructure such as food incubators. One is a constraining revenue model due to owners' high fixed costs, as kitchens require large capital building investments, while they rely on revenue from new food businesses that are often low-margin. Many of them develop other, complementary businesses such as CSAs or catering operations (Danovich, 2016). These businesses typically are run by entrepreneurs with limited experience and limited financial resources. Another challenge is maintaining facility utilization; by design, entrepreneurs leave the incubator to develop their businesses on their own. The incubator owners must replace the departing

businesses, which takes time and resources. In addition, these owners confront complex scheduling and operational logistics. Culinary incubators must also contend with food processing regulations and licensing and inspection requirements (Brooks, 2018). Other challenges include the temptation to grow too quickly (Forgrieve, 2019), and that an incubator's operating costs may outweigh its revenues (Danovich, 2016).

Wholesale, distribution, and food hubs

As with other supply chain businesses, wholesalers and distributors have experienced multiple mergers and acquisitions resulting in the consolidation of companies and a concentration of buying power in fewer firms. This raises concerns about the viability of smaller farms and the overall structure and performance of the food system including "market power abuses" (Saitone & Sexton, 2017 p.25), as well lack of competition (MacDonald, 2017; MacDonald et al., 2018). Most research on industry concentration has focused on farms, manufacturers, processors, and retailers. It is difficult to find information on the wholesale and distribution sectors, except through industry sources. As stated earlier, among other reasons for the dearth of contemporary data is that USDA discontinued collection of information on these and other sectors.

Other challenges faced at present and undoubtedly in the future by food distributors include understanding and meeting demand, transparency in the supply chain and in supply chain disruptions, recalls, food safety and quality issues, and adhering to delivery schedules (El-Hiti, 2012). Seasonal peaks and labor shortages are an issue in many parts of the country as well (Rickard, 2019), a situation COVID-19 has exacerbated Seasonal factors result in a national market that pits regions against each other. Farmers and regions that are limited by shorter growing seasons do not always receive fair prices, while growers from areas less affected can adjust their prices as competition drops (Miller et al., 2016).

We can assume that wholesale distributors in the Northeast region face all these problems, and that small operators are even more vulnerable. As regional production by farmers increases through enhanced crop diversity and other sustainable practices, more and different infrastructure is needed (Miller et al., 2016). But entrepreneurs in newly emerging regional supply chains have a steep learning curve as they adapt from direct marketing to volume shipping, a step that is necessary to enter wholesale markets (Miller et al., 2016). They need to learn many things to be successful, such as "facing the competing goals of reducing costs and improving quality while balancing marketing inefficiencies with relational values" (Day- Farnsworth & Miller, 2014, p. 22). Many new farms find it challenging to identify strategic supply chain partners (Day-Farnsworth & Miller, 2014). Not surprisingly, regional supply chains may not be appropriate for many operations, for example, "where the competitive edge is for distributors is a serious question" (Day-Farnsworth & Miller, 2014, p. 14), and that edge is not attainable for many of them, 2014, p. 22).

A more active area of research on wholesale distribution has focused on food hubs in order to understand the challenges faced by these operations. Food hubs must cope with capitalization, liability issues, compliance with food safety regulations, and management of human resources. Many are not sufficiently strategic when deciding on locations. Other challenges include a lack of coordination among hubs, potential costs which lead to investor wariness, and the loss of economies of scale and greater inefficiencies in supply chains (Ge et al., 2018). Interestingly, as complex food systems move through adaptive cycles, many emerging food hubs face a "poverty trap" where they find themselves with inadequate capital (Stroink & Nelson, 2013). It is necessary but difficult to get out of the trap because most food systems infrastructure is oriented to industrial food systems (Hoey et al., 2018).

Food hubs must cope with capitalization, liability issues, compliance with food safety regulations, and management of human resources.

Transportation

Between 2011 and 2016 Miller and her colleagues conducted research on regional food distribution and transportation in the Midwest with funding from a number of sources, including the USDA's National Institute of Food and Agriculture (NIFA) and Agricultural Marketing Service (AMS). We cited some of that work earlier, and much of the material in this section comes from their work on regional food supply chains and transportation issues in the Chicago multi-state region (Miller et al, 2016). A large group of practitioners guided the research team in discussing how to optimize resilience and identify opportunities for efficiency and diversity in regional supply chains. The group utilized a systems dynamics (SD) approach to examine more deeply particular systems, such as supply chain functions, which helped them to better understand the chains' weaknesses and leverage points. SD analysis uses diagnostic tools such as stock and flow diagrams to consider the underlying structures of a system and reveal its structural weaknesses (Miller et al., 2016).

Because this research demonstrates that production and market regions are unique, we do not claim that all of their descriptions and recommendations apply to the Northeast. But since there is no comparable analysis for the Northeast region, we think it quite useful to review their analyses and findings. In Chapter VIII we offer suggestions for possible solutions to the problems described here.

Since the 1950s, the expansion of interstate highways, irrigation, immigrant labor, and urbanization has allowed the U.S. food system to move from regional food flows between cities and close-by farms to a system largely reliant on national and global sources (Miller et al., 2016). Today the distribution systems among regions are "insufficiently organized" to meet changing rural and urban needs, due in large part to the need for efficiencies that neglect more sustainable and resilient practices. Businesses engaged in supplying regional or local products experience inefficiencies associated with short hauls, which create market disincentives for these foods either as a result of the high transportation costs to shippers

or of the high cost of goods to wholesale buyers (Miller et al., 2016). Certain minimums, for example in load size, must be reached for the system to operate efficiently, which means that individual crop production minimums must also be met by producers for markets of varying sizes. Consolidation decades ago led to a bifurcation in the system where very small and very large companies and their supply chains dominate, which has left little opportunity for midscale businesses to participate (Miller et al., 2016). Furthermore, due to the erosion of regional public infrastructure because of public disinvestment and other actions such as the growth of national supply chains and the lack of anti-trust actions, the private sector now controls most of the supply chain infrastructure. Redundancies in the system that provide options in the face of supply chain disruptions have been lost (Miller et al., 2016), as shown dramatically in the COVID-19 era supply chain problems.

In addition, as the costs of fuel and labor increase, so do the costs of distribution. Truck transportation constitutes 76% of all U.S. agricultural transport (Blanton, 2017); its efficiency and reliability depend on public investment in roads. A further issue is that rail service reductions have made it much more difficult to utilize this cost-effective shipping alternative. Regional trucking companies are critical to midscale farms and processors, but these midsized trucking operations have shrunk dramatically across the country (Miller et al., 2016), in part because larger food truck movement offers higher profit per mile. Recently, food freight could also rely on public investment in warehousing infrastructure. As population and food production patterns have shifted, infrastructure for food freight has tended to become privatized, and systemic distribution failures are occurring in both very rural and very urban areas (Miller et al., 2016). Grower-shippers struggle to find trucking companies to move their product affordably and need cold storage facilities near their markets to improve logistics. At the same time, federal restrictions on driving time for truckers, with electronic monitoring of driving time, show the need for strategically placed public and private warehousing serving vertically integrated companies to provide better rest places and shorter runs. This problem is compounded by the location of warehouses in places that are only accessible by highway (Tropp, private communication, 2019).

The consolidation of processing and distribution facilities outside the Northeast over the last few decades has increased wear and tear on roads and decreased air quality due to increased truck traffic in and out of the region (National Association of Development Organizations, 2010). The most recent report shows that six of the 10 states with the worst infrastructure scores in the U.S. are in the Northeast (Davis, 2021). Therefore, it is not surprising that transportation infrastructure is described many times as one of the threats to the progress of the agricultural sector in Pennsylvania (Econsult Solutions & Fox School of Business, 2018).

Climate change, with its consequent extreme weather, and policies directed to mitigate GHG emissions, have important implications for the link between food and transportation sectors. While food transport accounts for only 5% of the agricultural sector's GHG emissions (Center for Sustainable Systems, University of Michigan, 2019), interdependence across critical infrastructure sectors such as water, energy, transportation, and telecommunication

can lead to cascading failures during extreme weather events (USGCRP, 2018). More flooding will damage most types of infrastructure, making timely food distribution even harder. Increased coastal flooding will also affect farms and fisheries all along the East Coast (USGCRP, 2018), requiring more infrastructure to prevent and control flooding in these areas and assure the smooth flow of food supplies.

Because regional food systems at this point are not recognized as part of the conventional U.S. model of a national and global system, there are many infrastructure challenges that developers of regional food systems have to overcome. Among other consequences of consolidation and the reliance on economic efficiency as the only yardstick of success are the weaker links between urban centers and surrounding regional populations and enterprises. Furthermore, "local food" efforts have offered larger direct markets to peri-urban farms but have not captured the links between rural agricultural areas in a larger region and their potential urban markets (Miller et al., 2016).

Purchasing

Retail. We believe that regional chains and independent grocers can play an important role in building and supporting regional brands and supply chains. But it is difficult to predict what grocery shopping will look like following the COVID-19 pandemic. Even before the pandemic, experts were offering advice such as "Surviving the Brave New World of Food Retailing" (Howard et al., 2017), with recommendations that apply to retailers at all scales such as taking a consumer-centric approach to identifying which consumers to target, utilizing data and analytics to accomplish identification; redesigning stores to improve consumer experiences, and recognizing that stores need to cater to customers with diverse values and preferences. In the pandemic summer of 2020, food retail experts predicted that the whole shopping experience would need to continue emphasizing worker and shopper safety, including protections already in place and new ones that will arise (Mechelse & McQuilkin, 2020). Online shopping will probably increase. In this scenario, smaller local supermarkets may benefit from in-store personnel fulfilling online orders and getting paid more for it (Bogost, 2020). But it's also likely that the biggest retailers will continue to dominate by utilizing freed-up space to warehouse food for online orders and expanding sales of cookware and related items, as well as offering space to fast food operations and other services, "transforming the superstores into the shopping mall's successors" (Bogost, 2020, p. 8)

As has been mentioned in Chapter VI, concentration has already swept the food retail sector, although most shoppers may not realize it because many regional chains kept their names when they were acquired by much larger conglomerates like Kroger and Ahold (Grabar, 2013). The challenges to new and old regional retail venues will be to offer adaptive shopping models, to know their customer base well, and to use transitional tools such as hybrid chains made up of traditional and alternative modes in order to increase their chances of success. Independent stores continue to be important, however. In the summer of 2021, they accounted for 33 percent of total grocery sales, an almost a doubling of sales since

The challenges to new and old regional retail venues will be to offer adaptive shopping models, to know their customer base well, and to use transitional tools such as hybrid chains.

the last survey in 2012 (National Grocers Association, 2021a). The survey also found that independents were declining in small and inner-city low-income areas. The association is attempting to address this problem through a new antitrust advocacy approach to restrain the increasing power of the large national and international chains and encourage grocery investment in disadvantaged communities (National Grocers Association. 2021b.

Procurement. As previously noted, more and more public and private institutions are preferencing local products. On the one hand, this is highly desirable: local purchasing fulfills many alternative food system values. And since the definition and criteria for 'local' are often vague or flexible, regional procurement might qualify. On the other hand, in these schemes regional sourcing often plays second fiddle to hyperlocal and local markets, despite the acknowledged advantages and benefits of regional procurement (such as volume, variety, stability, and economic impact). An overly simplified protocol—either a product is local or it is "other"—and the tendency to devolve to local do not give regional its own and deserved recognition or standing. For example, guidelines from the Centers for Disease Control and Prevention (CDC) recognize the benefits of regional food systems, yet they "urge federal agencies to make 25% of their offered food products organic, locally produced or sustainably grown" (Fitch & Santo, 2016, p. 21). Some tiered and score-based purchasing protocols acknowledge regional value but still preference "as local as possible." What if regional had distinct and equal standing—if a product from, say, 200 miles away received the same "geography" points as a hyperlocal one?

A perceived barrier to regional food procurement is the additional time needed to find and purchase food from regional producers, largely caused by inadequate regional food distribution mechanisms (USDA ERS, 2015). An additional barrier is a lack of infrastructure such as processing facilities, warehousing, refrigerated trucks and appropriately scaled kitchen equipment (Fitch & Santo, 2016). For procuring institutions, the benefits of regional purchasing such as processing and food preparation capacity, storage, and more efficient aggregation distribution systems conflict with the challenges and barriers, not the least of which is the public's (and purchasers') attraction to 'local' and regulatory compliance.

> *[These] must be addressed by individual farms and the food safety barrier might actually be greater in the case of regional sourcing as the Food Safety Modernization Act (FSMA) exemption based on geographic location of consumers may no longer apply. Liability insurance requirements might also be greater for a regional distributor than they are for a smaller scale distributor or food hub (Becot et al., 2016, p. 9).*

Furthermore, regulatory barriers "will most likely not decrease and might actually increase due to interstate commerce regulations that might not have been at play before" (Becot et al., 2016, p. 9). See discussion in Chapter VI and in the section on trade and commerce in this chapter.

One of the biggest barriers in alternative procurement is the policies around foodservice contracts and pricing systems. Procurement laws often mandate that state, local, and federal agencies engage in a competitive bidding process requiring acceptance of the lowest bid, which typically favors larger companies. While it is possible to give preference to regional food in all types of contracts, there are challenges to doing so, including collective purchasing schemes that favor larger distributors and requirements to use pre-approved vendors (Fitch & Santo, 2016). Furthermore, there may be packing specifications, food safety audits, certifications, and insurance requirements for farmers to participate in institutional procurement ventures (USDA, 2012).

Social and economic justice

Food needs, access, and security

Previous chapters discussed food security, community food security, and food justice, noting the intersections of these concepts with scale. Regions may provide a sufficient volume and variety of foods, along with resilient supply chains, to improve food access for all. To achieve this, however, the multiple challenges discussed throughout this chapter must be overcome, from adequate production, appropriate infrastructure, accessible food outlets, affordable healthy options, and adequate food and health safety nets. Parochial planning, poor cross-state cooperation, and weak regional supply chains undermine food security.

An additional barrier, and one even more important than the logistical ones, is inadequate participation by communities of color and other socially disadvantaged groups in planning and controlling food access. This challenge is often compounded by disconnects between urban and rural communities, including tensions between food security and farmer security. The impulse to think and organize regionally is relatively weak: most food security groups operate at the local, state, and national levels, as do policy responses such as community food projects and emergency food programs. Because diversity of food choices is a key component of meeting food needs, local production for a specific culturally identified group makes sense if that product can be grown or raised and marketed locally to meet local demand. However, actually producing many of these specialty items at scale and getting them to the appropriate markets in an economically sustainable way has often proved challenging at the local level.

The impulse to think and organize regionally is relatively weak: most food security groups operate at the local, state, and national levels.

Fairness and opportunity for all food chain participants

Chapter VI discusses many of the social justice issues in food systems, from land access to working conditions. Structural racism and discriminatory biases affect people of the global majority throughout the food chain. The current structure of U.S. agriculture poses significant challenges for new, small, midscale, and non-traditional producers in all regions. Thinking and acting regionally can help shape appropriate solutions, but regionalism in itself is not a solution to these systemic issues.

Nearly all new Northeast farmers face barriers to entry, primarily access to land which is generally more expensive and less available than in other regions. Because agriculture is not dominant in many parts of the Northeast, lending institutions and other supportive infrastructure are not robust. Northeast farmers with innovative and entrepreneurial operations often are turned down by lenders who do not understand or lack adequate information about such enterprises. (The same could be said for food businesses.) Zoning and other regulations that are not agriculture-friendly conflict with Northeast urban and peri-urban producers—often people of color—who seek to establish, scale up, or relocate their businesses. Undoing the Northeast's own legacy of land dispossession will require difficult conversations and creative strategies. Mainstreaming innovative and evolving land access methods, including reparations, will be challenging, but work on land access in the Northeast as well as other regions is promising and exciting.

The pandemic has exposed and elevated awareness about the plight of food chain workers. Farm, processing, and food service workers are more likely to live in conditions that pose higher risks of illness. They are less likely to receive adequate personal protective equipment (PPE) and work in sanitary conditions. As explained by the UK-based Business & Human Rights Resource Centre,

> *COVID-19 related impacts on workers in food and beverage supply chains include a lack of worker voice … and a lack of respect of the rights of workers in vulnerable conditions … Negative impacts of the pandemic on labor rights can be observed around the world in both food processing and production (impacting for example workers producing soft drinks or processing meat) and in particular at commodity level, i.e., impacting workers picking fruits, salad, and vegetables, or producing goods such as palm oil or seafood" (n.d. para. 2).*

The precise nature and extent of bad conditions may be related to particular regions. As has been discussed, organizing regionally around labor and workforce issues is challenging and may not be the most effective scale. Even at the state level, food system labor issues do not seem to receive the same attention as other concerns. In fact, the social justice dimensions of food systems change are not uniformly integrated into many existing food system analyses, plans, and visions, although that is changing. NESAWG, Food Solutions New England, Vermont's Farm to Plate Network, and Future Harvest/ Chesapeake Alliance for Sustainable Agriculture are examples of cross-sector alliances in

the Northeast region with a strong social justice commitment, which includes food chain workers.

Human and political capacity

Governance

Maintenance of the status quo is typically the goal of existing governance arrangements. However, the current rate of social and environmental change threatens to overwhelm institutions. New governance tools may be needed to meet food security and social justice objectives (van Bers et al., 2016). Some of the questions identified for instituting better governance include "how to mobilize strategic alliances, how to build strong support networks that create a space or niche for experimenting and learning, and what are the most suitable governance configurations to avoid an expropriation of control" (Roep & Wiskerke, 2012, p. 218).

The challenges to developing new governance models are based on the fact that interaction and coordination are necessary between different levels of government (Dubbeling & Santini, 2018), so power relations between different institutions and stakeholders must be managed. This calls for strong leadership with clear frameworks and rules regarding responsibility and accountability, along with transparent discussion (Berger, 2003). Also, multiple levels of government at times must commit to public investment, for example, to repair and build appropriate infrastructure (Colasanti et al., 2010; Farnsworth & Miller, 2014; Miller et al., 2016; NADO, 2010). Furthermore, actors at different scales and from different sectors may not be on the same page about the form or authority of certain governance structures. They may work at odds with each other around the purpose or legitimacy (or scale) of the governing entity and/or the degree and nature of collaboration (Andree et al., 2019).

The challenges to developing new governance models are based on the fact that interaction and coordination are necessary between different levels of government.

Boundary problems can occur between the interlocking but significantly contested governance systems in and between different geographic and business scales, so it is a challenge for the new alternative businesses "to engage with and be part of the deliberations in establishing governance systems" (Marsden et al., 2018, p. 1304). Proactive participation of networks is crucial as part of more reflexive, strategic and deliberative food governance (Marsden et al., 2018). Training and technical assistance are parts of the process of learning the facilitation skills needed for network coordination (Dubbeling & Santini, 2018); however, new supply chain members often lack the requisite experience and expertise for sustained evaluation and reflection (Roep & Wiskerke, 2012).

Another set of issues resides in the supply chains and networks themselves. Because alternative chains and networks can be fragmented and in competition with one another, coordination

among different networks or chains becomes a substantial challenge. Government support is needed for coordinating mechanisms, such as the creation of national and regional food policy councils (Marsden et al., 2018). Other support is needed through continued adjustments in the dominant regulatory entities and to assure that alternative networks can become more institutional without losing integrity and autonomy (Marsden et al., 2018).

Food systems that establish an open governance structure, and that are familiar with the negotiation of boundaries, will have more adaptability than those based on a fixed set of standards that prescribe and defend boundaries (Dupuis & Goodman, 2005). Flexibility is critical in social systems and ecosystems governance, which includes the ability to respond to environmental feedback. Often, feedback takes place at a different scale than the one at which action must be taken: for example, the dead zones in bodies of water that are caused by field runoffs hundreds of miles away. Feedback issues are thus a reason that co-management across scales is critical to solving complex problems (Newman & Dale, 2009).

Some food policy councils do function as places of discussion among different actors, but only rarely do they bring together local with regional decision-makers.

In their extensive review of the benefits and challenges of city region food systems, Jennings and colleagues (2015) point out that there is a risk that the pursuit of integrated governance initiatives will be stymied where it comes up against the vested interests of specialists who want to maintain the privileged status of their sector or where it faces opposition between elected representatives from different jurisdictions within a region. Furthermore, trade-offs occur between different scales or levels of management and require context-specific solutions and the ability to resolve conflicts (Ericksen, 2007). Unfortunately, the authors of these papers do not provide specific examples of the challenges, but offer their conclusions based on extensive experience with many different projects.

Food policy councils use their networks to respond to evolving community needs and promote connections among supply chain players. These functions were especially notable during the COVID pandemic when many food policy councils "used racial equity frameworks to guide decisions, and shaped policy to mitigate the impacts of COVID-19" (Johns Hopkins Center for a Livable Future, 2021, p.1). Some food policy councils do function as places of discussion among different actors, but in general, they rarely bring together local with regional decision-makers. There is also good reason to include conventional farmers and other supply chain participants in food sustainability and security debates and policy framings (Marsden et al., 2018). Michael Rozyne, founder of Red Tomato, a Massachusetts-based regional produce hub, has championed regional supply chains for decades. From lived experience, he recognizes the challenges of scaling up midsized farms and organizations. All kinds of creative collaboration across lines that often divide food system actors are required: "It takes logistics (an under-acknowledged challenge) and coordination that turn competitors into partners" (Rozyne, 2014, p. 14).

Federal policy

Recognition and support of regional approaches requires real changes at the federal level, not just advocacy by regional interest groups. Drabenstott and Sheaff (2002) note that "experts agreed that building new regional partnerships needs new policy directions. This will require new efforts by leading federal agencies like the USDA, by state and local governments, and by public institutions" (p. 55). In this vein, "the federal government must create a framework that acknowledges and builds upon the growing interdependence of urban, suburban and rural areas and constituencies" (Fluharty, 2011, p. 1). Separating urban and rural, defining rural as "residual" and pitting one against the other for resources violates this mandate. Despite efforts and some notable successes described in Chapter VI,

> *there is little question that the Northeast could be better served by federal farm and food policy. … For example, farm safety net programs are better suited to larger, less diversified farms and farming regions. … Marketing programs [suited to the Northeast] are under-funded and underdeveloped (Hance et al., 2006, p. 21).*

From 1995 to 2018, Northeast states received 1.8% of federal commodity, conservation, disaster, and crop insurance subsidies. If farm subsidy allocations were based on the value of agricultural production rather than commodities, the Northeast would see a 200% increase in support levels (Environmental Working Group, n.d.). Another example of the tensions found in rural-urban discussions is the disconnect on the issues of food security and access between food producers and urban stakeholders in Colorado. In conversations, producers held that these issues "had little to do with them" and placed support of that state's rural economy ahead of the food security challenges (Jablonski et al., 2019, p. 10).

Organizing across sectors and states to advocate for a regionally focused policy agenda remains challenging. Regional influence on federal policy is uneven across regions and interregional competition persists. Compared to the heavy influence of commodity and other agriculture industry groups, Northeast agricultural interests are for the most part considered marginal by national and other regional players. In contrast, the Northeast's urban-focused food security and anti-hunger groups have demonstrated relatively greater clout (and success) in Washington, D.C. Unfortunately, these groups sometimes compete with farm constituencies for scarce federal funds.

Federal food and nutrition programs benefit recipients in every region. Historically, the largest amount of public resources directed to community and household food security is the Supplemental Nutrition Assistance Program (SNAP, formally known as the food stamp program). In FY 2019, SNAP distributed approximately $60 billion to low-income households and individuals. In the last 15 years or so, the synergistic links between food access and farmer sales and incomes have been addressed through several farmers market nutrition programs and farm-to-school grant programs.

Food supply chain capacity

Support services. Over the past several decades, the number of agricultural providers from feed stores to agri-food attorneys has decreased as the standing of agriculture has diminished compared to other commercial sectors in the Northeast. A dramatic decline in funding for some land-grant universities has reduced Extension, teaching, and research. Several Northeast states have lost significant numbers of Extension staff, leaving gaps in expertise and services.

The resurgence of interest in farming and food systems has kindled new farmer training and support programs, but as a region, the Northeast falls behind other regions in farmer education, agricultural lending, farm management companies, and farm business consulting services, for example. Scarce resources are forcing universities, state agencies, lenders, and the private sector to economize and avoid inefficient redundancy. While seeking efficiencies is understandable, certain redundancies can contribute to resilience, and locale-specific knowledge is not easily transferable.

Few Northeast states have agriculture and/or food law sections or committees in their bar associations. The American Bar Association does not have an agriculture and food group, although food and agriculture appear in several interest areas, such as environment, real estate, consumer protection, and business law; there is an agriculture and food committee within the antitrust law section (American Bar Association, n.d.). In the Northeast, Maryland and Pennsylvania are the only states with an agriculture law section or committee. Several states have sections on environment, and a few include food as a committee interest. On the whole, however, legal support for food system players is thin in the Northeast region. Agri-food is not seen as a lucrative specialty, although interest in food systems in some law schools and among aspiring attorneys is increasing as shown by agri-food law programs such as Vermont Law School's Center for Agriculture and Food Systems, and Harvard's Food Law and Policy Clinic.

The challenges to service provision manifest in two ways: adequacy of service, and obstacles to collaboration. States and locales are uneven in the availability (and quality) of services ranging from organic certification to nutrition education, from farm equipment dealers to land conservation organizations, food safety educators, agriculture lawyers, and food chain worker advocates. Investigating regionally reveals sometimes dramatic gaps in service coverage. For example, Cooperative Extension in New England has been severely gutted over the past several decades, and in the Southeast U.S. there are very few farmland access programs. Service providers require attention, too, such as adequate and timely training, and the support of professional networks and resources. Often job and institutional constraints, as well as parochial and turf interests, prevent providers in all regions from collaborating, especially across state lines to fill service gaps and enhance services overall. Partnerships succeed when players buy into a larger mission—i.e., at a regional scale. As previously described, multistate (and multisector) collaborations are sometimes encouraged and occasionally required in order to be able to access grant

and government funds. On the other hand, many public and private grantors and grant programs discourage or prohibit such projects out of narrow regulatory or mission constraints.

Food chain players. Much has been written about the challenges facing regional food hubs and values-based supply chains, as presented in earlier sections. Among these are technical hurdles such as maintaining product supply, quality, and consistency; source identification; product differentiation and branding; transportation and labor inefficiencies; and technology. Other challenges include managing growth, maintaining farmer and retailer buy-in, and financing (Clancy & Ruhf, 2010a). A cross-cutting challenge seems to be in human resources—dealing with value chain partners, "process," and staff expertise and capacity (e.g., Mount, 2012). It has been argued that the initiators of new food supply chains often "lack expertise and experience" (Roep & Wiskerke, 2012, p. 210) in reflection and decision-making, in which cases external advisors can offer training and support.

Various writers have described the importance of embeddedness, the "degree to which economic actors operate in social networks, particularly the role of relationships among actors engaging in economic transactions" (Conner et al., 2014, p. 697). For these connections to be successful, open lines and clear communication among all the actors need to be present (Becot et al., 2016). A sizable percentage of hubs participate in formal and informal networks which they see as a major source of information on developing and managing hubs (Colosanti et al., 2018). Hub, chain, and network managers are often overwhelmed, understaffed and underfunded; quite a few rely on philanthropic funds that need to be raised. More than one-third of hubs are highly dependent on grants (75% of these are non-profits) which require expertise to obtain and sustain (Colasanti et al., 2018).

An analysis of the sustainability of food hubs estimated the number of food hubs an area can sustain and the current degree of competition in the sector (Cleary et al., 2019). It then compared the results to those estimated for more established fruit and vegetable wholesalers. This work went further than other food hub studies in using a measure of social capital, an index of indicators such as voter turnout and number of nonprofit organizations in a county, because it is associated with economic growth and may apply to food hubs that rely on grant support and volunteers. It was determined that a county establishing its first food hub needs a population of about 182,000 people (significantly higher than the average county size of 99,000). For a county to sustain two hubs, over 2.75 times as many residents are needed: there are only about 130 U.S. counties at least that size. This finding indicates that in a number of places there is already a saturation of food hubs that can remain viable. It was also found that social capital can reduce the size of the population necessary for viability, so the establishment of a new hub could be considered where there is more evidence of public support for its social mission, such as business development for new, small-scale, and young producers (Cleary et al., 2019).

In a number of places there is already a saturation of food hubs that can remain viable.

Public engagement: Thinking and acting regionally

Why and how to act regionally is a central theme of this report. While thinking and acting regionally make sense in the many ways discussed here, the political obstacles to doing so effectively are significant.

The politics of regionalism present five special challenges:

1. Overcoming a weak sense of regional identity;

2. Finding consensus on political strategies for regional change;

3. Securing the benefits of a "big tent" coalition without succumbing to the fragility of diverse alliances;

4. Overcoming a strategic bias toward relatively uncontentious issues of economic development and away from knottier equity and land use goals; and

5. Responding to often inconsistent federal and state policies. (Foster, 2001)

In the U.S., regional identity is ephemeral, as most people naturally identify with their local geographic community or social group. Home rule and local control are deeply embedded into the American psyche. "Regions themselves inspire little loyalty. … Regions lack the rhetorical advantages of counties and states whose boundaries are reinforced by political authority" (Cumming et al., 2019, p. 209). In the EFSNE focus groups, people identified their region as the East Coast or the Northeast or the mid-Atlantic, as well as smaller geographic areas like the Delmarva (parts of Delaware, Maryland, and Virginia). While there are several notable examples of multistate political cooperation in the Northeast (e.g., the New England Governors Conference, Harvest New England, Chesapeake Bay Program, Delaware Valley Regional Planning Commission, and the Conservation Law Foundation's Legal Food Hub), political leaders serve—and are beholden to—their constituencies, who are politically defined by municipality, district, county, or state.

Coalescing multiple and diverse groups around a relatively obscure "big tent" geographic construct may not produce desired cohesion or actions (Foster, 2001). It is hard work to generate a sense of solidarity across traditionally, culturally, and geographically separate interest groups. Urban-rural divides, parochial agendas, and sectoral competition militate against forming fruitful region-scale change agendas. Any strength in numbers by broadening the base can be diluted by weak regional identity. The bigger and more complex the coalition, the harder to forge a common cause and concrete action. At this time, research on the economic effects of urban development initiatives on nearby rural locales does not show much impact (Jablonski et al., 2019). The task is to find the comparative advantage in both areas and to institute policies and programs to support collaboration. The question of how producers and regional leaders "can be more fully

integrated into policymaking processes" (Jablonski et al., 2019, p. 7) is another piece of the puzzle of regional collaboration.

It makes sense to figure out the proper scale of action—local, state, regional, national, or global—to achieve a particular outcome. In many cases, eschewing a regional approach is not a matter of sectoral or scale narrow-mindedness, but rather of mission. Municipal and county officials naturally prioritize what will affect their geographic area of influence. Public health champions do not naturally find common cause with conservationists. A challenge, not new to organizers, is encouraging practitioners and policymakers to adopt multijurisdictional and cross-sectoral approaches that may attain outcomes superior to those produced by a narrower constituency or geography. A related challenge is assessing which scale, sectors, and/or alliances would lead to optimal outcomes.

McKinney and Essington (2006) add other strategic considerations to regional work by identifying four primary obstacles encountered when planning across traditional boundaries:

1. Who participates and what is the scope? How should a region be defined?

2. The value of working together is not always shared; people do not engage unless they believe that regional collaboration makes it more likely that they will meet their objectives better than through working independently.

3. Many people are unfamiliar with the process of regional collaboration, which makes them uneasy with ad hoc meetings and reluctant to link them with formal decision-making processes. Furthermore, people may lack the skills to organize and represent their constituencies, to deal with scientifically (and, we would add, socially) complex issues, and to negotiate with multiple parties.

4. A lack of time, money, information, and knowledge.

State and federal government funding typically is aimed at or within individual states. Multistate collaborations are sometimes, but not routinely, rewarded and occasionally required (for example, grants in the USDA/AFRI food security challenge area). The 2018 farm bill's Local Agricultural Marketing Program (LAMP) offers grants for local food programs and regional food programs, through the Regional Food System Partnership program which explicitly encourages multiple public and private entity partnerships. Recipients of federal funding for Extension must expend a certain amount of formula funds on multistate activities (USDA/NIFA, 2000). More often, however, a program's rules discourage such collaboration. For example, the USDA Specialty Crop Multi-state Program and Federal State Marketing Improvement Program allow multistate projects, but likely due to regulatory disincentives, actual funded multistate projects under these programs are relatively few. States try to add to their own coffers by competing against one another. For example, neighboring states might seek to develop infrastructure (e.g., meat processing) within state

boundaries rather than looking together for the most efficient location for the larger area. Understandably, states have incentives to protect their own businesses and markets. For example, a state may not welcome—and may regulate against—farmers from just over the state line selling at "their" (local) farmers markets.

It is not hard to imagine the political and administrative obstacles to states working together to coordinate regulations.

In this context, efforts at cross-state regulatory harmonization and reciprocity go against the current. It is not hard to imagine the political and administrative obstacles to states working together to coordinate regulations. But examples exist, from renewable energy standards to efforts to deal with climate change. The Northeast Regional Climate Center's Northeast Drought Assessment brings together farmers and others from across the region to build stronger regional responses. The USDA Northeast Regional Climate Hub conducts surveys to measure the effects of climate change and weather variability on producers in the region and enhance communication across the states. Cross-state professional certifications are another category of regulatory reciprocity. In the agri-food sector, New England states have had reciprocal agreements for pesticide applicator licensing (although they are no longer in effect for reasons we could not ascertain).

Public engagement. Several notable challenges undermine efforts to get citizens to appreciate and engage in regional food systems. The first is obvious and has already been addressed: most people do not resonate with the regional food system term or concept. "Know your region" lacks salience. Groups working on food systems work primarily at the local or national levels, and many groups—including those who work at a regional scale—fail to make the local-regional distinction. This makes it difficult to build the case for regional approaches. Thinking in terms of scale and systems is hard when primary allegiances are more narrowly focused on a local community. Most public education campaigns get their "juice" from connection either to a locale, such as particular farms or a community store or garden, or to sweeping national issues in which national groups take the lead. However, because regions "nest" and their boundaries are malleable, region-building can occur wherever a regional identity or purpose has, or can establish, a foothold.

Moving to a regional food paradigm is not an easy task. It will require champions in governments, supply chains, nonprofits, and research and educational institutions, and among consumers, who see regionalism as a cause, something worth developing. Retailers and institutions may be in the best position to champion a regional approach due to their difficulties obtaining the large quantities of local foods that shoppers and food procurement officials are interested in. A larger regional scale can supply significant amounts of local food, which when complemented by national and global sources can meet the total demand.

In the absence of a direct relationship between growers and eaters, regional food system players need to creatively communicate (that is, market) to consumers the attributes and

values of regional products that may not have a specific farmer's face or name attached. Regional food systems can be enhanced even without widespread recognition by the general public. Food system change advocates have addressed communications challenges for several decades. How food systems and food system issues are framed can facilitate communication by understanding how different people hear and process certain messages (Bales, 2006; Knezevic, 2021). Messaging is not limited to persuading eaters and supply chain buyers to choose specific products.

Messaging and media are becoming more sophisticated and complex at breakneck speed. Social media is a powerful tool that transcends geography and can be harnessed to inform and mobilize people regardless of locale. Websites, podcasts, chatrooms, blogs, and e-newsletters, for example, can be used to reinforce regional identity, planning, advocacy and collaboration. To be effective, tools require consciousness of and commitment to a regional framework. Leaders of regional food system thinking can help groups understand, buy into, and communicate about regional food systems. Groups can become more conscious of their own messaging, and thus not conflate local and regional, not "forget" region-scale components, and not disregard food system needs beyond local.

It is hard to organize groups based on regional identity, although we have described several that have done so successfully. Building consensus across a region around policy agendas is especially challenging. The NESAWG Northeast Ag Works! Project (NESAWG, 2007) produced a Northeast farm bill agenda with 10 "must have" food and farm policy goals specifically for the Northeast, based on a region-wide policy summit convened for that specific purpose. Regional projects are hard to launch, and hard for groups to galvanize around. Funding is typically tied to local or national projects rather than regional ones. Whether by statute, philanthropic preference, or logistical complexity, regional projects are more challenging to support. Regional engagement requires cross-sector and multi- institution cooperation—reaching across boundaries not traditionally traversed.

Food system education begins—or should begin—early. We do not expect elementary school children to grasp regionalism as they respond to pulling a carrot from the earth. But many graduate programs in sustainable agriculture and sustainable food systems, in our opinion, do not adequately lift up regional thinking and the role of scale in food systems. These students will go on to play influential roles in the food system; it is crucial that they think regionally. Only about 20% of universities with sustainable food systems education (SFSE) programs demonstrate equity as a topic or core competency in their curricula (Valley et al., 2020). We suspect that regionalism and regional food systems appear even less frequently. Both topics need much more attention.

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As this chapter elaborates, there is no shortage of challenges to developing more regionally focused food systems. It remains to be seen how substantively the COVID-19 pandemic

and heightened engagement around racial injustice and climate change will reshape the food system, in response to recent calls of alarm. Entrepreneurs, advocates, educators, and citizens are stepping up to meet many of these challenges. Perhaps the time has come to give 'regional' its due.

VIII. CONCLUSION

Introduction

In this concluding chapter, we look at the big picture. We highlight systems thinking as a central framework and review the overarching themes of resilience, diversity, and sustainability applied to regional food systems. We summarize the core concepts and benefits of regional food systems overall. Then we lay out the core concepts and benefits of each of the six dimensions, along with our suggestions, drawn from previous chapters, for what needs to be done.

We hope we have made clear that the task of strengthening regional food systems is too complex for simple formulas or models. We also want to emphasize again that a more regional approach is essential to address, but does not solve, the systemic, structural problems in the overall food system. Equitable and full participation by oppressed and marginalized communities in all aspects of the food chain is essential for a more sustainable, resilient and just regional food system. Anything that undermines the full participation of all people in a region undermines the regionalism we advocate. Furthermore, we recognize that food systems intersect with other systems—education, health, housing, and wealth-generation, for example--that disproportionately disadvantage communities of color. The systems approach that we espouse must be used to analyze and address these intersectionalities.

For us, regionalism applies both to a physical area and an approach. We stress the *critical importance of scale, geography and systems thinking* and the particular role that thinking regionally plays toward desired food system change.

Many examples, successful practices, and resources appear throughout the previous chapters; we encourage readers to refer to them. This chapter offers additional examples of the regional approach. During the three-year process of writing this report, we frequently came upon new research and on-the-ground work on regional food systems; it was challenging to decide when to stop integrating these innovations. In addition, new lessons from the COVID-19 pandemic and concurrent racial, environmental and broader social justice

movements continue to provoke greater analyses. We approached this chapter with humility, acknowledging all that we did not include and have yet to learn.

The big picture

Systems thinking

One can see from the breadth of topics covered in this report that food systems are complex systems, driven by multiple economic, social, cultural, and environmental factors that are internal and external to a system's boundaries (Allen & Prosperi, 2016). Systems thinking provides a valuable framework to describe the conclusions we have drawn from our literature review and our thinking on regional food systems. At any scale, food systems and their subsystems—such as production, consumption, and capital—involve multiple dynamic interactions between humans and the natural world and with each other, resulting in complex analytical and policy challenges at every place in the system (Zhang et al., 2018). They also offer multiple potentially competing, contradictory, and complementary points of intervention (Foran et al., 2014). Too little is known about how food systems work at different scales; "only partial knowledge is available to help decision-makers … drive the system to more sustainable outcomes" (Bene et al., 2019, p.117).

For some time, U.S. and global experts have argued that to be fully understood, complex adaptive systems such as food systems need to be assessed through research, planning, programs, and policy development using systems science and thinking (Institute of Medicine [IOM], 2015). The tools of systems science, such as systems dynamics models, concept mapping, causal loop diagrams, and network analysis, help identify the drivers of change as determined and affected by feedback loops, delays, and nonlinear relationships (Zhang et al., 2018). They can also identify key variables that affect natural resources and social and economic development, identify leverage points where decision-makers can take effective actions and interventions (Keegan & Nyugen, 2011), and achieve "a comprehensive understanding of what takes place in reality" (Zhang et al., 2018, p.,7). Systems thinking is valuable in helping people consider a wide range of variables. These include, for example, actors' value systems, acknowledging trade-offs among multiple potential solutions to a problem, making predictions, finding areas where synergies are possible, targeting intervention points, and identifying workable policies (Clancy, 2019). Systems thinking also exposes contradictions and difficult trade-offs that offer options as they are resolved.

In this chapter we present several basic Causal Loop Diagrams (CLDs) to illustrate some of the linkages in an aspirational regional food system. A CLD helps to visualize how variables in a system are causally related to each other and to other systems. CLDs can visually describe how a system behaves or might behave. CLDs often start with a question about how a problem can be solved or better understood. The graphic can then "describe the reality through causalities between the variables and how they form a dynamic circular influence" (Haraldsson, 2004, p. 21).

In CLDs, there are two types of systems. A reinforcing system is one that is growing. The CLDs produced here reflect our aspirations of positive (as in, reinforcing) actions occurring in different scenarios describing regional food systems. A balancing system, in contrast, shows variables that dampen or limit the growth of the components of the loop. In a full CLD, reinforcing and balancing loops are combined. These simpler diagrams show only the former. Much of Chapter VII offers examples of actions that can impede or balance the progress of the system. Full diagrams also show the timescale between the components and the interactions expected among the variables in much greater detail than pictured in this chapter.

Resilience, diversity, and sustainability

Regionalization builds resilience in the face of disruptions like extreme floods, droughts, farmland loss, depressed markets, and other issues because risk is spread across larger-than-local geographic areas. Regions can also more efficiently respond to disruptions because of their rural-urban connections and place-based interconnectedness of interests. Systems can be managed for general and specific resilience through adaptive strategies. But to achieve resilience, actors across the food system need to address multiple dimensions of the system and engage at least three scales: the focal scale and the scales above and below it (See Chapter III, Figure III F.).

Institutional diversity at a regional scale provides the largest degree of resilience when complex problems arise. Biodiversity is also a critical contributor to resilience by spreading risk, offering redundancy across and between regions, increasing product and market options, offering more economic opportunities for supply chain actors, and other mechanisms. Diversity can be nurtured and increased through management strategies all along supply chains and in many other food subsystems such as financing and governance. Unfortunately, consolidation and concentration—which decrease diversity in food systems—continue apace.

With hundreds of definitions of agricultural and food systems sustainability, the particular meaning of sustainability is context-specific. It needs to be clearly defined in any research or action project. Regional-level sustainability is much less studied than sustainability at the local level. Practitioners and researchers should forthrightly acknowledge the regional nature of food systems, recognizing that 'local' nests within 'regional,' and that a region is a critical scale to advance sustainability. Environmental, social, and economic sustainability will always involve trade-offs among the dimensions, given their complexity, that must be acknowledged and accepted.

Core concepts of regional food systems

Regions can be described and bounded in various ways, e.g., natural factors, political units, and cultural expressions; regions are distinct, nested, and inter-related. Regionalism is a

powerful and essential construct for developing sustainable and resilient food systems. Unlike the more rigid and linear structures of global and conventional food systems, regions describe a complex of flows, webs, processes, and relationships.

Local and regional are different in many ways. All scales are necessary. Regions are the scale between national and local, and the least studied and least visible of the food system tiers. Boundary or spatial references that define a particular region are necessary to plan and act effectively. Cities, suburbs, and rural areas are interdependent, and regions offer the flow and networks required for a food system to function well. Food security from the global to the household scale will be much more difficult to reach without serious attention to the regional scale. Distinguishing regional from local is necessary and legitimate. Failure to acknowledge the distinctions hobbles efforts to support both.

The process of food systems regionalization requires the combined engagement of experts, practitioners, and advocates from planning, finance, governance, economic development, logistics, policy, and other arenas. Most analyses of food systems are centered on critiques of the existing national and global systems along with descriptions and analyses of aspirational alternatives—typically local—to the present system. At this point, regional food systems are not usually part of these analyses.

Because regions nest and their boundaries are malleable, region-building can occur wherever a regional identity or purpose has, or can establish, a foothold. Regional food systems can be strengthened if relevant actors use systems approaches in their efforts to understand and solve food security problems, because they transcend boundaries and embrace urban-rural linkages.

Acting regionally requires:

1. Receptivity to the concept, advantages and applicability of regionalism;

2. Appropriate governance from the public and private sectors, including supply chain actors;

3. Cross-sectoral coalitions and other types of networks;

4. Thinking strategically rather than parochially; and

5. Addressing tensions around efficiency, equity and competing interests.

Benefits of regional thinking and regional food systems

We hope we have made convincing arguments throughout this report about the benefits of regional food systems and about regionalism. Thinking regionally compels us to consider scale and geography. Regions are the appropriate scale to address, among other

key concerns, climate change, land and water, farm demographics and production, crop options and practices, and markets. Regional food systems offer greater food volume and supply; crop, natural resource and cultural diversity; and resource efficiencies. They are well positioned to withstand disruption and add resilience through redundancy, diversity, greater food security, and energy and transportation efficiencies. They provide an effective framework for building urban-rural connections, rising above parochial planning and advocacy, solving border-transcending problems, and addressing economic and social issues such as transportation, environmental degradation, land use, infrastructure, emergency food planning, and workforce development.

Thinking regionally about food systems spurs inclusive governance structures and customized strategies to address racial and other inequities. Regional thinking can foster creative supply chain business models, and increased viability for midsize farms from greater market opportunities. In addition, regions might offer the minimum size for markets and business networks to reach economies of scale and maximum size for crafting and sustaining working relationships.

The Northeast region is an ideal laboratory for studying and developing regional food systems. There is a history of regional food systems thinking and action, along with strong examples of supportive policies, projects, institutions, and research. As with every region, the Northeast has its own history of and reckoning with racism, dispossession, and exploitation. All stakeholders in the region must step up to confront the historic and contemporary oppressions that exclude communities from full and equitable participation in their food systems and beyond.

What is needed

- Frameworks that look at resilience, diversity (of all types), and sustainability simultaneously.

- Increased attention to a region's particular historic and contemporary profile of racism, and addressing the impacts of oppression toward full and equitable participation in the food system.

- Explanations of the essential contributions of the regional scale in addressing food security and food chain systems, in ways that resonate with diverse communities.

- Conscientious assessments of regions to determine which resilience characteristics already exist and which need development.

- More attention to the resilience characteristics already present or needed within all the nodes in supply chains, with more attention to manufacturing and distribution.

- Investments in the development and accumulation of capital assets at regional levels that

enhance the resilience of those food systems and greater investments in rural areas.

- Recognizing Indigenous and other cultural knowledge, and blending local and regional knowledge with scientific knowledge and shared learning to develop innovations that can enhance agroecosystem resilience.

- Wide discussion of the benefits to a region of having more diversified food systems.

- More incentives to diversify farms with a range of region-appropriate crops and animal species.

- More training in management skills that help food systems actors increase diversity.

- Increased antitrust enforcement related to the structure of agriculture, and concentration and consolidation in the manufacturing wholesaling, and distribution sectors.

- Enhanced cross-cultural linkages within and between regions.

- Thoughtful conceptualizations of the short- and long-term complexity and feedbacks in regional food systems.

- Implementation of widespread training and education regarding the trade-offs that always occur among environmental, social, and economic goals and how those can be brought forward and addressed.

- More research and pilot programs on regional resilience efforts that encompass a systems approach to studying multiple dimensions.

- Research on the multiple facets of sustainability at a regional scale such as land use, the structure of agriculture, soils, food security, food-related transportation, and many others.

In sum, the development of larger and stronger regional food systems could increase food supplies in a region for consumption within and outside the region; increase farmers' (and others') incomes and viability from new and expanded markets; and increase the number and size of supply chains. It would add more crop and animal diversity to the regions' farms and optimize the use of arable land, water, and energy, thereby contributing to resiliency. It would bring more attention to farm and farmland preservation. And it would build stronger urban-peri-urban-rural and state-to-state linkages through collaborations and governance mechanisms. These effects are seen in Figure VIII A.

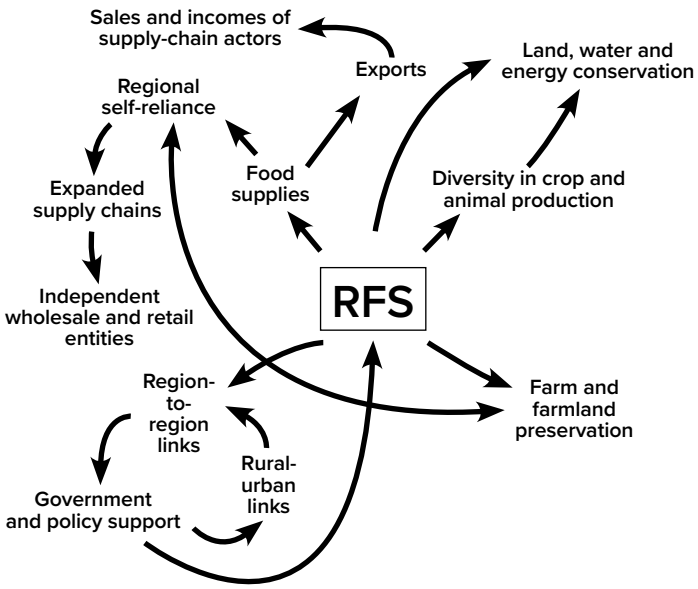

Figure VIII A: CLD depicting outcomes of larger, stronger and more numerous regional food systems on stakeholders

Food needs and supply

Core concepts

By comparing food needs to supplies, researchers can analyze the degree to which any particular U.S. region can satisfy the food needs of its population. Knowing a region's food production capacity—volume and variety—makes it possible for all the actors to understand the parameters within which they are working to build regional food supplies. Such knowledge allows the identification of relevant geographic boundaries, appropriate food needs, and capacity for any new efforts toward greater regional self-reliance. It also allows food systems actors to share a pragmatic understanding of the needs for food imports from national and global sources over the short and medium term, to argue for farmland preservation and land access, and to plan for farm business expansion, crop choices, and new markets. Consciousness about and collaboration on regional food systems development could support, maintain, and increase current production to meet a larger proportion of food needs, thereby increasing food security.

The Northeast can only meet a small percentage of most of its food needs because of its large, dense population areas and relatively small arable land base. The region is able to meet the food demand of between 14% and 28% of the population, depending on the type of diet consumed. According to McCarthy (2021), although it is possible for the Northeast to supply all of its overall fruit and vegetable demand, doing so would require extraordinary changes in land use and diet composition.

Urban agriculture and indoor food production have modest but important roles to play, although they also present considerable challenges in meeting those demands. While every state in the Northeast is capable of producing a greater variety of foods, it is likely that a greater amount and variety of new production in the region will occur in Pennsylvania, New York, and Maryland, where approximately 70% of the farmland is located (Griffin et al., 2018). We have offered the conservative estimate of about a 25% increase in the food supply that could be produced in the 12-state region according to the studies done so far. This would make a significant contribution to the food security of the region. In parallel, regional thinking can be applied to traditional Indigenous foods and also to marine resources to optimize sustainable seafood harvests and confront the precariousness of fisheries from climate change and other threats.

What is needed

- Maintenance of present production. This will require retaining current productive farmland and fisheries, and fostering the sustainability of present farms, farmers, fishers, and marine resources.

- Development of more diversified production, i.e., multiple crops and animals produced on farms because that appears to be an important route to farms that are more viable.

- More markets and other supply chain support of all sizes to handle new and more diverse production.

- Addressing trade-offs between production diversity and transportation efficiency to bring a wider diversity of income-producing crops grown on small and midsize farms to markets.

- Clarification of the environmental, social, cultural, and economic parameters of urban food production, and its benefits and downsides in any particular urban area. Use of data, for example, on zoning and infrastructure to plan and increase urban-rural connections can foster the growth of stronger regional systems.

- Collaboration to manage Northeast fisheries to balance resource protection with food needs and a vital fisheries industry in the face of dramatic climate change impacts.

- Growing more connections and collaborations across food supply chain actors.

- Research: Based on our review of the research on regional self-reliance and carrying capacity in the U.S. and Canada, what would be useful are:

    - Updates of previous studies to see what changes have occurred to move regions toward greater regional self-reliance goals

- Following on the research by Peters and his colleagues, including the EFSNE project, more work focused on the Northeast, funded by collaborations among regional entities, state governments, federal agencies, and academic institutions.

- More research to gather supportive, replicated, and more granular data on carrying capacity.

Natural resources

Climate change

Core concepts

Regions are uniquely appropriate spheres of implementation for climate adaptation and mitigation. In the U.S., both farm types and crop and animal production are identified by regions. So are many watersheds and river basins, areas of biodiversity, and soil types, as well as National Climate Assessments, climate conditions, and federal climate adaptation and mitigation collaborations. In the context of regional food systems, climate change adaptations and mitigations can be successful if best or sustainable practices are followed. Any and all interventions can increase resiliency across food supply chains in multiple ways.

Going state by state to address climate impacts doesn't make sense; nor does a national one-size approach to designing and implementing responses. The effects of climate change will continue to vary by crop and region, such that impacts on production centers in the West and Southeast, for example, could necessitate increased output in the Northeast. Climate change will greatly influence what production in the Northeast region looks like in the future in several ways. Impacts include seasonal drought, delayed plantings, and crop losses.

Regional Examples

- Regional Greenhouse Gas Initiative
- Regional Climate Hubs organized by USDA
- Transportation and Climate Initiative of the Northeast and Mid-Atlantic States
- Chesapeake Bay Program Partnerships
- Climate Adaptation Resource Database

A "benefit" from climate change is that some crops increase productivity with exposure to higher levels of CO2, so new crop options and markets may open up in some regions. Longer growing seasons enable more intensive production, provided that sufficient water is available and excess rain does not delay plantings or cause flood damage. Northeast farmers do see benefits in earlier plantings, longer growing seasons, and growing different crop varieties (Takahashi et al., 2016). For the

Northeast, Wolfe et al. (2018) suggest that more double cropping than what is currently done might be possible, thereby increasing yields. Greater use of cover crops in the region would produce multiple benefits, including improved carbon sequestration from improved soil tilth and decreased erosion. Of course, these benefits could be offset by drier or wetter conditions in other parts of the region, but at this point those trade-offs have not been compared.

What is needed

- Development of multiple regionally appropriate adaptations to climate changes in order to preserve a region's production capacity and help farmers face climate challenges; recognition that farmers will need to adapt regardless of their location, scale of production, or market.

- More funding to help smaller and lower-income farmers purchase or share technologies needed to adapt to and mitigate weather and climate changes, e.g., more use of the Regional Conservation Partnership Program.

- Greater consideration of the political, cultural, and regulatory factors that influence climate adaptation and mitigation behavior.

- Development of approaches to farmers that utilize weather language rather than climate change to overcome the politicization of the latter.

- Research:

    - More interdisciplinary research in larger geographic locations focused on climate adaptation and mitigation.

    - Focus within bioregions to characterize the vulnerabilities and adaptive capacity of regional food production and regional food supply chains, and to consider the political, cultural, and regulatory factors that influence climate adaptation and mitigation behavior.

    - A continuing need for new decision tools, such as early warning signs of drought and pests.

As shown in Figure VIII B, regional food systems' climate change adaptations and mitigations that include increased biodiversity in crops and animals (and the value-added products that flow from them) can decrease soil loss, improve soil tilth and, and improve water use if best sustainable practices are followed. Changes in climate and weather patterns will have both positive and negative effects on food systems. Floods, droughts, and heat stress cause declines in crop and animal health, crop and farm income losses, and increases in pests and pathogens. Positive adaptations and mitigations such as more diversified farms and sustainable practices

can lead to more seasonal product diversity, increased farm incomes, and increased processor, distributor, and retailer sales. But to be truly resilient, food systems actors need to work at a large enough regional scale for a significant impact on climate mitigation to occur. Regional collaboration can lead to more regional markets, better climate mitigation strategies, better land and water use, and induce more public and private investments.

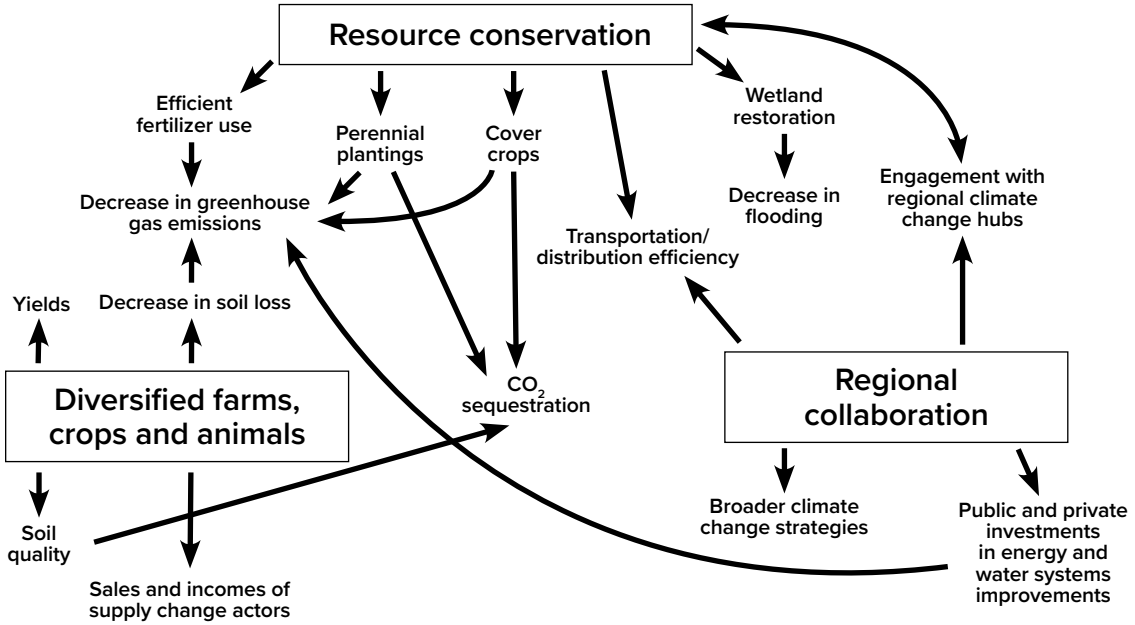

Figure VIII B: CLD depicting outcomes of climate change adaptations and mitigations of food systems at a regional scale

Land and water

Core concepts

Regional thinking is essential for addressing land and water availability, use, management, and protection. Land and water attributes and challenges do not conform to political boundaries. The Northeast's productive land base is both diverse and limited. This means that land for agriculture must be judiciously managed with an eye to which parts of the region can supply what volume of which foods. Land access and transfer are key challenges in every U.S. region. Regional approaches to fisheries lag behind land-based regional frameworks.

What is needed

- Application of regional thinking to examine the historical and contemporary patterns of land dispossession and unequal access (e.g., institutional discrimination, tribal treaty violations, Black dislocation and heir property) and to advocate for remedies.

- Customized expansion of land access and transfer programs in all regions to ensure viable transfers of land and operations to future producers and equitable access to

Regional Examples

- Farm Transfer Network of New England
- Northeast Farmers of Color Land Trust
- Chesapeake Bay Watershed Action Plan
- Northwest Atlantic Marine Alliance
- New England Farm Link Collaborative

secure land tenure, making it possible for them to begin farming and fishing careers and to access the means of production, whether land or vessel.

- Thinking regionally and holistically about farmland protection, expansion and restoration.
- A regionally appropriate balance of land for food with land for solar and wind energy as well as with forests and other "natural" landscape contributions to climate resilience.
- Support of "rematriation" and similar strategies regarding Indigenous lands.
- Assistance to Northeastern BIPOC with heir property issues and settlements in the Southeast U.S. and elsewhere.
- Encouragement of farmers to "think regionally," away from saturated direct-to-consumer markets and unaffordable land toward more region-scale supply chains.
- Strengthening of supply chains and non-direct markets so that producers can thrive in more rural settings.
- Viewing water management through a regional lens, rather than political boundaries.
- More research, practical approaches, and advocacy to develop regional thinking around marine fisheries

Economic development

A good deal of economic development occurs at a regional scale. A major advantage of regional approaches to economic development is that communities can achieve more by pooling and leveraging resources, increasing coordination, and exercising a stronger voice to maximize political influence. While regionalism in itself is not a remedy for concentration and consolidation in the U.S. food supply, the regional scale might offer a promising antidote to these damaging structural trends by providing more—and more beneficial—supply chain and consumer options, and by reclaiming resources and control along with some competitive efficiencies.

Economic impact analyses

Core concepts

It is important to not confuse local impact analyses with regional impact analyses; there are important differences. Researchers agree that without distinguishing local from regional, more nuanced and useful conclusions from such research assessments are not possible. A larger scale can be more than the sum of its parts and can produce much larger returns to both local and regional businesses. There are obvious benefits to farmers and other supply chain actors from participating in larger regional markets, in contrast to local direct markets, which have been found by many researchers to be of limited economic importance (although they have many other benefits).

Regional Examples

- Northeast Kingdom Plan (Vermont)
- Regional Plan Association (NY-NJ-CT)
- Food Forward NYC
- New England Food State Food System Planners Partnership
- Delaware Valley Regional Planning Commission

What is needed

- More recognition of the utility of regional economic development to improve regional food systems.
- Training and education on regional food systems and scale in regional planning and impact analyses.
- More carefully defined scales and boundaries when planning and assessing local or regional food systems.
- Training on whole food systems, thus integrating food, environment, equity, waste, zoning, land use, transportation, etc.
- Using a focus on a regional perspective in siting infrastructure and market outlets.
- Inquiry into regionally focused food systems as a promising antidote to damaging structural trends of concentration and consolidation.
- Research:
    - More regional economic impact studies and models that do not confuse local and regional and do take into account local versus regional opportunity costs.

- Research that contributes to policy change at a regional scale.

- Studies that demonstrate the value-added to food products, supply chain viability, and security through regional food systems.

Food systems planning

Core concepts

We cannot stress enough both the urgency and potential of thinking regionally in food systems planning. A regional, integrated planning framework can link water supply, biodiversity, public health, natural disaster planning, climate mitigation, workforce development, food production, food access, and related civic concerns. A landscape or place-based approach to environmental planning and management, one of which is the city region model described in Chapter III, can promote greater food security and equity as well as natural resource sustainability. Regions are a critical unit for mapping land use and capability, tracking growth patterns, siting infrastructure, and promoting smart growth.

What is needed

- Much more effort applied to regional food systems planning.

- Urging regional planning agencies (RPAs) to lead on multi-state, landscape-based food system planning, even if an RPA's jurisdiction is at the state or sub-state level. Similarly, locales can look for opportunities to scale up their perspective, seek partnerships, and adjust criteria for decision-making at a larger scale.

- Addressing historic Indigenous land dispossession and implement regionally and culturally appropriate strategies to redress injustices and promote access to such lands for production as well as traditional practices and activities.

- Strengthening urban-rural connections; employment of city region concepts to build awareness and design practical actions.

- Where it makes sense, encouragement of place-based branding based on 'regional.' Building understanding about how "regional" is perceived by diverse communities and assuring inclusive planning at all levels and scales.

- Research to shed more light on best practices for region-scale food systems planning.

Regional supply chains

Core concepts

A balance between efficiency and diversity is a keystone of resilience. Many midscale farms and other food enterprises can be exemplars of this balance. Regional supply chains offer diversity as well as redundancy, another hallmark of resiliency. More differentiated regional supply chains will emerge from national chains when farmers feel more confident in participating in them. Not all supply chains will or have to be regional. Regional supply chains are not appropriate for all businesses. Many smaller enterprises do not wish to become larger or to invest the effort required to work out relationships in longer supply chains (Foley et al., 2012). Over the last decades, all the entities in food supply chains have experienced consolidation and the concentration of buying power in fewer firms. This has taken a heavy toll, especially on more vulnerable smaller entities.

What is needed

- A rebuilding of regional supply chains by appropriately scaling up smaller supply chains and meeting the critical volumes needed to make transportation costs viable.

- Investment in supply chain infrastructure as one of the best opportunities for regional governments to strengthen regional food systems. This infrastructure includes food business technology companies, food business incubators, food hubs, and farm-to-institution supporting businesses that can affect economic development and job creation.

- Rebuilding, re-siting, and repurposing of wholesale and transportation infrastructure.

- Strengthening of collaborative networks across local areas and regions by development agencies and governments.

- More attention by producers and processors to the food standards and regulations needed to participate in bigger markets.

- A recognition of the appropriate efficiencies needed in systems that do not depend only on lower costs, but include actions and structures that build resiliency.

- Addressing the various challenges that actors along supply chains face; this requires collaborative, multi-institution investments in education and training, including public support for collaborative entrepreneurial business development. Much of the work of agriculture, processing, and distribution is done by private-sector entities; public-sector investments can help strengthen and incentivize these actions. Provision of educational programs, technical assistance and models to help regional supply chain actors understand how each node in the supply chain works and how collaboration occurs across the chain.

- Research: More research and modeling of regional food flows.

Trade and commerce

Core concepts

Trade at all scales is, and will continue to be, an essential element of sustainable and resilient food systems. No region is self-sufficient. Both import substitution and export are valid. Thinking regionally enables the conscious and productive pursuit of inter-regional trade, which is necessary to provide the full array of food needs for the Northeast as well as other regions. Inter-regional trade can enhance a region's food economy and incorporate fair and reciprocal trade practices. Laws and regulations generally do not impede regional commerce. That said, local preference can undercut cross-border procurement and other markets. Some buyers are already inclined to source regionally. The opportunities to expand and formalize regional preferencing are enormous, but they require additional supportive policies.

What is needed

- Regard for trade as necessary and desirable; seek balance between import substitution and exports.
- Support for the development of domestic fair trade and DFT standards to elevate social and economic justice to inter-region commerce.
- Assurance that procurement and other policies do not disadvantage regional purchasing.
- Research: More data and analysis on import substitution.

Work force and labor

Core concepts

All food system components are heavily reliant on labor of which there is a chronic shortage in every region and relevant sector. Farm laborers and food chain workers remain marginalized and relatively few food system initiatives address workforce issues, despite active organizing efforts on the part of food chain workers and farmworkers. Viability for small and midsize farms is precarious and new entrants into farming are faced with numerous hurdles related to labor.

What is needed

- Heightened attention and advocacy for each region's food system workforce, including worker rights and dignified work, led by workers; organizing by region where it makes sense.
- Encouragement and incentives for Northeast farmers to think beyond direct markets

and to locate beyond peri-urban settings to more affordable land and costs of living for themselves and their workers.

- More robust, region-scale supply chains and infrastructure.

- More attention to rural economies so that farm families have other employment opportunities and community rewards further away from metro areas.

Business models

Core concepts

For several decades, non-traditional business models have emerged to assist food supply chain members from farmers to retailers to scale up, increase their product lines, increase their business-related income, and become more viable. These models rely on cooperation and collaboration among similar businesses (business clusters) and entire supply chains (values-based supply chains, horizontal collaborative networks, and regional food networks). Each model is well suited to regional scales of all sizes, and all face challenges such as developing trust among participants, preventing unhealthy competition among members, encouraging patience, and managing expectations.

What is needed

- Promotion of an understanding of the utility of collaboration at a regional scale.

- Development of skilled leadership and champions to foster regional collaboration and cooperation over the long-term.

- Strong communication structures among supply chain members and affiliated institutions.

- Significantly more funding from public and private sources to support the development of supply chain business models.

- Research:

    - Social scientists should bring together theories and new thinking from varied disciplines to better understand regionalizing processes at different spatial scales, while addressing social relationships such as class, gender, racial and ethnic inequalities in production and consumption, and the government and market forces embedded in a region. The preponderance of studies of supply chains in the literature have been conducted on local, not regional, examples.

- Analyses should be done on the different types of business models prevalent in regional food supply chains to identify those that are successful and easiest to adapt by regional-scale enterprises and supply chains, as well as the unsuccessful attempts and their challenges.

- More research on alternative approaches, including Native American provisioning systems.

- Studies of the actual business practices and competitive strategies of new food firms as they adopt a more regional food system strategy.

Access to capital and related support

Core concepts

There is a paucity of funding for regional-scale food systems. Current funding sources, some of which are ephemeral, include some conventional commercial lenders, government loan programs, government and philanthropic grants, finance agencies, investment capital, and creative, nontraditional sources of capital such as crowdfunding. The reasons for this funding dearth include poor understanding of the importance of regional food systems, conflation of local and regional, and insufficient examples of success.

What is needed

- Greater understanding by funders of the potential of regional food systems and midscale enterprises, leading to increased investment in these that could include more risk-tolerance and patient capital with flexible terms and longer time horizons.

- More education and training for funders on regional-level opportunities and encouragement to collaborate on projects that span funder-limited geographies.

- Funders also need education and training on the food systems values and aspirations of "non-mainstream" groups like Indigenous Peoples.

- Encouragement of economic development agencies to reach across traditional boundaries to cooperate on regional food system development and to provide funding, training, and other resources.

It is critical that recognition evolves regarding the importance of regional economic development in improving regional food systems and vice versa. Regional food systems can strengthen rural-urban connections, land-use mapping, infrastructure siting, and smart growth. But for this to occur, economic development agencies must reach across traditional boundaries to cooperate and help build a consciousness of regional scales. An integrated

planning framework can link multiple service and policy sectors, from climate change to workforce development. Regional food supply chains rely on all these sectors and plans and can build larger markets to increase diversity and redundancy—keystones of resiliency. But this can happen only if both public and private investment programs and policies are forthcoming to incentivize and support new and old business models through technical assistance and financing, and to enhance inter- and intraregional trade (see Figure VIII C).

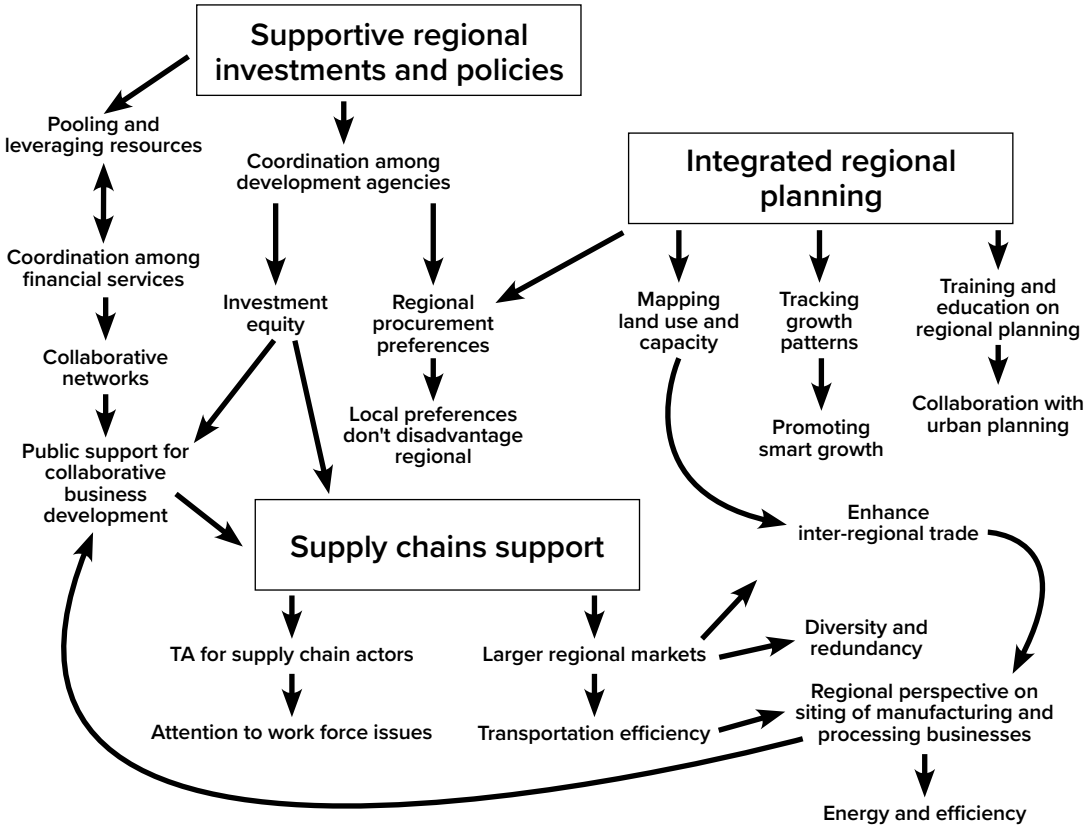

Figure VIII C: CLD depicting outcomes of economic development focused more intensely on regional food systems

Infrastructure

Core concepts

Much emphasis is placed on the dearth of infrastructure to support local food initiatives, but less attention has been paid to comparable needs at the regional level. Regional food systems must be perceived as being valuable. This requires shifting desires and removing oversimplified protocols that focus on local infrastructure and imply that other scales are not as important. In many cases, components of local and regional chains are already shared but are not identified as such or as visible.

Insufficient and inappropriate supply chain infrastructure is perhaps the biggest barrier to building strong and resilient regional food systems. One consequence of consolidation

and the allure of economic efficiency is the deterioration of infrastructure that links urban centers and surrounding regional populations and enterprises. When infrastructure is examined, researchers conclude that the "processing sector was among the most promising in terms of potential high returns" (Pansing et al., 2013b, p. 6). The processing sector is described as the least risky, and as having a high multiplier or ripple effect on other supply chain actors.

There are many observations and recommendations on how to improve individual infrastructure nodes in the supply chain. But a systems perspective compels planners to connect all the pieces. When this is done, options arise with the potential to address system-wide market and food access failures, as well as the environmental challenges in the current system (Miller et al., 2016).

If regional food systems are optimized for logistics and fuel efficiency, shorter-distance food transports may be able to compete on proximity with large growers at a greater distance (Miller et al., 2016). The Biden Administration's national infrastructure initiative to upgrade roads, bridges, and broadband service recognizes the critical importance of these improvements for the agriculture and food sector.

Newer distribution modes such as regional food hubs and cluster food networks hold promise for regional food systems. Other innovative solutions to encourage regional food supply chains are smaller chains through not-for-profit terminals, drop yards for urban freight in megaregions, and federal support for regional food trucking companies that serve metro regions. As efforts evolve to clarify the unique benefits of regional food systems more widely, Palmer et al. (2017) argue that wholesalers and retailers may be the supply chain actors that regional food advocates should target.

Regarding procurement, public and private agencies, organizations, and institutions have a vital role to play in advancing regional food systems. These entities can harness their considerable purchasing power to expand regional sourcing and also promote social values. In addition to more reliable and adequate supplies, the benefits of regional procurement include more robust regional supply chains and increased access to markets for midsize farms. Barriers include inadequate infrastructure, along with regulations and the public and purchasers' preferencing of 'local.'

What is needed

- More economic development and resource planning at the regional level that consider the optimal scale, location, and design of new infrastructure.

- Siting studies that identify the optimal location of infrastructure facilities such as packing, slaughter, processing, and warehousing.

- More public and private investments in supply chain infrastructure for local and regional governments to strengthen their food systems and increase job creation and economic returns to a region.

- New strategies and innovative solutions to bring regional food to regional markets by strengthening supply chain relationships and improving logistics at the regional level.

- The addition of 'regional,' not just 'local,' as a value in procurement regulations. Promotion of the regional scale in geographic preferencing and values-based tiered purchasing guidelines.

- Acknowledgement that wholesalers and retailers probably have the largest roles to play in advancing regional food availability.

- More effort by large institutions to support and expand regional food supply chains. Regional food systems distribution and retail opportunities are greatest with midsize distributors and retail firms that serve larger areas.

- Efforts at regional levels (at whatever size) to align branding activities that will create market synergy and increase consumer recognition of regional products without a proliferation of different regional brands.

- More public education about the benefits of regional scale and regionally located agri-food infrastructure.

- Training of entrepreneurs who have only been involved with direct markets, who are scaling up to larger volumes to engage in newly emerging regional supply chains.

- Assurance that, where appropriate, definitions of 'local' reach across state lines.

- Increased rail transportation to respond to northward shifts in production due to climate change.

- More private-sector efforts to improve freight transportation in city regions.

- Development of more export terminals, notably in the Northeast.

- Research: More study of

    - Regional supply chains that already exist.

    - The processing sector in all U.S. regions; this topic is understudied, as demonstrated by sparse literature.

- Changes in processing capacity that affect rural area viability.
- The artisanal food business sectors by region and their contributions to economic health and the capacity for growth.
- The role of major food retailers and supermarkets in a re-regionalized food system
- How regional food networks relate to the advanced distribution, storage technology and market research capacity of global supermarket change.

To tackle infrastructure improvements, regional planners and others need to connect all the pieces. Doing so offers the potential to address system-wide market and food access failures as well as environmental challenges (Miller et al., 2016). Increasing sales for regional supply chain actors—farmers, wholesalers, and retailers—can occur with more terminal markets, larger processing capacity, optimal logistics, greater fuel efficiency, upgraded infrastructure such as roads and bridges, and more private investment. All these improvements can enhance the viability of rural areas and improve urban food access, especially if accompanied by public and private purchasing from regional supply chains (see Figure VIII D).

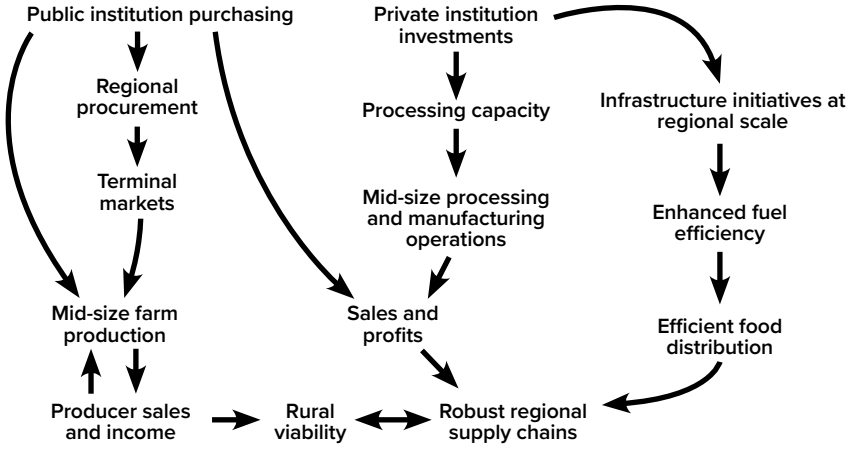

Figure VIII D: CLD depicting outcomes of more support for food supply chain infrastructure at a regional scale

Social and economic justice

Core concepts

Regionalism enables us to look beyond a local community to the structural barriers that populations face in producing and accessing healthy food. All communities in a region must be able to obtain safe, culturally acceptable, and nutritionally adequate foods. By taking in the bigger picture, culturally and racially distinct groups can seek to meet their unique food preferences and find common cause with other groups. Food chain workers

in every region, from producers and laborers to restaurant staff, should have safe and fair working conditions, living wages and benefits, and equitable access to opportunities, capital, and other resources. Parochial planning, poor cross-state cooperation, and weak regional supply chains undermine regional-scale contributions to food security and worker justice.

Regional Examples

- Northeast Farmers of Color/ Land Trust
- Grow NYC
- Future Harvest-CASA
- Cultivating Community (Maine)
- Native Land Conservancy (Massachusetts)

Every region must address its own role in historic and contemporary injustices toward populations of color and other marginalized and disenfranchised groups regarding food, capital, and land, and take responsibility to remedy these injustices. A region's population must collectively acknowledge its region's history of racism and dispossession and seek systemic solutions at that scale in the areas of land, food chain and farm labor, and food apartheid, for example.

While understanding a region's part in discrimination and structural racism is crucial, regions may not be the most effective frame or scale for response. Motivation for social and economic justice-oriented action often comes from identity-based rather than place- based groups. That said, regional chapters can be effective organizing structures. Place-based challenges such as access to land can be addressed at regional levels while finding common cause across regions.

What is needed

- Identification of ways to use a region as an organizing framework to advance social and economic justice. Implementing a social justice agenda requires a strategic analysis of the role of scale and place (along with other dimensions) in mobilizing, organizing, and messaging to constituents.

- Organizational commitments to racial equity and to dismantling structural racism in people's work, including anti-racism and diversity trainings in organizations and networks, and development and placement of equity and anti-racism statements of intent in organization and network mission statements, acknowledging the regional context.

- Participation in, and strengthening the work of BIPOC and other organizations and networks that center racial equity and social justice.

- Leveraging of the COVID-19 pandemic and Black Lives Matter movement that have

further exposed food system dysfunction and disparities; use these analyses to show the need and potential for substantive change in areas of racial justice, farm labor, emergency food, disaster preparedness and vulnerable supply chains, for example, and apply regional thinking to generate solutions.

- Employment of a food justice or rights-based framework, emphasizing structural conditions over individual choice and tying food to other social issues at the regional scale such as housing, public health, labor, redlining, safety nets, and wealth disparities.

- Encouragement and strengthening of regional training programs for farmers of color, farmworkers, and immigrant and refugee farmers; strengthening of urban farming and gardening programs. Advocacy for strategies such as subsidies to make these opportunities available and feasible for the intended audience.

- Advocacy for a region's historically Black, Hispanic-serving, and tribal colleges and universities.

- Increasing diverse and inclusive membership and leadership of food policy councils, local food groups, farmer organizations, etc.

- Support for each region's Black and Indigenous agriculture and food organizations and their policy platforms.

- Promotion and support of the production of food varieties, breeds, and seeds that are both resonant to marginalized groups and suited to the region.

- Advocacy for fair and safe working conditions and compensation for every region's farm and food workers, including undocumented and migrant labor.

- The embedding of racial equity into the values and procedures of regional values-based supply chains.

- Support for the development of domestic fair trade principles and practices to elevate social and economic justice to inter-region commerce.

- Support for or leadership of efforts to redo maps to show historic and current lands of Indigenous Nations.

Human and political capacity

Governance

Core concepts

Regionalism and regional food system approaches must be more firmly embedded in governance, including government institutions, the private sector, and civil society. Working regionally is imperative—and possible. The complex task of instituting regional governance around food systems requires governments to care about the provenance of their food supplies—and their constituents to urge them to do so. They must have the vision and political will to establish, develop, and maintain multistakeholder and diverse structures. Formal governance structures must be guided by scale and boundaries. Mechanisms described elsewhere in this report (commissions, compacts, MOUs, etc.) can be used to advance and support regional food efforts. Currently, most endeavors to develop and improve food systems are not part of specific and practical long-range plans for collaborations across multiple scales. The city region may be a powerful construct to advance regional governance for food systems; it should be explored further. While regulations and understandable loyalties get in the way of regional collaboration, more can be done to overcome these barriers, especially in the areas of food production, land use, and related economic development.

Regional Examples

- Northeast Association of State Departments of Agriculture
- Northeast Regional Center for Rural Development
- Chesapeake Foodshed Network
- USDA Northeast SARE
- Northeastern Agricultural and Resource Economics Association
- NESAWG
- Harvest New England
- Northern Forest Center
- Farm to Institution New England
- Future Harvest/Chesapeake Alliance for Sustainable Agriculture
- Food Solutions New England
- Northeast Organic Farming Association
- Agricultural Viability Alliance
- Northeast Beginning Farmer Learning Network

What is needed

- Urging of regional (and local) governments and quasi-governmental institutions to play a greater role in strengthening scale-attentive food systems.
- Encouragement to regions that have not already executed infrastructure assessments and feasibility studies to begin them soon. Regional development organizations and councils of government can and must play key roles in these endeavors.

- Local, state, and regional governance entities committing to public investment at the local, state, and regional levels to repair and to build appropriate infrastructure.

- Validation and support for the important role of nongovernmental organizations in governance particularly where they can operate purposefully at the regional level and collaborate across state lines.

- Critical examination by advocates of governance purposes and structures in civil society and movement groups that seek food systems change and encourage greater inclusivity and regional-scale collaboration where needed.

- Promotion of the role of food policy councils as another forum for comprehensive policy action at the regional level.

- State governments working with neighboring states on issues ranging from transportation to climate to marketing.

States should:

- Coordinate regional branding (e.g., Harvest New England, Future Harvest) and promote regional markets.

- Collaborate on program delivery.

- Partner on education and training programs, projects, and events (food safety, nutrition, procurement, farm succession, conservation, workforce development).

- Harmonize regulations where feasible; enable cross-state regulatory and licensing reciprocity and coordinate implementation (e.g., the Food Safety Modernization Act, HACCP).

- Advance tiered procurement and interstate and inter-regional trade.

- Partner with and contribute to regional multisector networks for collective impact.

- Participate in multi-state land, water, transportation, energy, and climate planning initiatives (several examples of past and currently underway).

- Share models and best practices around policies and programs (e.g., farmland protection, farm viability).

- Statewide planning efforts that identify and embrace policy innovations to support a strong regional food system.

- Research:

    - Assessments of successful regional food systems collaborations to provide models and lessons to others.

    - Research on the role played by regional food entities (e.g., NEASDA) in building strong regional food systems.

Federal policy

Core concepts

One-size-fits-all federal policies can disadvantage certain regions. Furthermore, the local-regional conflation we lament discourages federal agencies from advancing a robust regional food system vision. The federal government has a key role to play in promoting regional thinking, structures, and projects. Regional equity provisions and flexible rules can help mitigate regional disparities in federal government program delivery.

What is needed

- Advocacy and suggestions for federal policies that: (a) address specific regional needs and priorities; (b) accommodate regional differences and foster regional solutions in general; and (c) do not disadvantage any region.

- Recognition and support for regional approaches through changes at the federal level. Bring to light any federal legislation and rules that prohibit, discourage, or do not reward regional projects, collaborations and/or partnerships.

- Education and support for legislators to think regionally and to advocate for regional approaches, particularly in regions that historically have under-benefited from certain federal programs.

- Tailoring federal program rules to encourage—and sometimes require—regional (as in, multi-state) structures, projects, and collaboration. Definitions of local and regional in legislation, rules, and guidance should be revised and clarified.

- Acknowledgment of and finding ways to work through the reality that interests within a defined region, or between regions, may be in conflict. Where possible, finding common cause with other regions on such issues as value-added agriculture and beginning farmers.

- Training of USDA employees to be region-sensitive and encourage intra- and inter-regional cooperation wherever possible.

- Research:

    - Evaluation of the success of federal programs that are supporting regional food systems and their components.

    - Documentation of the effectiveness of federal programs for particular regions.

    - Studies of the level of federal support received in different regions to build regional food systems in multi-county and multi-state regions.

    - Pilot projects supporting new regional collaborations.

Food supply chain capacity

Core concepts

Food supply chain capacity refers to both support services and food chain players. Support services include public and private entities that provide information, technical assistance, capital, inputs, and other support to food system actors. The service provider landscape is uneven within regions and from region to region; in general, increased capacity, networking, and collaboration are essential. Industry and trade groups also play key roles in supporting a region's food supply chain players, especially those grappling to establish and sustain regional supply chains.

What is needed

- Exploration of efficiencies among a region's land-grant universities and other higher education institutions to eliminate redundancies and take advantage of specialties. Where it makes sense, states should share Extension expertise, labs, and specialists.

- Collaboration among educational institutions (rather than competition for scarce resources), even if that means a project or facility being housed or developed in another state.

- Fostering regional collaborations and networks.

- Generous sharing of resources and expertise housed in academic institutions with "outside" players. A regional solidarity framework can foster such sharing.

- Educators and researchers advancing a more nuanced understanding and investigation of regional food systems and communicating about them with partners and constituents.

- Where there are service gaps, an emphasis on putting resources toward building capacity. This includes lawyers with food and agriculture expertise working with regional stakeholders, and others offering farm and food business planning assistance, for example.

- More capacity and support for regional food hubs and values-based supply chains, from management expertise to technology to market development.

- More lenders and funders supporting regional-scale projects. The more information, encouragement and requests they have for regional projects, the more likely some will move to or increase their support in this area. (Some may need to revise their operating guidelines to allow such initiatives, for example, lending to a food hub whose geography extends beyond the lender's or funder's permitted or customary boundaries).

- Philanthropy-sector leaders of regional thinking to educate peers about regional food systems, explain the rationale for investing, lending, or granting, and encourage greater investment in regional projects.

- Research:

    - Identification of regional gaps in support services from Extension, farmer certifications, equipment dealers, food safety and nutrition education, agricultural lawyers, and more, and recommendation on how to fill the gaps.

    - Assessments of multistate collaborations to evaluate their successes and failures.

    - Assessments of the technical assistance needs of regional supply chains, food hubs, and network managers.

    - Examples of successes and data (market research) to support investment in regional markets, supply chains etc.

    - More research on regional values-based supply chains and food hubs.

Public engagement: Thinking and acting regionally

Core concepts

Food and foodways figure prominently in what people associate with a region. Research shows that a portion of the population would respond positively to regional labels and campaigns. Nonetheless, several challenges work against getting citizens to appreciate and engage in regional food systems as consumers and advocates. The "language conundrum" that conflates 'local' and 'regional' undermines comprehension of the essential concepts, and most people are not inclined to "think regionally." Moving to a regional food paradigm will require champions in governments, supply chains, nonprofits, and research and educational institutions, and among consumer and civic groups. Supply chain buyers may be "low-hanging fruit" in their receptivity to regional markets. Educating about regional food systems can help citizens to make "system connections" and mobilize actions for change through the multiple entry doors that food systems offer. Thinking regionally can foster solidarity. It can overcome pitting local against regional or metropolitan against rural and invite participation by all constituents in the work of reshaping the food system.

All food system players can employ regional thinking to advance resilient food systems goals. Thinking in terms of geography and scale rather than silos and turf encourages more sophisticated actions, more inclusive solutions, and more collaboration. Social movement theory raises necessary questions around the role of place and scale in a movement's master frame and who is and is not at the table. A place-based framework (even if the region-place is not immediately resonant) can help disparate sectors find common ground. Acting regionally requires appropriate governance, cross-sector coalitions, and fostering a sense of regional identity and solidarity. The city region model offers one way to think about pulling urban and rural areas as well as larger regions together.

The Northeast is blessed with an abundance of groups engaged in food systems work. It has a history of acting regionally; many groups find common cause under the banner of the Northeast. And structures exist to promote regional interests. But to the point of this report, few groups explicitly prioritize or champion regional.

What is needed

- Clarity about terms and concepts. Although a region might not be as resonant as a community or state, messaging can build awareness and appreciation of regional food systems by the public.

- Communication about the advantages of regional thinking, and the unique challenges and opportunities faced by one's region and its sub-regions. Use of social media to reinforce regional identity and collaboration.

- Use of multi-cultural, multi-racial, intergenerational, intersectional, and interdisciplinary strategies to reach underserved, under-represented and under-engaged communities with messages that resonate and invite participation in the collective practice of reshaping food systems at a regional scale.

- The development of constituencies for regional food systems by educating consumers, public officials, and other stakeholders about the value of food systems that are optimally scaled.

- Marketing strategies that promote regional food and regional food systems with citizen consumers as well as with trade buyers, retailers, researchers, and policymakers.

- Utilization of existing multi-state entities and frameworks; creation of new ones as needed.

- Use of regional-scale meetings and events to educate about and promote regional food systems thinking.

- Training of all parties to utilize systems thinking, causal loop diagrams, and other tools to better grasp the issues and options for change.

- Cultivation and reward of government leaders and policymakers who reach across political boundaries in the interest of regional initiatives.

- Advocacy for policies and programs that incentivize rather than penalize multi-jurisdictional endeavors.

- Organization of civic engagement and advocacy efforts by region.

- Support and encouragement of city-region pilot projects to evaluate their success and challenges.

- Training of emerging leaders in regional concepts and collaboration. Cultivation of and support for new leaders and groups at both the community and regional level through networking, mentoring, and education at all levels. Injecting regional thinking into undergraduate and graduate agriculture and food systems academic programs.

- Encouragement and training of NGO groups on regionalism. Even local groups can push the scale envelope beyond local and "scale up" through regional networking and gatherings

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As we explored and researched the topic of regionalism and regional food systems, we became even more committed to the importance of scale and the need for greater attention to the regional scale and regional approaches in food systems. We are convinced that employing a

regional framework is a critical step towards food system resilience and justice, especially in the face of climate change, the pandemic and continuing racial injustices. Greater movement in this direction requires a commitment to collaboration across political boundaries and to embedding regional thinking in all food systems change work.

We know that this will not be an easy lift. Yet we have been heartened by new research, analyses, examples and dialogue about regional food systems. Every week through the three years of writing this report, we discovered new material. We learned of others grappling with definitions and boundaries. We came to deeply appreciate how regional characteristics have shaped, and continue to shape, structural inequities, and how regional identity, however defined and expressed, can reach across silos and diverse communities, foster constructive conversation, and engender creative solutions.

The Northeast has been a good laboratory in which to examine regional food systems, but we are confident that all regions will benefit from the messages and examples in this report. All regions, however defined, nested, and interrelated, can build strong and inclusive regional food systems. Each region is able to meet a certain amount of its food demand; the goal is for each region to determine its capacity and work to meet it. In the process, urban-rural ties will strengthen, economic returns will grow, equity and opportunity will expand, natural resources will be more comprehensively stewarded, and food security for all will be enhanced.

REFERENCES

Aaronson, R. A. (2014). *Eating in crisis: Culturally appropriate food and the local food movement in the lives of domestic violence survivors* (Honors college senior thesis, University of Vermont). https://scholarworks.uvm.edu/hcoltheses/21/

Abatekassa, G. & Peterson, H. C. (2011). Market access for local food through the conventional food supply chain. *International Food and Agribusiness Management Review, 14(1).* https://core.ac.uk/download/pdf/6429813.pdf

Ackerman, K., Dahlgren, E., & Xu, X. (2013). *Sustainable urban agriculture: Confirming viable scenarios for production, final report, 13-07*. Urban Design Lab at the Earth Institute, Columbia University.

Ackerman, K., Plunz, R., Conard, M., Katz, R., Dahlgren, E., & Culligan, P. (2011). *The potential for urban agriculture in New York City: Growing capacity, food security and green infrastructure*. Urban Design Lab at the Earth Institute, Columbia University. http://doi.org/10.13140/2.1.4748.7683

Adair, C., Barbieri, L., Schiavone, K., & Darby, H. (2019). Manure application decisions impact nitrous oxide and carbon dioxide emissions during non-growing season thaws. *Soil Science Society of America Journal, 83*(1). 163-172. https://doi.org/10.2136/sssaj2018.07.0248

Agriculture of the middle. (n.d.) http://agofthemiddle.org/

Al-Kodmany, K. (2018). The vertical farm: A review of developments and implications for the vertical city. *Buildings, 8(2),* 24. https://doi.org/10.3390/buildings8020024

Alkon, A. H., Bowen, S., Kato, Y., & Young, K. A. (2020). Unequally vulnerable: A food justice approach to racial disparities in COVID-19 cases. *Agriculture and Human Values, 37,* 535–536. https://doi.org/10.1007/s10460-020-10110-z

Allen, C. R., Birge, H. E., Angeler, D. G., Arnold, C. A., Chaffin, B. C., DeCaro, D. A., Garmestani, A. S., & Gunderson, L. (2018). Quantifying uncertainty and trade-offs in resilience assessments. *Ecology and Society, 23*(1), 3. https://doi.org/10.5751/ES-09920-230103

Allen, T. & Prosperi, P. (2016). Modeling sustainable food systems. *Environmental Management, 57,* 956-975. https://doi.org/10.1007/s00267-016-0664-8

Altieri, M., Nicholls, C., Henao, A., & Lana, M. (2015). Agroecology and the design of climate change-resilient farming systems. *Agronomy for Sustainable Development, 35*. 869-890. http://doi.org/10.1007/s13593-015-0285-2

American Bar Association (n.d.) https://www.americanbar.org/

American Farmland Trust. (2017). *Saving American farmland: 2017 nationwide survey of land trusts that protect farm and ranch land.* American Farmland Trust, Farmland Information Center, & USDA Natural Resources Conservation Service.

American Farmland Trust. (2016). *Keeping farmers on the land: New research underscores need to address farm transition in New England.* American Farmland Trust. https://s30428.pcdn.co/wp-content/uploads/sites/2/2019/09/AFT_NE-FS_D_GainingInsights_GainingAccess.pdf

American Planning Association. (n.d.). *Knowledgebase collection: Food systems,* https://www.planning.org/knowledgebase/food/#:~:text=Food%20systems%20planning%20is%20concerned,%2C%20consumption%2C%20and%20waste%20management

American Planning Association. (2007). *APA policy guide on community and regional food planning.* https://www.planning.org/policy/guides/adopted/food.htm

Andree, P., Clark, J. K., Levkoe, C. Z., & Lowitt, K. (Eds.) (2019). *Civil society and social movements in food system governance.* Routledge.

Anderson, E. (2019). *The rise of artisanal brands*. Ignite2x. http://www.ignite2x.com/rise-artisanal-brands

Anderson, M. D., & Cook, J. T. (1999). Community food security: Practice in need of theory? *Agriculture and Human values, 16*, 141-150. https://doi.org/10.1023/A:1007580809588

Appalachian Regional Commission. (2019). *Strengthening economic resilience in Appalachia: A guidebook for practitioners.* https://www.arc.gov/wp-content/uploads/2019/02/StrengtheningEconomicResilienceGuidebook-Feb2019-1.pdf

Arabella Advisors. (2016). *Good food for all: An assessment of food system efforts in the Chesapeake foodshed.* https://www.arabellaadvisors.com/wp-content/uploads/2016/08/Good-Food-for-All-Chesapeake-Food-System-Assessment.pdf

Associated Grocers of New England (2019). https://AGNE.com/about

Associated Press. (2019, December). Lamont seeks to work with neighboring states on climate. *U.S. News and World Report*. https://www.usnews.com/news/best-states/connecticut/articles/2019-12-11/lamont-seeks-to-work-with-neighboring-states-on-climate

Azanedo, L., Garcia-Garcia, G., Stone, J., & Rahimifard, S. (2020). An overview of current challenges in new food product development. *Sustainability*. https://doi:10.3390/su1203364

Baker, L., Gemmil-Herren, B, & Lieppert, F. (2019*). Beacons of hope: Accelerating transformations to sustainable food systems.* Biovision Foundation for Ecological Development and Global Alliance for the Future of Food. https://foodsystemstransformations.org/wp-content/uploads/2019/08/BeaconsOfHope_Report_082019.pdf

Bales, S.N. (2006*). Framing the food system: A FrameWorks message memo.* FrameWorks Institute. https://www.frameworksinstitute.org/wp-content/uploads/2020/03/food_systems_message_memo.pdf

Barham, B. L., Melo, A.P, & Hertz, T. (2020). Earnings, wages, and poverty outcomes of US farm and low-skill workers. *Applied Economic Perspectives and Policy, 42*(2), 307-334. https://doi.org/10.1002/aepp.13014

Barham, J., Tropp, D., Enterline, K., Farbman, J., Fisk, J., & Kiraly. S. (2012). *Regional food hub resource guide*. U.S. Department of Agriculture, Agricultural Marketing Service. http://dx.doi.org/10.9752/MS046.04-2012

Barnhill, A., Palmer, A., Weston, C.M., Brownell, K.D., Clancy, K., Economos, C.D., Gittelsohn, J., Hammond, R.A., Kumanyika, S., & Bennett, W.L. (2018*). Grappling with complex food systems to reduce obesity: A US public health challenge*. Public Health Rep. 2018 Nov/Dec; 133 (1_suppl):44S-53S. doi: 10.1177/0033354918802793.

Bauman, A., Thilmany McFadden, D. & Jablonski, B. B. R. (2018). The Financial performance implications of differential marketing strategies: Exploring farms that pursue local markets as a core competitive advantage. *Agriculture and Resource Economics Review, 47*(3), 477-504. http://doi.org/10.1017/age.2017.34

Baur, L. (2020, July 9). *About 14 million children in the US are not getting enough to eat*. The Hamilton Project. https://www.hamiltonproject.org/blog/about_14_million_children_in_the_us_are_not_getting_enough_to_eat

Bawden, R. (2007). In Hinrichs, C.C & Lyson, T. A. (2007). *Remaking the North American food system: Strategies for sustainability*. University of Nebraska Press.

Beach, J. (2004). *Repositioning Northeastern agriculture*. New Jersey Department of Agriculture. Paper presented at a meeting of the Northeast Association of State Departments of Agriculture.

Becot, F., Conner, D., & Ettman, K. (2016). *How to develop a local and regional institutional food buying program*. University of Vermont. https://nofavt.org/sites/default/files/files/resources/becot-conner-ettman-developing.pdf

Bene, C., Oosterveer, P., Lamotte, L. Brouwer, I. D., de Haan, S., Prager, S. D., Talsma, E. F., & Khoury, C. K. (2018). When food systems meet sustainability: Current narratives and implications for actions. *World Development, 113,* 116-130. https://doi.org/10.1016/j.worlddev.2018.08.011

Berg, P. (2002). *What is bioregionalism?* Planet Drum Foundation.

Berger, G. (2003). Reflections on governance: Power relations and policy making in regional sustainable development. *Journal of Environmental Policy and Planning, 5(3),* 219-234. https://doi.org/10.1080/1523908032000154160

Berti, G. (2020). Sustainable agri-food economies: Re-territorializing farming practices, markets, supply chains, and policies. *Agriculture, 10(3)*, 64. https://doi.org/10.3390/agriculture10030064

Best, B., Kilkelly, M., Levine, S., & Ruhf, K. (2007). *Understanding food safety regulations for farm-direct food sales*. Northeast Sustainable Agriculture Working Group. Unpublished.

Berardi, G. M., Paci-Green, R., & Hammond, B. (2011). Stability, sustainability, and catastrophe: Applying resilience thinking to U.S. agriculture. *Environmental Studies Faculty and Staff Publications, 3*. https://cedar.wwu.edu/envs_facpubs/3

Biodiversity International. (2017). *Mainstreaming agrobiodiversity in sustainable food systems: Scientific foundations for an agrobiodiversity index*. Biodiversity International. Rome, Italy.

Blair, D. (1991). *The Northeast food system*. The Northeast Cooperative Extension System, Pennsylvania State University.

Black, M. (2015). *Geography of poverty: A journey through forgotten America*. MSNBC. https://pulitzercenter.org/stories/geography-poverty-journey-through-forgotten-america#:~:text=The%20Geography%20of%20Poverty%20is,Matt%20Black%20that%20combines...&text=From%20border%20to%20border%2C%20high,hope%20of%20better%20days%20dwindling.

Blay-Palmer, A., Santini, G., Dubbeling, M., Renting, H., Taguchi, M. & Giordano, T. (2018). Validating the city region food system approach: Enacting inclusive, transformational city region food systems. *Sustainability, 10*(5), 1680. https://doi.org/10.3390/su10051680

Bogost, I. 2020. "The supermarket after the pandemic." *The Atlantic*, April 17. https://www.theatlantic.com/technology/archive/2020/04/how-youll-shop-for-groceries-after-the-pandemic/610135/.

Bloom, D. (2009). *Conceptualizing "hybrid" food networks: Engaging conventional food system infrastructure to build local food systems* [unpublished thesis in rural sociology]. The Pennsylvania State University, College of Agricultural Sciences.

Bloom, D. & Hinrichs, C. C. (2016). The long reach of lean retailing: Firm embeddedness and Wal-Mart's implementation of local produce sourcing in the US. *Environment and Planning A: Economy and Space, 49(1),* 168-185. http://doi.org/10.1177/0308518x16663207

Bloom, D., Lelekacs, J., & Dunning, R. (2018). *Local food systems: Clarifying current research.* NC State Extension Publications.

Born, B., & Purcell, M. (2006). Avoiding the local trap. *Journal of Planning Education and Research, 262*, 195-207. http://doi.org/10.1177/0739456X06291389

Bosselmann, K., Engel, R., & Taylor, P. (2008). *Governance for sustainability: Issues, challenges, successes.* IUCN Environmental Policy and Law Paper No. 70. International Union for Conservation of Nature and Natural Resources. https://www.corteidh.or.cr/tablas/26253.pdf

Boston Globe. (2010, January 30). USDA meets with NE commissioners on regional food. *The Boston Globe.*

Bostrom, M., Aubrun, A., Brown, A., & Grady, J. (n.d.). *Perceptions of the US food system: What and how Americans think about their food.* W. K. Kellogg Foundation and Frameworks Institute. https://www.topospartnership.com/wp-content/uploads/2012/05/Food-Systems.pdf

Bowell, B., Coffin, C., Courchesne, C., Frignoca, I., Greene, M., Iarrapino, A., Rushlow, J. & Ruhf, K. (2014). *New England food policy: Building a sustainable food system.* American Farmland Trust, Conservation Law Foundation, & Northeast Sustainable Agriculture Working Group. http://www.clf.org/wp-content/uploads/2014/03/1.New_England_Food_Policy_FULL.pdf

Bower, J., Doetch, R., & Stevenson, G. W. (2010). *Tiers of the food system.* UW-Madison Center for Integrated Agricultural Systems. http://www.cias.wisc.edu/wp- content/uploads/2010/09/tiers082610lowres.pdf

Boyer, D., & Ramaswami. (2017). What is the contribution of city-scale actions to the overall food systems' environmental impacts?: Assessing water, greenhouse gas, and land impacts of future urban food scenarios. *Environment Science Technology, 51(20),* 12035-12045. http://doi.org/10.1021/acs.est.7b03176

Boys, K. A., & Hughes, D. W. (2013). A regional economics-based research agenda for local food systems. *Journal of Agriculture, Food Systems, and Community Development, 3*(4), 145-150. https://doi.org/10.5304/jafscd.2013.034.012 [SEE HUGHES & BOYS 2015]

Brainard, L. (2017, November 15). *Regional food systems and community development* [Speech]. Federal Reserve Bank of Boston regional food systems meeting, Boston, Massachusetts. Board of Governors of the Federal Reserve System. https://www.federalreserve.gov/newsevents/speech/brainard20171115a.htm

Brannen, S., & Simons, K. H. (2014). *Financing a better food system: A study of Infrastructure needs and available financing in the Hudson Valley.* A white paper for The Local Economies Project of The New World Foundation. http://localeconomiesproject.org/wp-content/uploads/2016/01/Financing-a-Better-Food-System-06-01-14.pdf

Brekken, C. A., Fiegener, R., & Duncan, S. (2018). Linking regional food networks to ecological resilience. *Choices, Agriculture and Applied Economics Association, 33(2).* https://www.choicesmagazine.org/UserFiles/file/cmsarticle_628.pdf

Brinkley, C. (2018). The small world of the alternative food network. *Sustainability, 10(8),* 2921. https://doi.org/10.3390/su10082921

Bristow, G. & Healy, A. (2014). Building resilient regions: Complex adaptive systems and the role of policy intervention. *Spatial Research and Planning, 72*(2), 93-102. http://doi.org/10.1007/s13147-014-0280-0

Brooks, N. (2018). *The culinary incubator business model.* Farm to Institution New England. https://www.farmtoinstitution.org/sites/default/files/imce/uploads/FINE%20Incubator%20Model%20White%20Paper.pdf

Brown, C. (2003). Consumers' preferences for locally produced food: A study in Southeast Missouri. *American Journal of Alternative Agriculture, 18*(4), 213-224. http://doi.org/10.1079/AJAA200353

Brox, J. (2004). *Clearing land: Legacies of the American farm*. North Point Press.

Business & Human Rights Resource Centre. (n.d.). *COVID-19: Food and beverage supply chain workers*. Business & human rights. https://www.business-humanrights.org/en/big-issues/covid-19-coronavirus-outbreak/covid-19-food-and-beverage-supply-chain-workers/

Buchanan, M. L. (2020). Potential for leasing institutional land in Windham County, Connecticut: Toward a New England food vision. *J. Agriculture, Food Systems and Community Development,* https://doi.org/10.5304/jafscd.2020.094.018

Butler, L. M. (2002). *Rural-urban interdependency and the future of agriculture*. Agriculture Outlook Forum 2002. Iowa State University.

Campbell, J. (n.d.). *What's the difference between a grocery store and a supermarket?* https://thegrocerystoreguy.com/whats-the-difference-between-a-grocery-store-a-supermarket/#:~:text=A%20supermarket%20is%20a%20type,supermarkets%20are%20usually%20very%20large.

Campbell, C. G. (2021). The impact of COVID-19 on local government stakeholders' perspectives on local food production. *Journal of Agriculture, Food Systems, and Community Development, 10*(2), 71–88. https://doi.org/10.5304/jafscd2021.102.035

Canning, P., & Tsigas, M. (2000). *Regionalism, federalism, and taxation: A food and farm perspective: Technical bulletin no. 1882*. USDA Economic Research Service. https://www.ers.usda.gov/webdocs/publications/47298/51946_tb1882.pdf?v=0

The Carrot Project. (n.d.) Loan programs. https://www.thecarrotproject.org/farmers-food-producers/#loan

Center for an Agricultural Economy. (2016). *Regional food systems plan for Vermont's Northeast Kingdom*. http://www.nvda.net/files/Final.Online.pdf

Center for Ecoliteracy. (2018). *Understanding food and climate change: A systems perspective. https://foodandclimate.ecoliteracy.org/systems-perspective/pg0009.xhtml*

Center for Good Food Purchasing. (2020). *The program*. https://goodfoodpurchasing.org/program-overview/

Center for Integrated Agricultural Systems. (2010). *The driftless region farm and food project: Building a robust, regional food system in Illinois, Iowa, Minnesota and Wisconsin*. University of Wisconsin-Madison. http://www.driftless.wisc.edu/wp-content/uploads/2010/10/driftless090210web1.pdf

Center for Integrated Agricultural Systems. (2012). *Values-based food supply chain case study: Shepard's grain*. University of Wisconsin-Madison, College of Agricultural and Life Sciences. https://cias.wisc.edu/wp-content/uploads/sites/194/2013/04/rb81shepherdsgrainfinal0418131.pdf

Center for Integrated Agricultural Systems. (2014). *Understanding domestic fair trade for agriculture of the middle*. University of Wisconsin-Madison. https://www.cias.wisc.edu/fair-trade/

Center for Sustainable Systems, University of Michigan. (2019). *U.S. Cities Fact Sheet*. Pub. No. CSS09-06. http://css.umich.edu/factsheets/us-cities-factsheet

Chait, J. (2019, August 28). *Locally grown food*. The Balance Small Business. https://www.thebalancesmb.com/what-does-locally-grown-really-mean-2538258

Chicago Council on Global Affairs. (2016). *Global food security symposium 2016*. https://www.thechicagocouncil.org/events/global-food-security-symposium-2016

Cho, C., & Volpe, R. (2017). *Independent grocery stores in the changing landscape of the U.S. food retail industry*. Economic Research Report no. 240. USDA, Economic Research Service. https://www.ers.usda.gov/webdocs/publications/85783/err-240.pdf?v=0

Chriestenson, C. & Thilmany, D. (2020). *Do factors contributing to appearance and success of conservation referenda in the West differ from those found in other regions of the United States?* The Annals of Regional Science. https://doi.org.10.1007/s00168-020-00975-7

Christensen, B., Kenney, M. & Patton, D. (2015). Regional identity can add value to agricultural products. *California Agriculture* 69(2):85-91. https://doi.org/10.3733/ca.v069n02p85.

Christian-Smith, J., Moran, J., Persad, G., Smith, G. & Szeptycki, L. (2017). *Navigating a flood of information: Evaluating and integrating climate science into groundwater planning in California*. Union of Concerned Scientists and Stanford/Water in the West.

Christie, M. (2011). *Scaling up local food: Investing in farm & food systems infrastructure in the Pioneer Valley*. Community Involved in Sustaining Agriculture. https://www.buylocalfood.org/upload/resource/ScalingUp10-17-11lrwithLinks.pdf

City of New York. (2021*). Food forward NYC: A 10 year food policy plan*. NYC Food Policy. https://www1.nyc.gov/assets/foodpolicy/downloads/pdf/Food-Forward-NYC.pdf

City of Sherrill v. Oneida Indian Nation of New York, 544 U.S. 197 (2005). *Oyez*. https://www.oyez.org/cases/2004/03-855

Clancy, K. (1992). *Urban infrastructure: Does anybody care about food?* [Presentation]. AAAS Annual Meeting, Chicago, IL.

Clancy, K. (1998). *Regionalism to Nationalism…and Back?* NESAWG White Papers.

Clancy, K. (2003). Potential contributions of planning to community food systems [Commentary]. *Journal of Planning Education and Research, 22*(1). https://doi.org/10.1177/0739456X04264893

Clancy, K. (2012). Digging deeper: Bringing a systems approach to food systems: Issues of scale. *Journal of Agriculture, Food Systems, and Community Development, 3(1),* 21-23. http://dx.doi.org/10.5304/jafscd.2012.031.017

Clancy, K., Bonanno, A., Canning, P., Cleary, R., Conrad, Z., Fleisher, D., Gómez, M., Griffin, T., Lee, R., Kane, D., Palmer, A., Park, K., Peters, C. J., & Tichenor, N. (2017). Using a Market Basket to Explore Regional Food Systems. *Journal of Agriculture, Food Systems, and Community Development*, *7*(4), 163–178. https://doi.org/10.5304/jafscd.2017.074.018

Clancy, K. (2019). *The usefulness of systems approaches in addressing food systems innovations.* In *Innovations* in the Food System: Exploring the Future of Food: Proceedings of a Workshop-in Brief. National Academies of Sciences, Engineering and Medicine. National Academies Press. Washington, DC.

Clancy, K., & Ruhf, K. (2010a). *Regional value chains in the Northeast: Findings from a survey* Northeast Sustainable Agriculture Working Group. [Unpublished].

Clancy, K., & Ruhf, K. (2010b). Is local enough? Some arguments for regional food systems. *Choices Magazine, 25*(1). http://www.choicesmagazine.org/magazine/article.php?article=114

Clancy, K., & Ruhf, K. (2018). Digging deeper: New thinking on "regional." *Journal of Agriculture, Food Systems, and Community Development*, *8*(3), 13-17. https://doi.org/10.5304/jafscd.2018.083.008

Clark, J. K., & Inwood, S. M. (2015). Scaling-up regional fruit and vegetable distribution: Potential for adaptive change in the food system. *Agriculture and Human Values, 33,* 503-519. https://doi.org/10.1007/s10460-015-9618-7

Clark, J., Jablonski, B.B.R., Inwood, S., Irish, A. & Freedgood, J. (2020). A contemporary concept of the value(s)-added food and agriculture sector and rural development. *Community Development. https://doe.org/10.1080/15575330.2020.1854804*

Clary, B. A., Hahn, A.J. & Maretzki, A.N. (1991). *Facilitator's manual.* The Northeast Network, Food, Agriculture and Health Policy.

Cleary, R., Goetz, S. J., Thilmany McFadden, D., & Ge, H. (2019). Excess competition among food hubs. *Journal of Agriculture and Resource Economics, 44(1),* 141-163. http://doi.org/10.22004/ag.econ.281317

Cohen, N., Freudenberg, N., & Willingham, C. (2017). *Growing a regional food shed in New York: Lessons from Chicago, Toronto and Cincinnati.* Policy Brief. CUNY Urban Food Policy Institute. https://www.cunyurbanfoodpolicy.org/news/2017/4/19/regional-food-in-other-cities

Colasanti, K., Cantrell, P., Cocciarelli, S., Collier, A., Edison, T., Doss, J., George, V., Hamm, M., Lewis, R., Matts, C., McClendon, B., Rabaut, C., Schmidt, S., Satchell, I., Scott, A., & Smalley, Will S. (2010). *Michigan good food charter.* C.S. Mott Group for Sustainable Food Systems at Michigan State University, Food Bank Council of Michigan, & Michigan Food Policy Council. https://www.canr.msu.edu/michiganfood/uploads/files/charter.pdf

Colasanti, K., Hardy, J., Farbman, J., Pirog, R., Fisk, J., & Hamm, M.W. (2018*). Findings of the 2017 national food hub survey*. Michigan State University Center for Regional Food Systems & The Wallace Center at Winrock International. https://foodsystems.msu.edu/2017foodhubsurvey

Cole, R. (2019). *Differences between wholesalers, distributors and retailers.* Chron. https://smallbusiness.chron.com/differences-between-wholesalers-distributors-retailers-30836.html

Collaborative Initiatives at Massachusetts Institute of Technology & The Urban Lab at the Earth Institute at Columbia University. (2009). *Food and health: Using the food systems to challenge childhood obesity*. Massachusetts Institute of Technology.

Collier, A. D. (2018). *A reparations map for farmers of color may help right historical wrongs.* Civil Eats. https://civileats.com/2018/06/04/a-reparations-map-for-farmers-may-help-right-historical-wrongs/

Coleman-Jensen, A., Rabbitt, M.P., Gregroy, C.A. & Singh, A. (2021). *Statistical supplement to household food security in the United States in 2020.* USDA Economic Research Service. https://ageconsearch.umn.edu/record/313486 doi 10.22004/ag.econ.313486

Community Food Strategies. (2016a). *2016 Regional gatherings.* https://communityfoodstrategies.org/2016-regional-gatherings/

Community Food Strategies (2016b). *Northeast regional food council report*. 2016 Northeast regional gathering of food council networks. May 19, 2016.

Community Food Strategies (2022). https://communityfoodstrategies.org/about

Conard, M. & Ackerman, K. (2010). *Regionalizing the food system for public health and sustainability.* Urban Design Lab, Columbia University. NESAWG conference presentation, Albany, NY. November 17, 2010.

Connecticut Department of Agriculture. (n.d.) *Farmland restoration program*. https://portal.ct.gov/DOAG/ADaRC/ADaRC/Farmland-Restoration-Program

Conner, D. S., Sevoian, N., Heiss, S. N., & Berlin, L. (2014). The diverse values and motivations of Vermont farm to institution supply chain actors. *Journal of Agricultural and Environmental Ethics*, *27*(5), 695-713. https://link.springer.com/article/10.1007%2Fs10806-013-9485-4

Congressional Research Service. (2008). *The 2008 farm bill: A summary of major provisions and legislative action*. CRS Report for Congress. https://www.everycrsreport.com/files/20080619_RL33934_614d6a0faf11fe1b17757b3ceff90babdaa67bde.pdf

Congressional Research Service. (2019). The 2018 farm bill (P.L.115-334): Summary and side-by-side comparison. https://crsreports.congress.gov

Congressional Research Service. (2019). *2018 farm bill primer: Support for local food systems.* https://crsreports.congress.gov/product/pdf/IF/IF11252

Conrad, Z., Tichenor, N., Peters, C. & Griffin, T. (2017). Regional self-reliance for livestock feed, meat, dairy and eggs in the northeast USA. *Renewable Agriculture and Food Systems,* 32(2), 145-156. doi:10-1017/S1742170516000089

Cook, S. (2017*). Nourishing diversity in our food systems.* International institute for environment and development. https://www.iied.org/nourishing-diversity-our-food-systems

Cooperative Grocer Network. (2016). *Walmart vs. Food Co-ops: Competing definitions of 'local produce'*. https://www.grocer.coop/articles/walmart-vs-food-co-ops

Cornell University. (n.d.). *A primer on community food systems: Linking food, nutrition and agriculture.* https://farmlandinfo.org/publications/a-primer-on-community-food-systems-linking-food-nutrition-and-agriculture/

Cornell University Library, LibGuides. (2020, December 2). *Local and Regional Food Systems: Glossary.* http://guides.library.cornell.edu/c.php?g=31298&p=199469

The Cornucopia Project. (1981a). *Empty breadbasket? The coming challenge to America's food supply and what we can do about it.* Rodale Press.

The Cornucopia Project. (1981b). *The Pennsylvania food system: crash or self-reliance?* Rodale Press.

Cornucopia Project. (1984). *Halfway home: An interim report on the state food system studies.* Cornucopia Project Newsletter, *3*(4).

Crane-Droesch, A., Marshall, E., Rosch, S., Riddle, A., Cooper, J. & Wallander, S. (2019). *Climate change and agricultural risk management into the 21st century.* USDA Economic Research Service report summary.

Crossroads Resource Center. (n.d.). *Statewide food system assessment.* https://www.crcworks.org/

Cuello, Y. (2020). History of agricultural labor in the US. https://www.ncfield.org/2020/history-of-agricultural-labor-in-the-us/

Cumming, G., Kelmenson, S., & Norwood, C. (2019). Local motivations, regional implications: Scaling from local to regional food systems in northeastern North Carolina. *Journal of Agriculture, Food Systems, and Community Development*, *9*(A), 197-213. https://doi.org/10.5304/jafscd.2019.091.041

Dabson, B. (2009). Regionalism, assets, and entrepreneurship: The future of rural economies. In *Perspectives on future opportunities in philanthropy* (pp. 106-109). Funders' Network for Smart Growth and Livable Communities.

Dabson, B. (2010, April). *Generating rural innovation and regional partnership*. Keynote address at Northeast Rural Summit, Burlington, VT.

Dahlberg, K. (1993). Regenerative food systems: Broadening the scope and agenda of sustainability. In P. Allen (Ed.), *Food for the future.*

Dale, V. H., Lowrance, R., Mulholland, P., & Robertson, G. P. (2010). Bioenergy sustainability at the regional scale. *Ecology and Society, 15*(4), 23. http://www.ecologyandscience.org/vol15/iss4/art23/

Daniel, P. (2013). *Dispossession: Discrimination against African American farmers in the age of civil rights.* The University of North Carolina Press.

Danley, S. (n.d.). *Issue: Labor and workforce.* Vermont Sustainable Jobs Fund. https://www.vtfarmtoplate.com/assets/resource/files/Vermont%20Food%20System%20Plan%20Issue%20Brief%20Labor%20and%20Workforce.pdf

Danovich, T. (2016). *What are food incubators and do they create viable businesses?* Eater. https://www.eater.com/2016/2/26/11110808/food-incubator-accelerator-small-business

Daukas, J. (2019, February). *Smart solar siting: Developing solar energy projects on agricultural lands.* Presentation to NACD Annual Meeting, San Antonio, TX. American Farmland Trust. http://www.nacdnet.org/wp-content/uploads/2019/02/NACD-solar-siting-2-4-19.pdf

Davaney, L. (2019). Scales of progress, power and potential in the US bioeconomy. *Journal of Cleaner Production, 233,* 379-389. https://doi.org/10.1016/j.jclepro.2019.05.393

Davis, E. (2021). *The ten states with the worst infrastructure.* U.S. News.com. November 8. https://www.usnews.com/news/best-states/slideshows/these-10-states-have-the-worst-infrastructure

Day-Farnsworth, L., McCown, B., Miller, M., & Pfeiffer, A. (2009). *Scaling up: Meeting the demand for local food.* University of Wisconsin Center for Integrated Agricultural Systems. https://www.cias.wisc.edu/scaling-up-meeting-the-demand-for-local-food/

Day-Farnsworth, L., & Miller, M. (2014). *Networking across the supply chain: Transportation innovations in local and regional food systems.* University of Wisconsin. http://dx.doi.org/10.9752/TS202.06-2014

Day-Farnsworth, L., & Morales, A. (2011). Satiating the demand: Planning for alternative models of regional food distribution. *Journal of Agriculture, Food Systems, and Community Development, 2(1).* http://dx.doi.org/10.5304/jafscd.2011.021.020

Debru, J., & Brand, C. (2017). *Theoretical approaches for effective sustainable urban food policymaking.* In Designing urban food policies: Concepts and approaches. Brand, J., Bricas, N., Conare, D., Daviron, B., Debru, J., Michel, L., & Soulard, C., Eds. 0-13958-2 (eBook) https://doi.org/10.1007/978-3-030-13958-2

Delaware Valley Regional Planning Commission. (2010). *The greater Philadelphia food system study.* https://www.dvrpc.org/reports/09066a.pdf

Delaware Valley Regional Planning Commission. (n.d.). *Food system planning.* https://www.dvrpc.org/Food/

DeLind, L. B. (2011). Are local food and the local food movement taking us where we want to go? Or are we hitching our wagons to the wrong stars? *Agriculture and Human Values, 28*, 273–283. https://doi.org/10.1007/s10460-010-9263-0

Denning, B. P., Graff, S., & Wooten, H. (2010). Laws to require purchase of locally grown food and constitutional limits on state and local government: Suggestions for policymakers and advocates. *Journal of Agriculture, Food Systems and Community Development, 1*(1). https://doi.org/10.5304/jafscd.2010.011.014

Department of Geography, PennState College of Earth Sciences. (2020). *Environment and society in a changing world: Collective action problems*. The Pennsylvania State University. https://www.e-education.psu.edu/geog30/node/342

Devaney, L. & Iles, A. (2019). Scales of progress, power and potential in the US bioeconomy. *Journal of Cleaner Production*. V. 233, 379-389. https://doi.org/10.1016/j.jclepro.2019.05.393

Diamond, A. & Barham, J. (2012). *Moving Food along the value chain: Innovations in regional food distribution*. Marketing Services Division, Agriculture Marketing Service, U.S. Department of Agriculture.

Dillemuth, A., & Hodgson, K. (2016). *Incentivizing the sale of healthy and local food*. In Raja, S., & Hodgson, K., (Eds.) Planning and policy briefs: Growing Food Connections.

Domestic Fair Trade Association. (n.d.). *Vision and principles*. http://www.thedfta.org/about/vision-and-principles/

Donahue, B., Burke, J., Anderson, M., Beal, A., Kelly, T., Lapping, M., Ramer, H., Russell, L., & Berlin, L. (2014). *A New England food vision: Healthy food for all, sustainable farming and fishing, thriving communities*. Food Solutions New England. http://www.foodsolutionsne.org/sites/default/files/LowResNEFV_0.pdf

Donahue, R. Parilla, J., & McDearman, B. (2018). *Rethinking cluster initiatives*. Brookings Institute. https://www.brookings.edu/research/rethinking-cluster-initiatives/

Donald, B., Gertler, M., Gray, M., & Lobao, L. (2010). Re-regionalizing the food system? *Cambridge Journal of Regions, Economy and Society*, *3(2)*, 171 -175. http://doi.org/10.1093/cjres/rsq020

Donkers, H. (2013). Governance for local and regional food systems. *Journal of Rural and Community Development, 8(1)*, 178-208.

Donkers, H. (2015). *Local food for global future: Classification, governance and knowledge for sustainable food security.* Scholar's Press. https://www.academia.edu/28223026/Local_Food_for_Global_Future_Classification_governance_and_knowledge_for_sustainable_food_security?email_work_card=view-paper

Drabenstott, M. & K. H. Sheaff. (2002). The new power of regions: A policy focus for rural America: A conference summary. *Economic Review, Federal Bank of Kansas City, 87*(2).

Dubbeling, M. & Santini, G. (May 2018). City region food system assessment and planning. *Urban Agriculture Magazine, 34*. https://ruaf.org/assets/2019/11/City-region-food-system-assessment-and-planning.pdf

Dubbeling M., Renting, H., Wiskerke, H., Carey, J., & Hoekstra, F. (May 2015). City region food systems. *Urban Agriculture Magazine, 29,* 8-11.

Dudlicek, J. (2019). *Grocery's regional battle for baskets. Progressive Grocer.* https://progressivegrocer.com/grocerys-regional-battle-baskets

Dumont, A. & Wascalus, J. (2017). *Reflecting on past progress, looking forward to the future.* Chapter 17 in Harvesting opportunity: The power of regional food system investments to transform communities. Federal Reserve Bank of St. Louis. https://www.stlouisfed.org/community-development/publications/harvesting-opportunity

Dun & Bradstreet (2020). *Food wholesalers industry profile.* https://firstresearch.com/industry-research/food-wholesalers.html

DuPuis, E. M. & Goodman, D. (2005). Should we go "home" to eat?: Toward a reflexive politics of localism. *Journal of Rural Studies, 21*, 359-371. https://doi.org/10.1016/j.jrurstud.2005.05.011

Duncan, S., Brekken, C. A., Lurie, S., Fiegener, R., Sherry, S., & Liang, C. K. (2018). Can regional food networks and entrepreneurial strategies enhance food system resilience? *Choices: The magazine of food, farm and resources Issues*, *33*(2). https://www.choicesmagazine.org/choices-magazine/theme-articles/the-linkages-between-entrepreneurship-and-sustainable-regional-food-networks/can-regional-food-networks-and-entrepreneurial-strategies-enhance-food-system-resilience

The Economist. (2021). Why New England is going wild for wet weeds. *The Economist,* June 26, 2021. https://www.economist.com/united-states/2021/06/26/why-new-england-is-going-wild-for-wet-weeds

Econsult Solutions, Inc. (2020). *U.S. kitchen incubators: An industry update.* https://econsultsolutions.com/wp-content/uploads/2020/01/Kitchen-Incubators-2019_1.14.20.pdf

Econsult Solutions, Inc. and Fox School of Business, Temple University. (2018). *Pennsylvania Agriculture: A look at the economic impact and future trends.* For Pennsylvania Department of Agriculture and Team Pennsylvania. May, 2018.

El-Hiti, M. (2021). *The top 5 challenges in food and beverage distribution logistics*. Softec Technologies. https://www.softec.ai/post/the-top-5-challenges-in-food-and-beverage-distribution-logistics

Enthoven, L., Van den Broeck, G. (2021). Local food systems: Reviewing two decades of research. *Agricultural Systems.* V. 193, October 2021. https://doi.org/10.1016/j.agsy.2021.103226

Environmental Working Group. (n.d.). *Farm subsidy database: The United States.* https://farm.ewg.org/progdetail.php?fips=00000&progcode=total&page=states&regionname=theUnitedStates

Erchull, C. (2014). *The dormant commerce clause: A constitutional barrier to sustainable agriculture and the local food movement. Western New England Law Review, 36*(3). https://digitalcommons.law.wne.edu/lawreview/vol36/iss3/6

Ericksen, P.J. (2007). Conceptualizing food systems for global environmental change research. *Science Direct.* http://doi:10.1016/j.gloenvcha.2007.09.002

Eshelman, J. & Clancy, K. (2015). *Food security in the Northeast US*. Penn State University.

Fair World Project. (2021). https://fairworldproject.org/news/press-releases/labor-rights-and-farmworker-groups-denounce-fair-trade-usa-and-chobanis-launch-of-fair-trade-dairy/

Farm to Institution New England. (2016). *Setting the table for success: A toolkit for increasing local food purchasing by institutional food service management*. https://www.farmtoinstitution.org/food-service-toolkit

Farmworker Justice. (2019). *Selected statistics on farmworkers*. http://www.farmworkerjustice.org/wp-content/uploads/2019/05/NAWS-Data-FactSheet-05-13-2019-final.pdf

Farmworker Justice. (2019). *New immigration policy change: "Public charge" final rule--what you need to know.* https://www.farmworkerjustice.org/sites/default/files/resources/NAWS%20Data%20FactSheet%2005-13-2019%20-%20final.pdf

Federal Reserve Bank 2017. *Harvesting Opportunity: The Power of Regional Food System Investment to Transform Communities*. Eds. Dumont, A, Davis, D. Wascalus, J., Wilson, T., Barham, J Tropp. D. Federal Reserve Bank of St. Louis and Board of Governors of the Federal Reserve System.

Feenstra, G. (2019). Increasing the capacity for place-based food systems. *Journal of Agriculture, Food Systems, and Community Development, 9*(A), 61-66. https://doi.org/10.5304/jafscd.2019.091.018

Feenstra, G. & Hardesty, C. (2016). Values-based supply chains as a strategy for supporting small and mid-scale producers in the United States. *Agriculture 6*(3), 39. https://doi.org/10.3390/agriculture6030039

Feldmann, C. & Hamm, U. (2015). Consumers' perceptions and preferences for local food: A review. *Food Quality and Preference,* 40(A), 152-164. https://doi.org/10.1016/j.foodqual.2014.09.014

Feldstein, S. & Barham, J. (2017). *Running a food hub learning from food hub closures. Service Report 280773.* USDA, Rural Development. http://doi.org/10.22004/ag.econ.280773

Fitch, C. & Santo, R. (2016*). Instituting change: An overview of institutional food procurement and recommendations for improvements*. The Johns Hopkins Center for a Livable Future. http://doi.org/10.13140/RG.2.2.31994.80327

Fleet Visioning Project. (2005). *The Northeast region's vision for the future of the groundfish fleet: A comprehensive report.* https://www.namanet.org/sites/default/files/documents/ComprehensiveFleetVisioningReport.pdf

Fleisher, D. (2019). USDA-Agricultural Research Service. Personal communication, April 16, 2019.

Fleury, P., Lev, L., Brives, H., Chazoule, C., & Desole, M. (2016). Developing mid-tier supply chains (France) and values-based food supply chains (USA): A comparison of motivations, achievements, barriers and limitations. *Agriculture*, 6(3), 36. https://doi.org/10.3390/agriculture6030036

Flores, L. https://www.stonybrook.edu/commcms/history/people/faculty/flores

Fluharty, C. (2011). The farm bill and (all) rural America. *The Daily Yonder.* https://www.dailyyonder.com/farm-bill-and-all-rural-america/2011/03/07/3216/

Fluharty, C. W. (2012). *Written statement for the record before the United States Senate Committee on Agriculture, Nutrition, and Forestry*. Rural Policy Research Institute.

Food and Agriculture Organization of the United Nations. (2003). *Trade reforms and food security: Conceptualizing the linkages*. Commodity Policy and Projections Service & Commodities and Trade Division. www.fao.org/3/y4671e/y4671e00.htm

Food and Agriculture Organization of the United Nations and Resource Centres on Urban Agriculture. (2015). *A vision for city region food systems.* http://www.fao.org/3/a-i4789e.pdf

Food and Agriculture Organization of the United Nations. (2017). *Defining Boundaries. City region food systems programme.* http://www.fao.org/in-action/food-for-cities-programme/toolkit-old/defining-the-crfs/defining-boundaries/en/

Food and Agriculture Organization of the United Nations. (2019a). *FAO framework for the urban food agenda: Leveraging sub-national and local government action to ensure sustainable food systems and improved nutrition.* FAO. https://doi.org/10.4060/ca3151en

Food and Agriculture Organization of the United Nations. (2019b). *The state of the world's biodiversity for food and agriculture* (Belanger, J. & Piling, D., Eds.). FAO Commission on Genetic Resources for Food and Agriculture Assessments. http://www.fao.org/3/CA3129EN/CA3129EN.pdf

Food and Agriculture Organization of the United Nations. (2022). *The CRFS approach.* City-region Food Systems Programme. https://www.fao.org/in-action/food-for-cities-programme/overview/crfs/en/

Food Chain Workers Alliance. (2012). *Food workers organizations in the U.S.* http://foodchainworkers.org/wp-content/uploads/2012/11/2012-11-Food-Workers-Organizations-in-U.S.-FCWA.pdf

Food Chain Workers Alliance & Solidarity Research Cooperative. (2016). *No piece of the pie: U.S. food workers in 2016*. Food Chain Workers Alliance. http://foodchainworkers.org/wp-content/uploads/2011/05/FCWA_NoPieceOfThePie_P.pdf

The Food Commons. (2014). *Summary.* http://www.thefoodcommons.org/summary/

Food, Conservation and Energy Act of 2008, H.R. 2419, 110th Cong. 110-234. (2008). https://www.congress.gov/bill/110th-congress/house-bill/2419

Food Print. (n.d.) *Local and regional food systems.* www.sustainabletable.org/254/local-regional-food-systems

Food Research and Action Center. (2018). *Household food insecurity rates by state, 2015-2017* [Infographic]. http://www.frac.org/maps/food-security/tables/tab1_foodinsecurity_2015_2017.html

Food Research and Action Center (FRAC). (2021, April). *ResearchWIRE newsletter.* https://frac.org/wp-content/uploads/2021-Spring-ResearchWire.pdf?eType=Email

Food Trade News. (2018). *C&S, Wakefern, UNFI outpace all wholesale grocers in Northeast.* December 17. https://www.foodtradenews.com/2018/12/17/cs-wakefern-unfi-outpace-ass-wholesale-grocers-northeast/

Food Trade News. (2019). *Ahold Delhaize USA will switch to self-distribution model by 2023; Retailer to invest $480 million.* https://www.foodtradenews.com/2019/12/11/ahold-delhaize-usa-will-switch-to-self-distribution-model-by-2023/

Food Trade News (2020). *In the Northeast C and S, Wakefern, UNFI, Bozzuto's pace wholesalers.* December 7.

Food Works. (2010*). A vision to improve NYC's food system.* The New York City Council.

Foran, T., Butler, J. R. A., Williams, L. J., Wanjura, W. J., Hall, A., Carter, A., & Carberry, P. S. (2014). Taking complexity in food systems seriously: An interdisciplinary analysis. *World Development, 61*, 85-101. http://dx.doi.org/10.1016/j.worlddev.2014.03.023

Forgrieve, J. (2019). *The ups and downs of sharing commercial kitchen space*. Smartbrief. https://www.smartbrief.com/original/2019/03/ups-and-downs-sharing-commercial-kitchen-space

Forster, T., & Getz Escudero, A. (2014). *City regions as landscapes for people, food and nature.* EcoAgriculture Partners, on behalf of the Landscapes for People, Food and Nature Initiative. https://www.un.org/esa/ffd/wp-content/uploads/sites/2/2015/10/CityRegionsAsLandscapesforPeopleFoodandNature_smallest.pdf

Fortin, N. D. (2017). *Introduction to food regulation in the United States*. In J. Wiley & Sons (Eds.), Food Regulation: Law, Science, Policy, and Practice, 2nd edition. https://www.canr.msu.edu/iflr/uploads/introduction%20to%20food%20regulation%20in%20the%20united%20states.pdf

Foster, C. H. W., & Meyer, W. B. (2000). *The Harvard environmental regionalism project*. BCSIA Discussion Paper 2000-11. Environment and Natural Resources Program, Kennedy School of Government, Harvard University.https://www.belfercenter.org/publication/harvard-environmental-regionalism-project

Foster, K. A. (2001). *Regionalism on purpose*. Lincoln Institute of Land Policy. https://www.lincolninst.edu/publications/policy-focus-reports/regionalism-purpose

Freedgood, J., Hunter, M., Dempsey, J., & Sorensen, A. (2020). *Farms under threat: The state of the states.* American Farmland Trust. https://s30428.pcdn.co/wp-content/uploads/sites/2/2020/09/AFT_FUT_StateoftheStates_rev.pdf

Foley, K. Goodman, T., & McElroy, B. (2012). *Bridging the gaps: Funding and social equity across the food systems supply chain.* RSF Social Finance.

Frumhoff, P. C., McCarthy, J., J., Melillo, J. M., Moser, S., C., Wuebbles, D. J., Wake, C., & Spanger-Siegfried, E. (2007). An integrated climate change assessment for the Northeast United States. *Mitigation and Adaptation Strategies for Global Change, 13*(5), 419-423. https://doi.org/10.1007/s11027-007-9138-x

Furbish, A. R. (2018, May). *The fate of farmers' markets*. Sentinel Source, Monadnock Table. https://www.sentinelsource.com/monadnock_table/features/the-fate-of-farmers-markets/article_b01bcece-520f-11e8-a737-5f168d384672.html

Fyksen, J. (2008). Wisconsin 'Good to Grow' to Capture Consumer Hunger For Regional Food. *Agri-View*. February 20, 2008.

Gabbard, S. & Hernandez, T. (2019). *Findings from the national agricultural workers survey (NAWS) 2015-2016: A demographic and employment profile of United States farmworkers (research report no. 13).* JBS International. https://wdr.doleta.gov/research/FullText_Documents/ETAOP_2019-01_NAWS_Research_Report_13.pdf

Galt, R.E. (2016). The relevance of regional political ecology for agriculture and food systems. *Journal of Political Ecology* 23(1), p.126-133. https://doi.org/10.2458/v23i1.20184

Gartenstein, D. (2020). *Food wholesalers & distributors.* Chron.com https://smallbusiness.chron.com/food-wholesalers-distributors-74633.html

Ge, H., Canning, P., Goetz, S., & Perez, A. (2017). Effects of scale economies and production seasonality on optimal hub locations: the case of regional fresh produce aggregation. *Agricultural Economies, 49,* 157-169. https://doi.org/10.1111/agec.12405

Gellynck, X., & Kuhne, B. (2010). Horizontal and vertical networks for innovation in the traditional food sector. *Journal of Food and System Dynamics, 1(2).* https://doi.org/10.18461/ijfsd.v1i2.124

Gilbert, J., Sharp, G., & Felin, M. S. (2002). The loss and persistence of black-owned farms and farmland: A review of the research literature and its implications. *Journal of Rural Social Sciences, 18*(2), 1-30.

Goddeeris, L., Rybnicek, A., & Takai, K. (2015). *Growing local food systems: A case study series on the role of local governments*. International City/County Management Association. https://icma.org/sites/default/files/307330_15-454%20Local%20Food%20Systems%20Case%20Studies%20Series-FINAL.pdf

Goetz, S., Shields, M., & Wang, Q. C. (2004). *Agricultural and food industry clusters in the Northeast U.S.: Technical report* [Rural development paper No. 26]. The Northeast Regional Center for Rural Development. https://aese.psu.edu/nercrd/publications/rdp/rdp26.pdf

Golden, S. (2013). *Urban agriculture impacts: Social, health, and economic: A literature review.* UC Sustainable Agricultural Research and Education Program and Agricultural Sustainability Institute at UC Davis.

Goldenberg, M. P., & Meter, K. (2019). Building economic multipliers, rather than measuring them: Community-minded ways to develop economic impacts. *Journal of Agriculture, Food Systems, and Community Development, 8*(3), 153-164. https://doi.org/10.5304/jafscd.2019.08C.010

Good, K. (2020). *An overview of U.S. farms from USDA's economic research service – 2020 edition.* Farm Policy News. https://farmpolicynews.illinois.edu/2020/12/an-overview-of-u-s-farms-from-usdas-economic-research-service-2020-edition/

Gottlieb, R., & Joshi, A. (2010). *Food justice*. The MIT Press. https://mitpress.mit.edu/books/food-justice

Governing. (2017). *State population by race, ethnicity data* [Infographic]. Governing.com https://www.governing.com/archive/state-minority-population-data-estimates.html

Grabar, H. (2013). *Why Walmart still hasn't crushed the regional grocery store.* Bloomberg CityLab. https://www.bloomberg.com/news/articles/2013-07-11/why-walmart-still-hasn-t-crushed-the-regional-grocery-store

Graff, G., Berklund, A., & Rennels, K. (2014). *The emergence of an innovation cluster in the agricultural value chain along Colorado's Front Range*. Colorado State University.

Gralak, S., Spajic, L., Blom, I., Omrani, O. E., Bredhauer, J., Uakkas, S., Mattijsen, J., Ali, A. O., Iturregui, R. S., Ezzine, T., Alqodmani, L., & Singh, S. (2020). COVID-19 and the future of food systems at the UNFCCC. *The Lancet Planetary Health, 4*(8). http://doi.org/10.1080/13549839.2013.792048

Grewal, S.S. & Grewal, P.S. (2011). Can cities become self-reliant in food? *Cities, 29*(1), 1-11. http://doi.org/10.1016/j.cities.2011.06.003

Griffin, T., Conrad, Z., Peters, C., & Ridberg, R. (2015). Regional self-reliance of the Northeast food system. *Renewable Agriculture and Food Systems, 30*(4), 349-363. http://doi.org/10.1017/S1742170514000027

Griffin, T., Peters, C., Fleisher, D., Conard, M., Conrad, Z., Tichenor, N., McCarthy, A., Piltch, E., Resop, J., & Saberi, H. (2018). Baseline trajectories, and scenarios: Exploring agricultural production in the Northeast U.S. *Journal of Agriculture, Food Systems, and Community Development, 8*(2), 23-37. http://doi.org/10.5304/jafscd.2018.082.015

Hagler, Y. (2009). *Defining U.S. megaregions*. America 2050. Regional Plan Association.

Halfway Home: An interim report on state food system studies. (1984). *The Cornucopia Project Newsletter, volume 3*(4).

Hamm, M.W. (2007). Localization in a global context: Invigorating local communities in Michigan through the food system. In Hinrichs, C.C & Lyson, T. A. (2007). *Remaking the North American food system: Strategies for sustainability*. University of Nebraska Press.

Hamm, M. W. & Bellows, A. C. (2002). US-based community food security: Influence, practice, debate. *Journal for the Study of Food and Society, 6*(1), 31-44. https://doi.org/10.2752/152897902786732725

Hamm, M. W., & Bellows, A. C. (2003). Community food security and nutrition educators. *Journal of Nutrition Education and Behavior, 35*(1), 37-43. http://doi.org/10.1016/S1499-4046(06)60325-4

Hance, A., Ruhf, K. & Hunt, A. (2006). *Regionalist approaches to farm and food policy: A focus on the Northeast*. The Northeast Sustainable Agriculture Working Group. Unpublished.

Haraldsson, H.V. (2004). *Introduction to systems thinking and causal loop diagrams*. Department of Chemical Engineering, Lund University. Report 1:2004.

Hardesty, J. R. (2019). *Black lives, native lands, white worlds: A history of slavery in New England*. Bright Leaf.

Hardesty, S., Feenstra, G., Visher, D., Lerman, T., Thilmany-Mcfadden, D., Bauman, A., Gillpatrick, T., & Rainbolt, G. N. (2014). Values-based supply chains: Supporting regional food and farms. *Economic Development Quarterly, 28(1),* 17-27. http://doi.org/10.1177/089124213507103

Harris, J. & Spiegel, E. (2019). *Food systems resilience: Concepts & policy approaches*. Center for Agriculture and Food Systems. https://www.vermontlaw.edu/academics/centers-and-programs/center-for-agriculture-and-food-systems/projects

Harvest New England. (2013). retrieved March 16, 2020, from https://www.harvestnewengland.org/

Haughton, B. (1982). *The cosmopolitan radish: Procedures for constructing a food guide for New York City and state in the year 2020* [Unpublished Ed.D. dissertation]. Teacher's College, Columbia University.

Heffernan, W., Hendrickson, M., & Gronski, R. (1999). *Consolidation in the food and agriculture system*. Report to the National Farmers Union. University of Missouri. https://www.iatp.org/sites/default/files/Consolidation_in_the_Food_and_Agriculture_Syst.htm

Heimlich, R. E., & Barnard, C. H. (1992). Agricultural adaptation to urbanization: Farm types in Northeast metropolitan areas. *Northeastern Journal of Agricultural and Resource Economics, 21*(1), 1-11. https://doi.org/10.22004/ag.econ.28849

Henderson, E., & Spula, J. B. (2011). *Building the movement: Labor in the Northeast food System* [Unpublished]. Northeast Sustainable Agriculture Working Group.

Hendrickson, M., James, H. & Heffernan, W. (2013). Vertical integration and concentration in US agriculture. Pp. 1791-1799 in Thompson, P.B., D. M. Kaplan, K. Millar, L. Heldke, L., and R. Bawden, R. (eds), *Encyclopedia of Food and Agricultural Ethics*. Dordrecht: Springer Science and Business Media. https://doi.org/10.1007/978-94-007-6167-4_216-1.

Hendrickson, M. K., Howare, P. H., & Constance, D.H. (2017). *Power, food and agriculture: Implications for farmers, consumers and communities.* University of Missouri. http://dx.doi.org/10.2139/ssrn.3066005

Herrin, M., & Gussow, J. D. (1989). Designing a sustainable regional diet. *Journal of Nutrition Education, 21*(6), 270-275. https://doi.org/10.1016/S0022-3182(89)80146-3

Hilchey, D. (2017). Food systems development practice and the Enhancing Food Security in the Northeast (EFSNE) project, part 1. *Journal of Agriculture, Food Systems, and Community Development, 7*(4), 1–3. https://doi.org/10.5304/jafscd.2017.074.021

Hinrichs, C. C. (2007). Introduction: Practice and place in remaking the food system. In Hinrichs, C.C. & Lyson, T. A. (2007). *Remaking the North American food system: Strategies for sustainability*. University of Nebraska Press.

Hinrichs, C.C. (2013). Regionalizing food security? Imperatives, intersections and contestations in a post -9/11 world. *Journal of Rural Studies* 29(January), 7-18.

Hise, P. (2016). *Beyond the farmer's market: How artisanal companies scale.* American Express.

History of slavery in Massachusetts. (2021, January 25). In *Wikipedia.* https://en.wikipedia.org/wiki/History_of_slavery_in_Massachusetts

Hoey, L. Shapiro, L. F., & Bielaczyc, N. (2018). "Put on your own mask before helping others": The capacity of food hubs to build equitable food access. *Journal of Agriculture, Food Systems, and Community Development, 8(3)*, 41-60. http://doi.org/10.5304/jafscd.2018.083.012

Holloway, L., & Kneafsey M. (2017). Producing-consuming food: Closeness and rurality in four 'alternative' food networks. In Geographies of rural cultures and societies. 262-282. DOI:10.4324/9781315254487-13

Homer-Dixon, T. (2005). Caught up in our own connections [Opinion Editorial]. *The New York Times,* August 13, 2005, A, 11. https://www.nytimes.com/2005/08/13/opinion/caught-up-in-our-own-connections.html

Horowitz, E. (2018, June 16). Why regional economies still matter. *Boston Globe*. https://www.bostonglobe.com/business/2018/06/15/why-regional-economies-still-matter/WqQ22FY3pozsYJ9CZB2wbM/story.html

Horst, M. (2019). *How Racism has shaped the American farming landscape*. Eater. https://www.eater.com/2019/1/25/18197352/american-farming-racism-us-agriculture-history

Horton, R., Yohe, G., Easterling, W., Kates, R., Ruth, M., Sussman, E., Whelchel, A., Wolfe, D., & Lipschultz, F. (2014). Chp. 16: Northeast. In J. M. Melillo, T. T. C. Richmond, & G. W. Yohe (Eds.), *Climate change impacts in the United States: The third national climate assessment* (pp. 371-395). U.S. Global Change Research Program. http://nca2014.globalchange.gov/report/regions/northeast

Howard, R., Horst, J., Orndorff, M., & Schottmiller, P. (2017). *Surviving the Brave new world of food retailing: A roadmap to relevance for the future for food retailers.* Kurt Salmon Accenture Strategy and Coca Cola Retailing Research Council. http://prod-wp.pub.coke.com/wpcontent/uploads/sites/24/2017/02/SurvivingtheBraveNewWorldofFoodRetailingKSA.pdf

Hristov, A. N., Degaetano, A. T., Rotz, C. A., Hoberg, E., Skinner, R. H., Felix, T., Li, H., Patterson, P. H., Roth, G., Hall, M., Ott, L. H., Baumgard, L. H., Staniar, W., Hulet, R. M., Dell, C. J., Brito, A. F., & Hollinger, D. Y. (2017). Climate change effects on livestock in the Northeast US and strategies for adaptation. *Climatic Change, 146*, 33-45. http://doi.org/10.1007/s10584-017-2023-z

Hu, G., Wang, L., Arendt, S., & Boeckenstedt, R. (2011). An optimization approach to assessing the self-sustainability potential of food demand in the Midwestern United States. *Journal of Agriculture, Food Systems and Community Development, 2*(1), 195-207. http://dx.doi.org/10.5304/jafscd.2011.021.004

Huffman, A., Maxwell, J., & Salerno, A. (2017). *Consolidation, globalization, and the American family farm*. Organization for Competitive Markets. https://competitivemarkets.com/wp-content/uploads/2017/08/Consolidation-Globalization-and-the-American-Family-Farm.pdf

Hughes, D. W., & Boys, K. A. (2015). What we know and don't know about the economic development benefits of local food systems. *Choices: The magazine of food, farm, and resource, 30(1)*. https://www.choicesmagazine.org/choices-magazine/theme-articles/community-economics-of-local-foods/what-we-know-and-dont-know-about-the-economic-development-benefits-of-local-food-systems

Huseman, M. (2017, September 19). Is agriculture exempt from OSHA? *Good Day's Work: OSHA Training for Ag*. https://blog.gooddayswork.ag/blog/is-agriculture-exempt-from-osha

Hynes, W., Trump, B. Love, P. & Linkov, I. (2020). (2020). Bouncing forward: A resilience approach to dealing with COVID-19 and future systemic shocks. Environmental Systems and Decisions 40:174-184. https://doi.org/10.1007/s10669-020-09776-x.

Institute of Medicine and National Research Council. (2015). *A framework for assessing effects of the food system*. The National Academies Press.

International Food Protection Training Institute. (2015). *Food and agriculture workforce capacity-building in Michigan: A critical examination*. Michigan Department of Agriculture and Rural Development.

Iowa State University. (n.d.) *What is the regional food systems working group of Iowa?* Iowa state university extension and outreach. Farm, food and enterprise development. https://www.extension.iastate.edu/ffed/what-is-the-regional-food-systems-working-group-of-iowa/

Iyengar, S. (1989). How citizens think about national issues: A matter of responsibility. *American Journal of Political Science*, *33*(4), 878–900. https://doi.org/10.2307/2111113

Jablonski, B. B. R., Hendrickson, M., Vogel, S., & Schmit, T. (2017). *Chapter 3: Local and regional food systems driving rural economic development*. In Harvesting Opportunity: The power of regional food system investments to transform communities. Dumont et al. (Eds) Federal Reserve Bank.

Jablonski, B. B. R., & Thilmany McFadden, D. (2019). What is a 'multiplier' anyway? Assessing the economics of local food systems toolkit. *Journal of Agriculture, Food Systems, and Community Development, 8*(Suppl.3), 1-8. https://doi.org/10.5304/jafscd.2019.08C.013

Jablonski, B.B.R.; Carolan, M.; Hale, J.; Thilmany McFadden, D.; Love, E.; Christensen, L.; Covey, T.; Bellows, L.; Cleary, R.; David, O.; Jablonski, K.E.; Jones, A.S.; Meiman, P.; Quinn, J.; Ryan, E.P.; Schipanski, M.; Summers, H.; Uchanski, M. (2019). Connecting urban food plans to the countryside: Leveraging Denver's food vision to explore meaningful rural–urban linkages. *Sustainability*, *11*, 2022. https://doi.org/10.3390/su11072022

Jennings, S., Cottee, J., Curtis, T. & Miller, S. (2015). *Food in an urbanized world: The role of city region food systems in resilience and sustainable development.* Food and Agriculture Organisation of the United Nations. http://www.fao.org/fileadmin/templates/FCIT/documents/Food_in_an_Urbanised_World_Report_DRAFT_February_2015.pdf

Joannides, J., Micka, A., & Ristau, J. (2013). *Regional approach & equitable urban/regional connections.* In Growing regional wealth: A closer look at the impact of local food systems and creative financing. https://paperzz.com/doc/9217258/growing-regional-wealth

Johnson, R. (2016). *The Role of local and regional food systems in U.S. farm policy.* Congressional Research Service. CRS report, 7-5700. https://fas.org/sgp/crs/misc/R44390.pdf

Journal of Agriculture, Food Systems and Community Development. (2019). Proceedings from the place-based food systems conference. *JAFSCD* V. 9, No. A. https://doi.org/10.5304/jafscd.2019.09A.004

Karen Karp & Partners. (2021). *Studying agriculture and local food in the Appalachian region*. Karen Karp & Partners. https://kkandp.com/2021/02/12/studying-the-agriculture-and-local-food-of-the-appalachian-region/

Katz, B. (Ed.). (2000). *Reflections on regionalism*. Brookings Institution Press.

Keegan, M. & Nguyen, N. (2011). *Systems thinking, rural development and food security: Key leverage points for Australia's regional development and population policy*. Migration Institute of Australia.

Kelly, G. (2020, March 25). *Rhode Island food systems rally in time of crisis*. Eco RI News. https://www.ecori.org/farming/2020/3/25/rhode-island-food-systems-rally-in-time-of-crisis

Khoury, C.K., Bjorkman, A.D., Dempewolf, H., Ramirez-Villegas, J., Guarino, L., Jarvis, A., Rieseberg, L.H. & Struik, P.C. (2014). *PNAS*. http://www.pnas.org/cgi/doi/10.1073/pnas.1313490111

King, R. P, Hand, M. S., & Gomez, M. I. (2014). *Growing local: Case studies on local food supply chains.* University of Nebraska Press.

King, R. P., Hand, M. S., Digiacomo, G., Clancy, K., Gomez, M. I., Hardesty, S. D., Lev, L., & Mclaughlin, E. W. (2010). *Comparing the structure, size, and performance of local and mainstream food supply chains.* Economic Research Report No. (ERR-99), 81. United States Department of Agriculture, Economic Research Service. https://www.ers.usda.gov/publications/pub-details/?pubid=46407

Kirschenmann, F., Stevenson, S., Buttel, F., Lyson, T., & Duffy, M. (2004). Why worry about the agriculture of the middle? *Leopold Center Publications and Papers, 143*. https://lib.dr.iastate.edu/leopold_pubspapers/143

Kinnunen, P., Guillaume, J. H. A., Taka, M., D'Odorico, P., Siebert, S., Puma, M. J., Jalava, M., & Kummu, M. (2020). Local food crop production can fulfil demand for less than one-third of the population. *Nature Food, 1,* 229–237. https://doi.org/10.5281/zenodo.3725646

Klein, C. (2014, June 25). *Deeper roots of northern slavery unearthed.* History. https://www.history.com/news/deeper-roots-of-northern-slavery-unearthed

Kneafsey, M. (2010). The region in food - important or irrelevant? *Cambridge Journal of Regions, Economy and Society, 3*(2), 177 -190. https://doi.org/10.1093/cjres/rsq012

Kneebone, E. (2017). *The changing geography of US poverty.* Brookings. https://www.brookings.edu/testimonies/the-changing-geography-of-us-poverty

Knezevic, I. (2021). Framing good food: Communicating value of community food initiatives in the midst of a food crisis. *Frontiers in Communication,* 25 June 2021. https://doi.org/10.3389/fcomm.2021.689522

Kok, K. & Veldkamp, T. A. (2011). Scale and governance: Conceptual considerations and practical implications. *Ecology and Society, 16(2),* 23. http://www.ecologyandsociety.org/vol16/iss2/art23/

Kremer, P. & Schreuder, Y. (2012). The feasibility of regional food systems in metropolitan areas: An investigation of Philadelphia's food shed. *Journal of Agriculture, Food Systems, and Community Development, 2*(2), 171–191. https://doi.org/10.5304/jafscd.2012.022.005

Kurtz, J. E., Woodbury, P. B., Ahmed, Z. U., & Peters, C. J. (2020). Mapping U.S. food system localization potential: The impact of diet on foodsheds. *Environmental Science and Technology, 54*(19), 12434-12446. http://doi.org/10.1021/acs.est.9b07582

Laborde, L. (2018). *List of co-packers in Pennsylvania and beyond.* PennState Extension. August 19, 2018. https://extension.psu.edu/list-of-co-packers-in-pennsylvania-and-beyond

Lamine, C. (2014). Sustainability and resilience in agrifood systems: Reconnecting agriculture, food and the environment. *Sociologia Ruralis,* 55(1) 41-61. https://doi.org/10.1111/soru.12061

Lamine, C. Magda, D., & Amiot, M. J. (2019). Crossing sociological, ecological, and nutritional perspectives on agrifood systems transitions: Towards a transdisciplinary territorial approach. *Sustainability, 11,* 1284. http://doi.org/10.3390/su11051284

La Rosa, D., Barbarossa, L., Privitera, R., & Martinico, F. (2014). Agriculture and the city: A method for sustainable planning of new forms of agriculture in urban contexts. *Land Use Policy, 41,* 290-303. http://doi.org/10.1016/j.landusepol.2014.06.014

The Land Institute. (2018). *Place-based food systems: Making the case, making it happen.* The Land Institute. https://landinstitute.org/news-events/event-calendar/place-based-food-systems-making-case-making-happen/

Lee, D. (1991). *The international environment for food and farming in the Northeast.* The Northeast Network: Food, agriculture and health policy education. Cornell University.

Lee, T. (n.d.). *Geography of poverty: A journey through forgotten America.* http://www.msnbc.com/interactives/geography-of-poverty/index.html

Lemann, N. (1991). *The promised land: The great black migration and how it changed America.* Alfred A. Knopf.

Lembeck, S. (Ed.). (1994). *Our changing landscape: Balancing rural and urban needs.* Pennsylvania State University.

Lengnick, L. (2015). *Resilient agriculture: Cultivating food systems for a changing climate.* New Society Publishers.

Lengnick, L. Miller, M., & Marten, G. G. (2015). Metropolitan foodshed: A resilient response to the climate change? *Journal of Environmental Studies and Sciences, 5*(4), 573-592. https://doi.org/10.1007/s13412-015-0349

Lev, L. Stevenson, G., Clancy, K., King, R., & Ostrom, M. (2015). Values-based food supply chains. In K. Albala (Ed.), *The SAGE encyclopedia of food issues, Vol 3* (pp.1417-1419). SAGE Publications, Inc.

Liddel, M., & Yencho, M. (Eds.). (2018). *Fisheries of the United States, 2017: NOAA current fishery statistics no. 2017.* U.S. Department of Commerce. https://www.fisheries.noaa.gov/feature-story/ fisheries-united-states-2017

Lisa, A. (2019). *States with the biggest rural populations*. Stacker. https://stacker.com/stories/2779/states-biggest-rural-populations?page=5

Lloyd, S., Miller, M., Barham, B., Farnsworth, L. D., Saunders, R., Frye-Levine, L., Maynard, K., Burmeister, L., Ugoretz, S. J., & Bell, M. (2019). *Fair ground: Strategies for decent work in food and agriculture* [Unpublished draft].

Lopez, R. A. (2014). *Economic impacts of agriculture in eight northeastern states*. A report for Farm Credit East.

Low, S. & Vogel, S. (2011). *Direct and intermediated marketing of local foods in the United States* [Report no. 128]. U.S. Department of Agriculture, Economic Research Service.

Low, S. A., Adalja, A., Beaulieu, E., Key, N., Martinez, S., Melton, A. Perez, A., Ralston, K., Stewart, H., Suttles, S., Vogel, S., & Jablonski, B.B.R. (2015). *Trends in U.S. local and regional food systems: A report to congress* [Administrative publication no. 068]. U.S. Department of Agriculture, Economic Research Service. https://www.ers.usda.gov/publications/pub-details/?pubid=42807

Lowrance, R., Hendrix, P. F., & Odum, E. P. (1986). A hierarchical approach to sustainable agriculture. *American Journal of Alternative Agriculture, 1*(4), 169-173. http://doi.org/10.1017/S0889189300001260

Lynch, T. (2016). Always becoming bioregional: An identity for the Anthropocene. *Caliban: French Journal of English Studies*. https://doi.org/10.4000/caliban.3324

Lyson, T. A., Stevenson, G. W., Welsh, R., & Guptill, A. (2008). *Food and the mid-level farm: Renewing an agriculture of the middle*. Brockport Bookshelf. 175. https://digitalcommons.brockport.edu/bookshelf/175

MacDonald, J., Perry, J., Ahearn, M., Banker, D., Chambers, W., Dimitri, C., Key, N., Nelson, K., & Southard, L. (2004*). Contracts, markets, and prices: Organizing the production and use of agricultural commodities*. USDA-Economic Research Service, Agricultural Economic Report Number 837, November 2004. https://www.ers.usda.gov/webdocs/publications/41702/14700_aer837_1_.pdf?v=0

MacDonald, J. M. (2017). Consolidation, concentration, and competition in the food system. *Economic Review (Kansas City), 102*, 85-105.

MacDonald, J. M., Hoppe, R. A., & Newton, D. (2018). *Three decades of consolidation in U.S. agriculture* [Economic information bulletin no. 189]. U.S. Department of Agriculture, Economic Research Service.

MacEwan, D., Scheer, J., Howitt, R., Noel, J., Nousaine, A., Kowta, M., Ballard-Rosa, G., & Shabazian, D. (2016). *Food system multipliers for specialty crops in the Sacramento region* [Final report]. ERA Economics. https://www.sacog.org/sites/main/files/file-attachments/food_system_multipliers_technical_report.pdf

McFadden, J. R., & Hoppe, R. (2017). *The evolving distribution of payments from commodity, conservation, and federal crop insurance programs*. Economic Information Bulletin No. (EIB-184). USDA, Economic Research Service. https://www.ers.usda.gov/publications/pub-details/?pubid=85833

MacGregor, J., & Vorley, B. (2006). *Fair miles? The concept of "food miles" through a sustainable development lens*. Sustainable Development Opinion Papers. International Institute for Environment and Development. https://pubs.iied.org/11064iied

MacRae, R., Nasr, J., Kuhns, J., Baker, L., Christianson, R., Danyluk, M., Snider. A., Gallant, E., Kaill-Vinish, P., Michalak, M., Oswald, J., Patel, S., & Wekerle, G. (2012). Could Toronto provide 10% of its fresh vegetable requirements from within its own boundaries? Part II, Policy supports and program design. *Journal of Agriculture, Food Systems, and Community Development, 2*(2), 147-169. http://dx.doi.org/10.5304/jafscd.2012.022.002

Magdoff, F., Foster, J. B., & Buttel, F. H. (1998). Hungry profit-Agriculture, food, and ecology: Introduction. *Monthly Review-An Independent Socialist Magazine*, *50*(3), 1-13.

Mares, T. (2019). *Life on the other border: Farmworkers and food justice in Vermont*. University of California Press. https://doi.org/10.1525/gfc.2020.20.1.90

Maretski, A. & Anderson, C. (1991). *The Northeast network: Food, agriculture and health policy education*. Pennsylvania State University, University Park, PA and Cornell University, Ithaca, NY.

Marsden, T., Banks, T., & Bristow, G. (2002). Food supply chain approaches: Exploring their role in rural development. *Sociologia Ruralis, 40*(4), 424-438. https://doi.org/10.1111/1467-9523.00158

Marsden, T., Hebinck, P., & Mathijs, E. (2018). Re-building food systems: embedding assemblages, infrastructures and reflexive governance for food systems transformations in Europe. *Food Security, 10*, 1301-1309. http://doi.org/10.1007/s12571-018-0870-8

Martin, K. (2018). Top 50 grocers: Independents ready to stand up to newcomer Amazon. Progressive Grocer. https://progressivegrocer.com/top-50-grocers-independents-ready-stand-newcomer-amazon

Martinez, S. (2017). Number of food and beverage processing plants varies across the United States. *Amber Waves.* USDA-ERS. November 6, 2017. https://www.ers.usda.gov/amber-waves/2017/november/number-of-food-and-beverage-processing-plants-varies-across-the-united-states/

Martinez, S., Hand, M., DaPra, M., Pollack, S., Ralston, K., Smith, T., Vogel, S., Clark, S., Lohr, L., Low, S. A., & Newman, C. (2010). *Local food systems: Concepts, impacts and issues* [Economic research report no. 97]. Economic Research Service, U.S. Department of Agriculture. https://www.ers.usda.gov/publications/pub-details/?pubid=46395

Massey, A. (2015). *Farm to table: Building local and regional food systems*. Sustainable Agriculture Research and Education. www.SARE.org/Local-Food

Mather, M. & Jarosz, B. (2014). Where poverty and inequality intersect in the U.S. Population Resource Bureau. *Population Bulletin,* vol. 69, no 2. https://www.prb.org/resources/us-inequality-poverty/

Matson, J., Sullins, M., & Cook, C. (2013). *The role of food hubs in local food marketing* [Service report no. 73]. U.S. Department of Agriculture, Rural Development. https://www.rd.usda.gov/files/sr73.pdf

Matthews, J.B.R., Moller, V., van Diemen, R., Fuglestvedt, J.S., Masson-Delmotte, V., Mendez, C., Semenov, S., & Reisinger, A., (eds). (2021). *Annex VII: Glossary*. In Climate Change 2021: The physical science basis; Contribution of working group to the sixth assessment report of the Intergovernmental Panel on Climate Change. Cambridge University Press. In Press.

McAdam, M., McAdam, R., Dunn, A., & McCall, C. (2016). Regional horizontal networks within the SME Agri-food sector: An innovation and social network perspective. *Regional Studies, 50(8),* 1316-1329. https://doi.org/10.1080/00343404.2015.1007935

McCabe, M. S. & Burke, J. (2013). The New England food system in 2060: Envisioning tomorrow's policy through today's assessments. *Maine Law Review,* 65(2), 549-579. https://digitalcommons.mainelaw.maine.edu/mlr/vol65/iss2/10

McCarthy, A.C. (2021). *Assessing the biophysical capacity and natural resources required to increase and geographically diversity fruit and vegetable production in the United States.* (Publication No. 28257679). [Doctoral dissertation, Tufts University]. ProQuest Dissertations Publishing.

McFadden, D. T., Conner, D., Deller, S., Hughes, D., Meter, K., Morales, A., Schmit, T., Swenson, D., Bauman, A., Goldenburg, M. P., Hill, R., Jablonski, B.B.R., & Tropp, D. (2016). *The economics of local food systems: A toolkit to guide community discussions, assessments, and choices*. U.S. Department of Agriculture, Agricultural Marketing Service. https://www.rd.usda.gov/files/ILAMSToolkit.pdf

McFadden, D. T. (2015). Community economics of local foods: What do we mean by "local foods"? *Choices, Q1*(R3). Agriculture Applied Economic Association. http://choicesmagazine.org/choices-magazine/theme-articles/community-economics-of-local-foods/what-do-we-mean-by-local-foods

McKinney, M., & Essington, K. (2006). Learning to think and act like a region. *Land Lines*, *18*(1), 8-13. https://www.lincolninst.edu/publications/articles/learning-think-act-region

McKinney, M. J., & Johnson, S. (2009). *Working across boundaries: People, nature and regions.* Lincoln Institute of Land Policy.

Meadowcroft, J., Farrell, K. N., & Spangenberg, J. (2005). Developing a framework for sustainability governance in the European Union. *International Journal of Sustainable Development, 8(1-2),* 3-11. http://doi.org/10.1504/IJSD.2005.007371

Mechelse, M., & McQuilkin, A. (2020). A blueprint for the store of the future in the COVID-19 era. *SN Supermarket News*. https://www. supermarketnews.com/issues-trends/blueprint-store-future-COVID-19-era

Mehta, C. (2021). *Call for innovation: New York's agrifood system*. Center for Excellence for Food and Agriculture and Center for Regional Economic Advancement, Cornell University. https://www.grow-ny.com/wp-content/uploads/2021/04/FULL-A-Call-for-Innovation_-New-Yorks-Agrifood-System-3.pdf

Melillo, J. M., Richmond, T.C., Yohe, G.W. Eds. (2014). *Climate change impacts in the United States: The third national climate assessment.* U.S. Global Change Research Program. Doi:10.7930/J0Z31WJ2.

Metropolitan Area Planning Council. (2014). *Minuteman area comprehensive agricultural planning program.* http://www.mapc.org/wp-content/uploads/2017/09/MAGIC_ag_report_1-21-14.pdf

Meuwissen, M., Paas, W., Slijper, T., Coopmans, I., Ciechomska, A., Lievens, E., Deckers, J., Vroege, W., Mathijs, E., Kopainsky, B., Herrera H., Nitzko, S., Finger, R., Mey, Y., Poortvliet, P. M., Nicholas-Davies, P., Midmore, P., Vigani, M., Maye, D., Urquhart, J., Balmann, A., Appel, F., Termeer, K., Feindt, P., Candel, J., Tichit, M., Accatino, F., Severini, S., Senni, S., Wauters, E., Bardaji, I., Soriano, B., Zawalinska, K., Lagerkvist, C. J., Manevska-Tasevska, G., Hansson, H., Peneva, M., Gavrilescu, C., & Reidsma, P. (2018). *Report on resilience framework for EU agriculture*: *Sustainable and resilient EU farming systems (SureFarm) project report, work package D1.1.* Sustainable, Resilient EU Farming Systems (SureFarm). https://library.wur.nl/WebQuery/wurpubs/fulltext/443054

Michel-Villarreal, R., Hingley, M., & Bregoli, I. (2018). *Defining alternative food networks: A systematic literature review* [Conference paper]. International Food Marketing Research Symposium 2018 at Bournemouth University. https://www.researchgate.net/publication/325897066

Mijatovic, D., Van Oudenhoven, F., Eyzaguirre, P., & Hodgkin, T. (2012). The role of agriculture biodiversity in strengthening resilience to climate change: towards an analytical framework. *International Journal of Agricultural Sustainability, 11*(2). 95-107. http://doi.org/10.1080/14735903.2012.691221

Milan Urban Food Policy. (October 2015). *Milan urban food policy pact.* https://www.milanurbanfoodpolicypact.org/wp-content/uploads/2020/12/Milan-Urban-Food-Policy-Pact-EN.pdf

Miller, M. (2018). *Critical thresholds for food flow: Optimizing efficiency and diversity for resilience*. Center for Integrated Agricultural Systems, University of WI-Madison.

Miller, M. (2021). Identifying critical thresholds for resilient regional food flows: A case study from the U.S. upper Midwest. *Front. Sustain. Food Syst.* 5:684159. doi: 10.3389/fsufs.2021.684159.

Miller, M., Holloway, W., Perry, E., Zietlow, B., Kokjohn, S., Lukszys, P., Chachula, N., Reynolds, A., & Morales, A. (2016). *Regional food freight: Lessons from the Chicago region*. Project report for USDA-AMS, Transportation Division.

Miller, M. & Lorenz, D. (2015). *Agriculture, transportation and climate change: Considering the future of agricultural freight transport in the Upper Mississippi River Valley*. University of Wisconsin Center for Integrated Agricultural Systems. https://cias.wisc.edu/wp-content/uploads/sites/194/2015/11/agtrptclimatefinal111015.pdf

Miller, M., Anderson, M., Francis, C. A., Kruger, C., Barford, C., Park, J., & McCown, B. (2013). Critical research needs for successful food systems adaptation to climate change. *Journal of Agriculture, Food Systems, and Community Development, 3*(4), 161-175. http://dx.doi.org/10.5304/jafscd.2013.034.016

Mittal, A., Krejci, C. C., & Craven, T. J. (2018). Logistics best practices for regional food systems: A review. *Sustainability, 10*(1), 168. https://doi.org/10.3390/su10010168

Morgan, C. (2008). Regionalism picks up speed: New England states find common ground. *Communities and Banking, Federal Reserve Bank of Boston (Winter)*, 20-22.

Morgan, D. (2001). 'Eggplant caucus' cultivates support. *The Washington Post.* https://www.washingtonpost.com/archive/politics/2001/07/30/eggplant-caucus-cultivates-support/c08e7a42-749a-4846-81a5-4885a5f95c62

Mount, P. (2011). Growing local food. Scale and local food systems governance. *Appetite, 2*(56), 538.

Mount, P. (2012). Growing local food: scale and local food systems governance. *Agriculture and Human Values*, *29*(1), 107-121.

Murphy, W.M. (2016). "No beggars amongst them": Primitive accumulation, settler colonialism, and the dispossession of Narragansett Indian land. *Humanity and Society, 42*(1). https://doi.org/10.1177/0160597616664168

Myran, C. (2018). *Good food glossary: Shared-use kitchen*. New Venture Advisors LLC. September 11, 2018. https://www.newventureadvisors.net/good-food-glossary-shared-use-kitchen/

National Agricultural Law Center. (n.d.). *Local food systems: An overview*. http://nationalaglawcenter.org/overview/local-food/

National Aquaculture Act of 1980. https://www.ars.usda.gov/SCA/National%20Aquaculture%20Act%20of%201980.pdf

National Association of State Departments of Agriculture (n.d.). https://s3.amazonaws.com/nasda2/media/Workforce-Development-One-Pager_FINAL2.pdf?mtime=20210107164848

National Association of Development Organizations Research Foundation. (2010). *Regional food systems infrastructure*. https://www.nado.org/wp-content/uploads/2011/04/NADO-RFSI-Report-Dec-2010.pdf

National Geographic. (2020). *New England colonies' use of slavery*. https://www.nationalgeographic.org/article/new-england-colonies-use-slaves/

National Grocers Association. (2021a). Press release. June 21, 2021.

National Grocers Association. (2021b). *Buyer power and economic discrimination in the grocery aisle: Kitchen table issues for American consumers.* https://www.nationalgrocers.org/wp-content/uploads/2021/03/NGA-Antitrust-White-Paper25618.pdf

National Integrated Drought Information System. (2020). *Quarterly climate impacts and outlook for the northeast region – December 2020*. https://www.drought.gov/sites/default/files/2020-12/Northeast%20Fall%202020.pdf

National Oceanic and Atmospheric Administration (n.d.). *New England/Mid-Atlantic, overview*. U. .Department of Commerce. https://www.fisheries.noaa.gov/region/new-england-mid-atlantic

National Research Council. (2006). *Food insecurity and hunger in the United States: An assessment of the measure*. The National Academics Press. https://doi.org/10.17226/11578

National Research Council. (2010). *Toward sustainable agricultural systems in the 21st century*. The National Academies Press.

National Research Council. (2012). Disaster resilience: A national imperative. Washington, D.D. The National Academies Press. https://doi.org/10.17226/13457

National Sustainable Agriculture Coalition. (2019). *Letter to AMS & RBCS Administration*. March 13, 2019.

National Sustainable Agriculture Coalition. (2019). *Agriculture and climate change: Policy imperatives and opportunities to help producers meet the challenge*. https://sustainableagriculture.net/wp-content/uploads/2019/11/NSAC-Climate-Change-Policy-Position_paper-112019_WEB.pdf

National Sustainable Agriculture Coalition. (2020). Inaugural regional food systems partnership program funding opportunity announced. https://sustainableagriculture.net/blog/inaugural-regional-food-partnership-program-funding/

National Sustainable Agriculture Coalition. (2020*). A plea for food and agriculture research funding*. NSAC blogpost April 2, 2020.

Nayga, R. M., & Zilberman, D. (2020). *Research priorities to fill critical knowledge gaps caused by the Coronavirus pandemic*. In Economic impacts of COVID-19 on food and agriculture markets (pp.34-36). Council for Agricultural Science and Technology. https://www.cast-science.org/wp-content/uploads/2020/06/QTA2020-3-COVID-Impacts.pdf

Neff, R., Parker, C., Kirschenmann, F., Tinch, J., & Lawrence, R. (2011). Peak oil, food systems, and public health. *American Journal of Public Health, 101*(9), 1587-1597. http://doi.org/10.2105/ajph.2011.300123

The New England Council. (2021). https://newenglandcouncil.com/about/history/

New World Encyclopedia. (n.d). *Northeastern United States*. https://www.newworldencyclopedia.org/entry/Northeastern_United_States

New York Economic Development Corporation. (2016). *Five borough food flow: 2016 New York City food distribution & resiliency study results*. https://www1.nyc.gov/assets/foodpolicy/downloads/pdf/2016_food_supply_resiliency_study_results.pdf

Newburger, E. (2019). 'We're fighting for our lives' - US apple farmers endure major crop and profit losses as climate changes. *CNBC.* https://www.cnbc.com/2019/11/09/us-apple-farmers-struggle-against-climate-change-floods-and-drought.html

Newcomer, L. (2021). *How people are resolving to reduce water scarcity*. Waterlogic. https://www.waterlogic.com/en-us/resources-blog/how-people-are-resolving-to-reduce-water-scarcity/

Newkirk, V. R. II. (2019, September). The Great Land Robbery. *The Atlantic.* 74-85. https://www.theatlantic.com/magazine/archive/2019/09/this-land-was-our-land/594742/

Newman, L. & Dale, A. (2009). Large footprints in a small world: Toward a macroeconomics of scale. *Sustainability: Science, Practice and Policy, 5*(1), 9-19. https://doi.org/10.1080/15487733.2009.11908024

Nicholson, C. F., He, X., Gomez, M., Gao, H. O., & Hill, E. (2015). Environmental and economic impacts of localizing food systems: The case of dairy supply chains in the Northeastern United States. *Environmental Science and Technology, 49(20)*, 12005-12014. https://doi.org/10.1021/acs.est.5b02892

Nickerson, C., Ribaudo, M., & Higgins, N. A. (2012). The farm act's regional equity provision: Impacts on conservation program outcomes. USDA-ERS Economic Research Report No. 98. July 28, 2012. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2114380

Nielsen IQ. (2019). *What food-related causes do U.S. consumers care about today?* March 6. https://nielseniq.com/global/en/insights/analysis/2019/what-food-related-causes-do-us-consumers-care-about-today/

Nielsen IQ. (2019). How Americans will shop: What products do consumers care about when buying local? April 29. https://nielseniq.com/global/en/insights/analysis/2019/how-americans-will-shop-what-products-do-consumers-care-about-when-buying-local/

Nischan, M. 2004. *A sense of place through taste*. Wingspread Journal, Johnson Foundation. Unpublished.

Nogeire-Mcrae, T., Ryan, E. P., Jablonski, B. B. R., Carolan, M., Arathi, H., Brown, C. S., Saki, H.H., McKeen, S., Lapansky, E., & Schipanski, M. E. (2018). The role of urban agriculture in a secure, healthy, and sustainable food system. *BioScience, 68*(10), 748-759. http://doi.org/10.1093/biosci/biy071

Northeast Organic Dairy Producers Alliance. (2021). *About NOPDA*. https://nodpa.com/p/16/About-NODPA

Northeast Organic Farming Association of Vermont. (2015). *The case for values-based tiered buying systems for institutions and wholesale buyers.* Northeast Organic Farming Association of Vermont. https://nofavt.org/sites/default/files/files/resources/values-based-tiered-buying-position-paper-august-2015.pdf

Northeast Regional Center for Rural Development. (2009). *Annual Report*. The Pennsylvania State University. https://aese.psu.edu/nercrd/publications/annual-report/archive/2009

Northeast Regional Center for Rural Development. (2021). https://aese.psu.edu/nercrd

Northeast Sustainable Agriculture Working Group. (n.d). *Policy*. https://nesawg.org/policy

Northeast Sustainable Agriculture Working Group. (2007). *A Northeast farm bill agenda: Priorities for the 2007 farm bill* [Unpublished].

Northeastern IPM Center (n.d.). https://www.northeastipm.org/about-us/mission-and-goals/

Nyeleni. (2015, September). *Nyeleni Newsletter, number 23*. https://nyeleni.org/DOWNLOADS/newsletters/Nyeleni_Newsletter_Num_23_EN.pdf

NYS-NYC Regional Food Hubs Task Force. (2015). *New York State-New York City Regional Food Hubs Task Force Final Action Plan.*

Obadia, J. (2015). *Food Service Management Companies in New England: Phase 1 research findings: Barriers and opportunities for local procurement.* Farm to Institution New England. https://www.farmtoinstitution.org/sites/default/files/imce/uploads/Report_FSMCs%20in%20New%20England.pdf

O'Hara, J. K., & Benson, M.C. (2019). Where have all the direct-marketing farms gone? Patterns revealed from the 2017 Census of Agriculture. *Journal of Agriculture, Food systems, and Community Development, 9*(4), 31-37. https://doi.org/10.5304/jafscd.2019.091.046

Olson, K. (2020). Maine farmers struggle with new, harsher climate reality. *Civil Eats.* https://civileats.com/2020/07/22/with-ever-more-unpredictable-weather-maine-farmers-reflect-on-climate-change/

Olson-Sawyer, K. (2017). A soil scientist with a plan for more resilient food system. *Civil Eats.* https://civileats.com/2017/07/14/a-soil-scientist-with-a-plan-for-a-more-resilient-food-system/

Oltman, A. (2005, November 7). The hidden history of slavery in New York. *The Nation.* www.thenation.com/hidden-history-slavery-new-york

O'Neill, A. (2021). *Urbanization in the United States, 1970-2019*. Statista. https://www.statista.com/statistics/269967/urbanization-in-the-united-states/

Onozaka, Y., Nurse, G., & Thilmany McFadden, D. (2010). Local food consumers: How motivations and perceptions translate to buying behavior. *Choices: The magazine of food, farm and resources Issues*, *25*(1). https://www.choicesmagazine.org/UserFiles/file/article_109.pdf

Ostrom, M., Master, K., Noe, E., & Schermer M. (2017). Values-based food chains from a transatlantic perspective: Exploring a middle tier of agri-food system development. *International Journal of Sociology of Agriculture & Food, 24(1),* 1-14.

Palmer, A., Santo, R. E., Berlin, L., Bonanno, A., Clancy, K., Giesecke, C., Hinrichs, C., Lee, R., McNab, P., & Rocker, S. (2017). Between global and local: Exploring regional food systems from the perspectives of four communities in the U.S. Northeast. *Journal of Agriculture, Food Systems, and Community Development, 7*(4), 187-205. http://dx.doi.org/10.5304/jafscd.2017.074.017

Pansing, C., Fisk, J., Muldoon, M., Wasserman, A., Kiraly, S., & Benjamin, T. (2013a). *North American food sector, part one: Program scan and literature review.* Wallace Center at Winrock International.

Pansing, C., Wasserman, A., Fisk, J., Muldoon, M., Kiraly, S., & Benjamin, T. (2013b*). North American food sector, part two: Roadmap for city food sector innovation and Investment.* Wallace Center at Winrock International.

Parasecoli, F. (2020, March 16). *Food (systems) in the time of Coronavirus*. https://fabioparasecoli.com/food-systems-in-the-time-of-coronavirus/

Park, B. (2019). *Top retailers in the Northeast by market share.* The Packer. https://www.thepacker.com/markets/know-your-market-news/retail/top-retailers-northeast-market-share

Park, K. S., Gomez, M.I., & Clancy, K. (2018). *Case Studies of supermarkets and food supply chains in low-income areas of the Northeast: A cross case comparison of 11 case studies.* Northeast Regional Center for Rural Development. https://dyson.cornell.edu/wp-content/uploads/sites/5/2019/02/Cornell-Dyson-eb1802.pdf

Parks, C. A., Nugent, N. B., Fleischhacker, S. E., & Yaroch, A. L. (2020). *Food system workers are the unexpected but under protected COVID heroes. The Journal of Nutrition*, *150*(8), 2006–2008. https://doi.org/10.1093/jn/nxaa173

Parsonson-Ensor, C., & Saunders, C. M. (2011). *Exploratory research into the resilience of farming systems during periods of hardship* [Conference paper]. New Zealand Agricultural and Resource Economics Society Conference, Nelson, New Zealand. https://researcharchive.

lincoln.ac.nz/bitstream/handle/10182/5169/Exploring_resilience_farming.pdf?sequence=1&isAllowed=y

Partner Community Capital. (n.d.) WV local food value chains initiative. https://partnercap.org/special-programs/value-chain-cluster-initiative/

Partridge, M.D. & Clark. J. (2008). *Our joint future: Rural-urban interdependence in 21st century Ohio.* White paper prepared for the Brookings Institute.

Pastor, M. Jr., Drier, P., Grigsby J.E. III, & Lopez-Garza, M. (2000). *Regions that work*: *How cities and suburbs can grow together.* University of Minnesota Press.

Penniman, L. (2018). *Farming while black: Soul Fire Farm's practical guide to liberation on the land.* Chelsea Green Publishing.

Penn State College of Agricultural Sciences. (n.d.). *Enhancing Food Security in the Northeast.* https://agsci.psu.edu/research/food-security

Penn's Northeast (2016). *Scranton/Wilkes-Barre/Hazleton MSA best for food processing in Northeast U.S.* July 6, 2016. https://pennsnortheast.com/news_media/article/scranton-wilkes-barre-best-in-northeast-u.s.-for-food-processing

Penn State Extension. (2020). *List of co-packers in Pennsylvania and beyond.* https://extension.psu.edu/list-of-co-packers-in-pennsylvania-and-beyond

Perdue, T. (n.d.). *Period 4: 1800-1848, Indian removal*: *AP US history study guide.* The Gilder Lehrman Institute of American History. https://ap.gilderlehrman.org/essay/indian-removal

Peters, C. (2021*). Improving vitality, sustainability and value-added processing by animal food systems in the New England states in a manner that enhances nutrition and public health. Project No. 8090-44530-001-000-D.* USDA, Agriculture Research Service, Food Systems Research Unit. https://www.ars.usda.gov/research/programs-projects/project/?accnNo=440167

Peters, C. J., Wilkins, J. L., & Fick G. W. (2007). Testing a complete-diet model for estimating the land resource requirements of food consumption and agricultural carrying capacity: The New York state example. *Renewable Agriculture and Food Systems, 22*(2), 145-153. https://doi.org/10.1017/S1742170507001767

Peters, C. J., Bills, N. L., Wilkins, J. L., & Fick, G. W. (2008). Foodshed analysis and its relevance to sustainability. *Renewable Agriculture and Food systems, 24*(1), 1-7. https://doi.org/10.1017/S1742170508002433

Peters, C.J., Bills, N. L., Lembo, A. J., & Wilkins, J. L. (2009). Mapping potential foodsheds in NY State: A spatial model for evaluating the capacity to localize food production. *Renewable Agriculture and Food Systems 24*(1), 72-84. https://doi.org/10.1017/S1742170508002457

Peters, C. J., Gomez, M. I., & Griffin, T. (2019). Roles of regional production in a global food system. *Renewable Agriculture and Food Systems, First View,* 1-11. https://doi.org/10.1017/S1742170519000401

Phillips, R., & Wallace, D. (2017). *Financing local regional sustainable food enterprises: A matter of national security.* In Harvesting opportunity: The power of regional food system investments to transform communities. Federal Reserve Bank of St. Louis. https://www.stlouisfed.org/community-development/publications/harvesting-opportunity

Pirog, R. S., Van Pelt, T., Enshayan, K., & Cook, E. (2001). *Food, fuel, and freeways: An Iowa perspective on how far food travels, fuel usage, and greenhouse gas emissions.* Leopold Center Pubs and Papers. http://lib.dr.iastate.edu/leopold_pubspapers/3

Pirog, R. (Ed). (2013). *Economic impacts of local and regional food systems: Response to questions from May 13, 2013 webinar.* Michigan State University Center for Regional Food Systems. https://www.canr.msu.edu/foodsystems/uploads/files/econ-analysis-webinar-q-a.pdf

Pollan, M. (2009, September 10). Big food vs. big insurance [Op-Ed]. *The New York Times.* https://www.nytimes.com/2009/09/10/opinion/10pollan.html

Pollan, M. (2008, October 9). An open letter to the next farmer in chief. *The New York Times Magazine, The Food Issue* https://www.nytimes.com/2008/10/12/magazine/12policy-t.html

Pothukuchi, K, & Kaufman, J. L. (2000). The food system: A stranger to the planning field. *Journal of the American Planning Association, 66*(2), 113-124. https://doi.org/10.1080/01944360008976093

Precious, C., Abousleman, F. & Warnock, P. (2016). COG's role in Oregon's food system: How Councils of Government can support regional food systems growth. Oregon Cascades West Council of Governments. http://www.ocwcog.org/wp-content/uploads/2017/01/OCWCOGs-Role-in-OR-Food-Systems-113016.pdf

Rahe, M. L., Van Dis, K., & Gwin, L. (2018). Communicating economic impact assessments: How research results influence decision-maker attitudes toward the local food sector. *Journal of Agriculture, Food, Systems, and Community Development, 8* (Suppl.3), 95-105. https://doi.org/10.5304/jafscd.2019.08C.004

Raja, S. (2020). Planning and pandemics COVID 19 illuminates why urban planners should have listened to food advocates all along. *Agriculture and Human Values, 37,* 553–554. https://doi.org/10.1007/s10460-020-10090-0

Rangarajan, A. & Riordan, M. [Cornell SIPS]. (2016, October 19). *The promise of urban agriculture* [Video]. YouTube. https://www.youtube.com/watch?v=T8XwcKqZ8OI&feature=youtu.be).

Redman, R. (2018). Ahold Delhaize USA makes Giant investment: Mid-Atlantic chain kicks off $175 million major store upgrade plan. *Supermarket News*. https://www.supermarketnews.com/retail-financial/ahold-delhaize-usa-makes-giant-investment

Regional. (n.d.). In *Dictionary.com*. Retrieved March, 4, 2020 from https://www.dictionary.com/browse/regional?s=t

Regional Greenhouse Gas Initiative. (2020). *An initiative of Eastern states of the U.S*. https://www.rggi.org/

Regional Plan Association. (2006). *America 2050: A prospectus*. Regional Plan Association. https://s3.us-east-1.amazonaws.com/rpa-org/pdfs/2050-Prospectus.pdf

Regional Plan Association. (2017). *The fourth regional plan: Making the region work for all of us*. https://rpa.org/work/reports/the-fourth-regional-plan

Reichl, R. (2020, August-September). The changing American table. *AARP the Magazine*.

Renee, A. (2018). What "local" actually means at the grocery store. *abc10.com*. https://www.abc10.com/article/news/what-local-actually-means-at-the-grocery-store/103-545391791

Rickard, D. (2019). *Top 3 challenges in modern food distribution*. Food logistics. https://www.foodlogistics.com/software-technology/blog/21066236/top-three-challenges-in-modern-food-distribution

Riensche, B., & Jakhar, A.V. (2019). *Here's how we can use agriculture to fight climate change*. World Economic Forum. https://www.weforum.org/agenda/2019/09/here-s-how-we-can-use-agriculture-to-fight-climate-change/

Rios, E. (2019). *4 examples of carrying capacity: When a population hits its limits*. Population Education. https://populationeducation.org/4-examples-of-carrying-capacity-when-a-population-hits-its-limit/

Rittner, T., Rowland, A. & Miller, A. (2019). *CDFA food finance white paper series: Food systems and development finance*. Council of Development and Finance Agencies. https://data.greaterpeoria.us/wp-content/uploads/2019/07/Food-Systems-Development-Finance.pdf

The Rockefeller Foundation. (2020). *Reset the table: Meeting the moment to transform the U.S. food system*. https://www.rockefellerfoundation.org/wp-content/uploads/2020/07/RF-Reset-the-Table-FULL-PAPER_July-28_FINAL.pdf

Rodin, J. (2011). *The resilience dividend: Being strong in a world where things go wrong*. United States: PublicAffairs.

Roep, D., and Wiskerke, J.S.C. (2010). On governance, embedding and marketing: Reflections on the construction of alternative sustainable food networks. *J. Agric. Environ. Ethics* (2012:205-221). https://doi.10.1007/s10806-010-9286-y

Rosenberg, N., & Stucki, B. W. (2019). *How USDA distorted data to conceal decades of discrimination against black farmers*. The Counter. https://thecounter.org/usda-black-farmers-discrimination-tom-vilsack-reparations-civil-rights/

Rossi, J. D., Johnson, T. G., & Hendrickson, M. (2017). The economic impacts of local and conventional food sales. *Journal of Agriculture and Applied Economics, 49*(4), 555-570. https://doi.org/10.1017/aae.2017.14

Rothstein, M. (1990, April 15). Round five for a theatrical heavyweight. *The New York Times*, sec. 2, 1, 8.

Rowe, J. (2016). *Food justice definitions*. Oregon Tilth. https://tilth.org/stories/food-justice-definitions/

Rowley, L.G. (2020). *The Lugar Center issues report on public agriculture research: U.S. can't catch up by slowing down*. The Lugar Center. September 28, 2020.

Rozyne, M. (2018). *What are we collaborating for? Presentation to the National Good Food Network Conference*. Albuquerque, NM. Unpublished.

Ruhf, K. (1998). *Getting organized*. White Papers. Northeast Sustainable Agriculture Working Group. Unpublished.

Ruhf, K. (2015). Regionalism: A New England recipe for a resilient food system. *Journal of Environmental Studies and Sciences, 5,* 650-660. https://doi.org/10.1007/s13412-015-0324-y

Ruhf, K. (2019). *Developing and strengthening farm link programs: A guide for practitioners and advocates*. Land for Good. https://landforgood.org/wp-content/uploads/LFG-Farm-Link-Guide-Developing-and-Strengthening-Farm-Link-Programs.pdf

Ruhf, K. & Clancy, K. (2010.) *It takes a region… Exploring a regional food systems approach: A working paper*. Northeast Sustainable Agriculture Working Group. https://nesawg.org/sites/default/files/NESAWGRegionalFoodSystemFINALSept2010.pdf

Ruhf, K. Z., Devlin, K., Clancy, K., Berlin, L., & Palmer, A. (2017). Engaging multiple audiences: Challenges and strategies in complex food systems projects. *Journal of Agriculture, Food Systems, and Community Development*, *7*(4), 179–185. https://doi.org/10.5304/jafscd.2017.074.016

Runkle, E. (2019). Crops suitable for vertical farming. Michigan State University Extension. https://www.canr.msu.edu/floriculture/uploads/files/crops%20for%20indoor%20farming.pdf

Rushing, J., & Ruehle, J. (2013). *Buying into the local food movement.* Cited in Pirog, R., Miller, C., Way, L., Hazekamp, C., & Kim, E. 2014. The local food movement: Setting the stage for good food. MSU Center for Regional Food Systems. https://www.canr.msu.edu/foodsystems/uploads/files/Local_Food_Movement.pdf

Saberi, H. (2016). *Stuck in the middle with you: Peri-urban areas and the food system*. Center for a livable future. http://livablefutureblog.com/2016/05/stuck-in-the-middle-with-you-peri-urban-areas-and-the-food-system

Sacramento Area Council of Governments, Centers of excellence, Los Rios Community College District, & Valley Vision. (2016). *Food and agriculture: Cluster and workforce needs assessment- Sacramento capital region.* Chancellor's Office California Community Colleges & Economic and Workforce Development Program. https://www.sacog.org/sites/main/files/file-attachments/coe-los_rios_food_and_ag-web.pdf?1475533319

Saitone, T. L., & Sexton, R. J. (2017). Concentration and consolidation in the U.S. food supply chain: The latest evidence and implications for consumers, farmers, and policymakers. *Economic Review (Kansas City), 102*(special issue), 25-59. https://www.kansascityfed.org/~/media/files/publicat/econrev/econrevarchive/2017/si17saitonesexton.pdf

Santo, R., Palmer, A., & Kim, B. (2016). *Vacant lots to vibrant plots: A review of the benefits and limitations of urban agriculture*. Johns Hopkins Center for a Livable Future.

Schipanski, M., Macdonald, G., Rosenzweig, S., Chappell, J. M., Bennett, E., Kerr, R. B., Blesh, J., Crews, T., Drinkwater, L., Lundgren, J., & Schnarr, C. (2016). Realizing resilient food systems. *BioScience, 66*(7). 600-610. https://doi.org/10.1093/biosci/biw052

Schlecht, J. (2021). Collin Peterson, Bill Northey plan Midwest coalition on agriculture to unite region's ag voices. *AgWeek*. https://www.agweek.com/news/government-and-politics/7195645-Collin-Peterson-Bill-Northey-plan-Midwest-Coalition-on-Agriculture-to-unite-regions-ag-voices

Schmit, T. M., Severson, R. M., Strzok, J., & Barros, J. (2019). Improving economic contribution analyses of local agriculture systems: Lessons from a study of the New York apple industry. *Journal of Agriculture, Food Systems, and Community Development, 8*(Suppl.3), 37-51. https://doi.org/10.5304/jafscd.2019.08C.009

Schonhart, M., Penker, M., & Schmid, E. (2009). Sustainable local food production and consumption: Challenges for implementation and research. *Outlook on Agriculture, 38*(2), 175-182. https://doi.org/10.5367/000000009788632313

Seidman, K. F. (2005). *Economic development finance.* Thousand Oaks: Sage Publications.

Selfa, T. & Qazi, J. (2005). Place, taste, or face-to-face? Understanding producer-consumer networks on "local" food systems in Washington State. *Agriculture and Human Values, 22*(4), 451-464. https://doi.org/10.1007/s10460-005-3401-0

Settembre, J. (2019). *People are willing pay a hefty premium for 'locally sourced' food, but sometimes it's made thousands of miles away*. Market Watch.

Sexton, R. J. (2000). Industrialization and consolidation in the U.S. food sector: Implications for competition and welfare. *American Journal of Agricultural Economics, 82*(5), 1087-1104. https://doi.org/10.1111/0002-9092.00106

Sheng, Y. K. (n.d.). *What is good governance?* United Nations Economic and Social Commission for Asia and the Pacific. https://www.unescap.org/sites/default/files/good-governance.pdf

Shideler, D. Bauman, A., Thilmany, D., & Jablonski, B. B. R. (2018). Putting local food dollars to work: The economic benefits of local food dollars to workers, farm and communities. *Choices, Agriculture & Applied Economics Association, 33(3).*

Shideler, D., & Watson, P. (2019). Making change through local food production: Calculating the economic impact of your local food project. *Journal of Agriculture, Food Systems, and Community Development, 8*(Suppl.3), 165-177. https://doi.org/10.5304/jafscd.2019.08C.011

Skelcher, C. (2004). Jurisdictional integrity, polycentrism, and the design of democratic governance. *Governance, 18*(1), 233-287. http://doi.org/10.1111/j.1468-0491.2004.00267.x

Shabazian, D., Ballard-Rosa, G., Holmqvist, A., & Ormiston. (2016). Food systems multipliers for specialty crops: Executive summary. Sacramento Council of Governments. https://www.sacog.org/sites/main/files/file-attachments/executive_summary_webdisplay.pdf

Shields, D. (2010). *Consolidation and concentration in the U.S. dairy industry*. Congressional Research Service. http://www.nationalaglawcenter.org/wp-content/uploads/assets/crs/R41224.pdf

Sorensen, A. A., Freedgood, J., Dempsey, J. & Theobald, D. M. (2018). *Farms under threat: The state of America's farmland.* American Farmland Trust.

Soul Fire Farm (2021). *Reparations*. https://www.soulfirefarm.org/get-involved/reparations/

Stanger, T. (2019). The brave new world of grocery shopping. Consumer Reports. https://www.consumerreports.org/grocery-stores-supermarkets/the-brave-new-world-of-grocery-shopping/

Stanton, B.F. & Weaver, T.F. (1979). *Leadership from the Northeast on food and agriculture policy.* https://ecommons.cornell.edu/xmlui/bitstream/handle/1813/68085/Cornell-Dyson-sp7907.pdf?sequence=1

Statista Research Department. (2016*). Factors influencing U.S. consumers' food and beverage purchases 2012-2016*. Statista. https://www.statista.com/statistics/245005/factors-influencing-purchase-of-food-and-beverages/

Steurer, R. (2009). *Sustainable development as governance reform agenda: An aggregation of distinguished challenges for policy-making*. http://dx.doi.org/10.2139/ssrn.2342103

Stevenson, G. W., Ruhf, K., Lezberg, S. & Clancy, K. (2007*). Warrior, builder and weaver work: Strategies for changing the food system.* In Remaking the North American food system. C. C. Hinrichs & T. A. Lyson, (Eds). University of Nebraska Press.

Stevenson, G.W., & Pirog, R. (2008) *Values-based supply chains: Strategies for agrifood enterprises of the middle.* In Lyson, T. A., Stevenson, G. W., & Welsh, R. (Eds.). (2008). Food and the Mid-level farm: Renewing an agriculture of the middle, 119-143. MIT Press.

Stevenson, G. W., Clancy, K., Kirschenmann, F., & Ruhf, K. (2014). Agriculture of the middle. (Thompson, I.N., Kaplan P.B., & Kaplan, D.M., Eds.). *Encyclopedia of Food and Agricultural Ethics*. Springer Science + Business Media. http://agofthemiddle.org/wp-content/uploads/2015/05/AOTM-Encyclopedia-of-Food.pdf

Storton, M. & Astone, J. (2019). Foundations can unlock a food system to feed the world. *Stanford Social Innovation Review.* https://ssir.org/articles/entry/foundations_can_unlock_a_food_system_to_feed_the_world#

Strainchamps, A. (Interviewer) & Anderson L. H. (Interviewee). (2016). *Reckoning with slavery's imprint on American life* [Interview transcript]. To The Best of Our Knowledge. https://www.ttbook.org/interview/reckoning-slaverys-imprint-american-life

Stroink, M. L., & Nelson, C. H. (2013). Complexity and food hubs: Five case studies from Northern Ontario. *Local Environment*, *18*(5), 620-635. DOI:10.1080/13549839.2013.798635#.UbyVq_ZAR14

Suchan, T. A., Perry, M. J., Fitzsimmons, J. D., Juhn, A .E., Tait, A. M., & Brewer, C. A. (2007). Chapter 2, population distribution. In *Census atlas of the United States*. U.S. Census Bureau.

Sukhdev, P. (2018). Smarter metrics will help fix our food system. *Nature* V. 558.

Sustainable Agriculture Education & American Farmland Trust. (2017). *The bay area food economy: Existing conditions and strategies for resilience.* California Coastal Conservancy, San Francisco Bay Area Program. https://abag.ca.gov/sites/default/files/ba_food_economy_white_paper_final.pdf

Swenson, D. (2010*). Selected measures of the economic values of increased fruit and vegetable production and consumption in the upper Midwest*. Leopold Center Pubs and Papers 68. https://lib.dr.iastate.edu/leopold_pubspapers/68

Swenson, D. (2011). *The regional economic development potential and constraints to local foods development in the Midwest*. Staff General Research Papers Archive 32697. Iowa State University, Department of Economics http://www2.econ.iastate.edu/papers/p12697-2011-03-30.pdf

Tagtow A., & Roberts S. (2011*). Cultivating resilience: A food system blueprint that advances the health of Iowans, farms and communities*. Iowa Food Systems Council. https://www.farmlandinfo.org/sites/default/files/Cultivating_Resilience_Iowa_Blueprint1.pdf

Takahashi, B., Burnham, M., Terracina-Hartman, C., Sopchak, A. R., & Selfa, T. (2016). Climate change perceptions of NY state farmers: The role of risk perception and adaptive capacity. *Environmental Management, 58*, 946-957. https://doi.org/10.1007/s00267-016-0742-y

Tavernia, B. G., Nelson, M. D., Goerndt, M. E., Walters, B., F., & Toney, C. (2013). Changes in forest habitat classes under alternative climate and land-use change scenarios in the Northeast and Midwest, USA. *Mathematical and Computational Forestry & Natural Resources Sciences, 5(2),* 135-150. https://www.fs.fed.us/nrs/pubs/jrnl/2013/nrs_2013_Tavernia_002.pdf

Tendall, D. M., Joerin, J., Kopainsky, B., Edwards, P., Shreck, A., Le, Q. B., Kruetli, P., Grant, M., & Six, J. (2015). Food system resilience: Defining the concept. *Global Food Security*, *6*, 17-23. http://dx.doi.org/10.1016/j.gfs.2015.08.001

Thilmany McFadden, D. (2015). What do we mean by "local foods"? Choices. Q1,pp 30-31. Agricultural & Applied Economics Association. https://www.jstor.org/stable/choices.30.1.02

Thomas A. Lyson Center for Civic Agriculture and Food Systems. (2019). Proceeding from the plant-based food systems conference. *Journal of Agriculture, Food Systems, and Community Development, 9*(A). https://doi.org/10.5304/jafscd.2019.09A.004

Thread Fund. (2019). *About us: Utilizing multiple forms of capital to generate social and environmental returns.* http://www.threadfund.org/about.html

Timmons, D., Wang, Q., & Lass, D. (2008). Local foods: Estimating capacity. *Journal of Extension, 46(5).* http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.535.6431&rep=rep1&type=pdf

Touzeau, L. (2019). "Being stewards of the land is our legacy": Exploring the lived experiences of young black farmers. *Journal of Agriculture, Food Systems, and Community Development 8*(4), 45-60. https://doi.org/10.5304/jafscd.2019.084.007

Tropp, D. (2018, May 31). *U.S. food consumption trends and their relationship to local food demand* [PowerPoint slides]. U.S. Department of Agriculture, Agricultural Marketing Services Division. https://www.douglas.k-state.edu/docs/communitydevelopment/Debra%20Trop%20Keynote%20Presentation%20May%2031%202018.pptx.pdf

Turenne, J. (2009). Sustainability in food service. In C. J. Baldwin (Ed.), *Sustainability in the food industry*. https://books.google.com/books?id=mDDiHh-PUoC&pg=PA228&lpg=PA228&dq=food+procurement+tiered+ranking&source=bl&ots=fmfgjLh7gL&sig=ACfU3U22pb0SwaN43SW8X9n3BvjmsTnc9Q&hl=en&sa=X&ved=2ahUKEwjp9bHf_Z_qAhXKGM0KHeKtCu4Q6AEwAHoECAoQAQ#v=onepage&q=food%20procurement%20tiered%20ranking&f=false

UC Davis. (2020). *Inter-institutional Network for Food, Agriculture and Sustainability.* Agricultural Sustainability Institute. https://asi.ucdavis.edu/programs/infas

Union of Concerned Scientists. (2018). *50-State food system scorecard.* https://www.ucsusa.org/resources/50-state-food-system-scorecard

University of Vermont. (2021). *Leahy secures and announces $11 million to support the Food Systems Research Center at UVM.* https://www.uvm.edu/news/story/leahy-secures-and-announces-11-million-support-food-systems-research-center-uvm

Upstander Project. (n.d.) *Doctrine of discovery*. https://upstanderproject.org/firstlight/doctrine

U.S. Census Bureau. (n.d.). *Income and Poverty*. Retrieved 2018 from https://www.census.gov/topics/income-poverty.html

U.S. Census Bureau. (2020). *Delineating metropolitan and micropolitan statistical areas.* https://www.census.gov/programs-surveys/metro-micro/about.html

U.S. Census Bureau. (2019). *QuickFacts*. https://www.census.gov/quickfacts/US

U.S. Cluster Mapping Project. (2018a). *Food processing and manufacturing. Establishments growth rate in food cluster by economic area 1998-2018*. Institute for Strategy and Competitiveness, Harvard Business School.

U.S. Cluster Mapping Project. (2018b). *Food processing and manufacturing: Specialization in food cluster by economic area, 1998-2018*. Institute for Strategy and Competitiveness, Harvard Business School.

U.S. Department of Agriculture [USDA]. (n.d.) *Farm to institution initiatives.* https://www.usda.gov/sites/default/files/documents/6-Farmtoinstitution.pdf

USDA. (2012). *Know your farmer, know your food, compass.* https://www.usda.gov/sites/default/files/documents/KYFCompass.pdf

USDA. (2018). *Summary report: 2015 national resources inventory*. Natural Resources Conservation Service, and Center for Survey Statistics and Methodology, Iowa State University. https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcseprd1422028.pdf

USDA (July 9, 2021). *USDA announces $500 million for expanded meat and poultry processing capacity as part of efforts to increase competition, level the playing field for family farmers and ranchers, and build a better food system* [Press release No. 0154.21]. USDA Press. https://www.usda.gov/media/press-releases/2021/07/09/usda-announces-500-million-expanded-meat-poultry-processing

USDA, Agricultural Marketing Service [AMS]. (n.d.). *Regional food systems partnerships.* https://www.ams.usda.gov/services/grants/rfsp

USDA AMS. (2016). *The economics of local food systems: A toolkit to guide community discussions, assessments and choices*. U.S. Department of Agriculture. https://www.ams.usda.gov/publications/content/economics-local-food-systems-toolkit-guide-community-discussions-assessments

USDA AMS. (2017). *Local food promotion program: Fiscal year 2017 request for applications.* U. S. Department of Agriculture. https://www.ams.usda.gov/sites/default/files/media/2017_LFPP_RFA_Final_12142016.pdf

USDA AMS (2019). *Local food directories: Food hub directory.* U. S. Department of Agriculture. https://www.a ms.usda.gov/local-food-directories/foodhubs

USDA AMS. (2020). *Regional food system partnerships: Fiscal year 2020 request for applications, 4,* 23. U. S. Department of Agriculture. https://www.ams.usda.gov/sites/default/files/media/2020_RFSP_RFA.pdf

USDA AMS. (2021). *Local systems response to COVID.* https://lfscovid.localfoodeconomics.com/

USDA, Agricultural Research Service [ARS]. (2009). In the eastern United States: A multi-faceted focus on farms and food. *Agricultural Research, 57*(8), 4-6. https://agresearchmag.ars.usda.gov/ar/archive/2009/sep/farms0909.pdf

USDA ARS. (n.d.) Food systems research unit: Burlington, VT. https://www.ars.usda.gov/northeast-area/burlington-vermont/food-systems-research-unit/

USDA, Climate Hubs. (n.d.) *Climate risks in the Northeast.* U. S. Department of Agriculture. https://www.climatehubs.usda.gov/hubs/northeast/topic/climate-risks-northeast

USDA, Economic Research Service [ERS]. (n.d.). *Farming and farm income.* U. S. Department of Agriculture. https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/farming-and-farm-income/

USDA ERS. (n.d.). *Farm structure.* U. S. Department of Agriculture. https://www.ers.usda.gov/topics/farm-economy/farm-structure-and-organization/farm-structure/

USDA ERS. (2013). *Beginning farmers and ranchers at a glance*: [Economic brief no. 22]. U. S. Department of Agriculture. https://www.ers.usda.gov/webdocs/publications/42874/34829_eb-22.pdf?v=0

USDA ERS. (2015). *Farming-dependent counties, 2015 edition.* U. S. Department of Agriculture. https://www.ers.usda.gov/webdocs/charts/62736/farmingdependent.png?v=4186.4

USDA ERS. (2015, January). Trends in U.S. local and regional food systems: Report to Congress. ERS Administrative Publication No. 068. https://www.ers.usda.gov/webdocs/publications/42805/51173_ap068.pdf

USDA ERS. (2019a). *Urban influence codes.* U. S. Department of Agriculture. https://www.ers.usda.gov/data-products/urban-influence-codes/

USDA ERS. (2019b). *Wholesaling.* U. S. Department of Agriculture. https://www.ers.usda.gov/topics/food-markets-prices/retailing-wholesaling/wholesaling

USDA ERS. (2020a). *Documentation: Overview of surveys.* U. S. Department of Agriculture. www.ers.usda.gov/data-products/food-security-in-the-united-states/documentation

USDA ERS. (2020b). *Farm labor.* U. S. Department of Agriculture. https://www.ers.usda.gov/topics/farm-economy/farm-labor/#size

USDA ERS. (2021). Farm structure: Classifying diverse farms. U. S. Department of Agriculture. https://www.ers.usda.gov/topics/farm-economy/farm-structure-and-organization/farm-structure/

USDA, Food and Nutrition Service. (2018). *Food buying guide for child nutrition programs*. U. S. Department of Agriculture. https://www.fns.usda.gov/tn/food-buying-guide-for-child-nutrition-programs

USDA, National Agricultural Statistics Service [NASS]. (2012). *Census of Agriculture.* U. S. Department of Agriculture. https://www.nass.usda.gov/Publications/Highlights/2014/Farm_Demographics/index.php

USDA NASS. (2017). *Census of Agriculture.* U. S. Department of Agriculture. https://www.nass.usda.gov/Publications/AgCensus/2017/index.php

USDA NASS. (2013). *Census of aquaculture.* U. S. Department of Agriculture. https://www.nass.usda.gov/Publications/AgCensus/2012/Online_Resources/Aquaculture/introduction.pdf

USDA NASS. (2014) 2014 Tenure, ownership and transition of agricultural land. U. S. Department of Agriculture. https://www.nass.usda.gov/Publications/AgCensus/2012/Online_Resources/TOTAL/index.php

USDA NASS. (2017a). *Census of agriculture.* U. S. Department of Agriculture. https://www.nass.usda.gov/Publications/AgCensus/2017/index.php

USDA NASS. (2017b). *Hired farm labor: Workers and payroll.* Census of Agriculture. State Data. U.S. Department of Agriculture. https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_2_US_State_Level/st99_2_0007_0007.pdf

USDA NASS. (2021). *Family farms*. Census of Agriculture, highlights. U. S. Department of Agriculture. http://www.nass.usda.gov/AgCensus

USDA, NASS. (2018). *Land values 2018 summary*. U. S. Department of Agriculture. https://www.nass.usda.gov/Publications/Todays_Reports/reports/land0818.pdf

USDA, National eXtension Project Team. (2020). *Community, local & regional food systems.* https://foodsystems.extension.org/

USDA, National Institute of Food and Agriculture. (2000). *Administrative guidance for multistate extension activities and integrated research and extension activities.* Federal Register. https://nifa.usda.gov/sites/default/files/resource/Administrative%20Guidance%20for%20Multistate%20Extension%20Activities%20and%20Integrated%20Research%20and%20Extension%20Activities_0.pdf

USDA, Natural Resources Conservation Service. (2021). *USDA investing $75 million in partner-led project with focus on climate-smart ag, equity in program delivery.* https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/newsroom/releases/?cid=nrcsprd182958

USDA, Office of Community Food Systems. (2017). *Geographic preference: What it is and how to use it.* U. S. Department of Agriculture. https://fnsprod.azureedge.net/sites/default/files/f2s/GeoPreference.pdf

USDA, Office of the Chief Scientist & U.S. Department of Energy, Bioenergy Technologies Office. (2019). *Research and development potentials in indoor agriculture and sustainable urban ecosystems.* U. S. Department of Agriculture. https://www.usda.gov/sites/default/files/documents/indoor-agriculture-workshop-report.pdf

USDA Press (2021). *USDA Announces $500 Million for expanded meat & poultry processing capacity as part of efforts to increase competition, level the playing field for family farmers and ranchers, and build a better food system.* Release No. 0154.21. July 9.

U.S. Environmental Protection Agency. (2021*). Inventory of U.S. greenhouse gas emissions and sinks, 1990-2019.* EPA 430-R-21-005.

U.S. Global Change Research Program. (2017). *Climate science special report: Fourth national climate assessment, Volume I.* (Wuebbles, D. J., Fahey, D. W., Hibbard, K. A., Dokken, D. J., Steward, B. C., & Maycock, T. K., eds.). doi:10.7930/J0J964J6.

U.S. Global Change Research Program. (2018). *Impacts, risks, and adaptation in the United States: Fourth national climate assessment, Volume II* (Reidmiller, D. R., Avery, C. W., Easterling, D.R., Kunkel, K. E., Lewis, K. L. M., Maycook, K. T. K., & B. C. Stewart, Eds). http://doi.org/10.7930/NCA4.2018

U.S. House of Representatives. (1990). *Food security in the United States.* Select Committee on Hunger, Committee Report. U.S. G.P.O.

Useful Community Development. (n.d.). *The definition of economic development is not obvious.* https://www.useful-community-development.org/definition-of-economic-development.html

Vaarst, M., Getz Escudero, A., Chappell, M. J., Brinkley, C., Nijbroek, R., Arraes, N. A. M., Andreasen, L., Gattinger, A., Almeida, G. F., Bossio, D., & Halberg, N. (2018). Exploring the concept of agroecological food systems in a city-region context. *Agroecology and Sustainable Food Systems, 42(6),* 686-711. http://doi.org/10.1080/21683565.2017.1365321

Valley, W., Anderson, M., Blackstone, N. T., Sterling, E., Betley, E., Akabas, S., Koch, P., Dring, C., Burke, J., & Spiller, K. (2020). Towards an equity competency model for sustainable food systems education programs. *Elementa: Science of the Anthropocene*, *8*(1), 33. http://doi.org/10.1525/elementa.428

Van Bers, C., Pahl-Wostl, C., Eakin, H., Ericksen, P., Lenaerts, L., Forch, W., Korhonen-Kurki, K., Methner, N., Jones, L., Vasileiou, I., & Erikson, S. (2016). *Transformation in governance towards resilient food systems*. CCAFS Working Paper no. 190. CGIR Research Program on Climate Change, Agriculture and Food Security (CCAFS). https://cgspace.cgiar.org/handle/10568/78293

Vaughan, B., Robinson, M.D., Zeigler, A., Hunter, G.X., Wall, G., & Brown, J. (2017). The small farmer-Tuskegee University-Walmart project: Observations of the steps within commercial supply. *Professional Agricultural Workers Journal*. Vol 4: No. 2, 5. Http://tuspubs.tuskegee.edu/pawj/vol4/iss2.5.

Ventura, S. & Bailkey, M. (2017). *Good food, strong communities: Promoting social justice through local and regional food systems*. University of Iowa Press.

Vermont Sustainable Jobs Fund. (2020). *Farm to plate: Strengthening Vermont's food system*. https://www.vtfarmtoplate.com/features/vermont-local-planning-food-access#.XrbM355KjIU

Wallis, A. (2002). *The new regionalism: Inventing governance structures for the early twenty-first century.* Retrieved August 23, 2011.

Wang, S.L., Nehring, R., & Williams, R. (2019). *Climate change likely to have uneven impacts on agricultural productivity.* Amber Waves. USDA Economic Research Service. August 12, 2019. https://www.ers.usda.gov/amber-waves/2019/august/climate-change-likely-to-have-uneven-impacts-on-agricultural-productivity/

Welch, C. (2017). *Organizing for success: Regional economic development*. International Economic Development Council.

Wells, J. (2017). *Growing pains: Why supermarkets are struggling to source local products.* Grocery Dive. https://www.grocerydive.com/news/grocery--grocery-source-local-vegetables-fruit-produce/535172/

Werner, S., Lemos, S. R. Jr., McLeod, A., Halstead, J. M., Gabe, T., Huang, J., Liang, C. L., Shi, W., Harris, L., & McCannon, J. (2019). Prospects for New England agriculture: Farm to fork. *Agriculture and Resource Economics Review, 48(3),* 473-504. https://doi.org/10.1017/age.2019.33

Whitt, C. Todd, J.E., & MacDonald, J. M. (December 2020). *America's diverse family farms: 2020 edition.* Economic information bulletin No. (EIB-220) 30pp. Economic Research Service. U.S. Department of Agriculture. https://www.ers.usda.gov/publications/pub-details/?pubid=100011

Whole Foods Market. *Locally grown, raised and produced.* http://www.wholefoodsmarket.com/about-local

Wiens, J. & Bachelet, D. (2010). Matching the multiple scales of conservation with the multiple scales of climate change. *Conservation Biology 24(1),* 51-62. http://doi.org/10.111/j.1523-1739.2009.01409.x

Wills, K. (2017). *What is food systems planning?* Michigan State University Extension. https://www.canr.msu.edu/news/what_is_food_systems_planning

Wires, K. N., & LaRose, J. (2019). Sogorea Te' land trust empowers indigenous food sovereignty in the San Francisco bay area. *Journal of Agriculture, Food Systems, and Community Development, 9*(B), 31-34. https://doi.org/10.5304/jafscd.2019.09B.003

Witzling, L., Shaw, B., & Trechtrer, D. (2016). *Wisconsin consumers and local food: Public opinion, trends and marketing recommendations*. University of Wisconsin-Extension. https://assets.documentcloud.org/documents/2939928/Wisconsin-Consumers-and-Local-Food-May-2016.pdf

Wolfe, D., DeGaetano, A., Peck, G., Carey, M., Ziska, L., Lea-Cox, J., Kemanian, A., Hoffman, M., & Hollinger, D. (2018). Unique challenges and opportunities for northeastern US crop production in a changing climate. *Climatic Change, 146*. 231-245. http://doi.org/10.1007/s10584-017-2109-7

Wolman, H., Levy, A., & Hincapie, D. (2011). Chapter VII: Government and Governance https://gwipp.gwu.edu/sites/g/files/zaxdzs2181/f/downloads/Working_Paper_044_Governance.pdf

World Population Review. (2021a). *Whitest states 2021*. https://worldpopulationreview.com/states/whitest-states/

World Population Review. (2021b). Native American population 2021. https://worldpopulationreview.com/state-rankings/native-american-population

Wong, J., & Schuchard, R. (2011). Adapting to climate change: A guide for food, beverage and agriculture companies. *Business for Social Responsibility*. http://dpanther.fiu.edu/sobek/FI13022721/00001

Worstell, J. & Green, J. (2017). Eight qualities of resilient food systems: Toward a sustainability/resilience index. Journal of Agriculture, Food Systems, and Community Development, 7(3), 23–41. http://dx.doi.org/10.5304/jafscd.2017.073.001

Yeh, D., Nishi, I., & Gomez, M.I. (2017). *A supply chain of impacts of vegetable demand growth: The case of cabbage in the U.S*. A working paper. Charles H. Dyson School of Applied Economics and Management, Cornell University.

Zhang, Wei; Gowdy, John; Bassi, Andrea M.; Santamaria, Marta; DeClerck, Fabrice; Adegboyega, Adebiyi; Andersson, Georg K. S.; Augustyn, Anna Maria; Bawden, Richard; Bell, Andrew; Darnhofer, Ika; Dearing, John; Dyke, James; Failler, Pierre; Galetto, Leonardo; Hernandez, Carlos Calvo; Johnson, Pierre; Jones, Sarah K.; Kleppel, Gary; Komarek, Adam M.; Latawiec, Agnieszka; Mateus, Ricardo; McVittie, Alistair; Ortega, Enrique; Phelps, David; Ringler, Claudia; Sangha, Kamaljit K.; Schaafsma, Marije; Scherr, Sara; Hossain, Md Sarwar; Thorn, Jessica P. R.; Tyack, Nicholas; Vaessen, Tim; Viglizzo, Ernesto; Walker, Dominic; Willemen, Louise; and Wood, Sylvia L. R. (2018). *Systems thinking: An approach for understanding 'eco-agri-food systems'*. In TEEB for Agriculture & Food: Scientific and Economic Foundations. Chapter 2 Pp. 17-55. Geneva: UN Environment. http://teebweb.org/wp-content/uploads/2018/11/Ch2.pdf

Zulauf C. & Brown, B. (2019). *Cover crops, 2017 US census of agriculture*. Farmdoc daily (9); 135. Department of Agriculture and Consumer Economics, University of Illinois at Urbana Champaign, July 24, 2019. https://farmdocdaily.illinois.edu/2019/07/cover-crops-2017-us-census-of-agriculture.html

Zumkehr, A. & Campbell, J. E. (2015). The potential for local croplands to meet US food demand. *The Ecological Society of America, 13*(5), 244-248. https://doi.org/10.1890/140246

Zurek, M., Hebinck, A., Leip, A., Vervoort, J., Kuiper, M., Garrone, M., Havlik, P., Heckelei, T., Hornbort, S., Ingram, J., Kuijsten, A., Shutes, L., Geleijnse, J.M., Terluin, I., Van't Veer, P., Wijnands, J., Zommermann, A., & Achterbosch, T. (2018). Assessing sustainable food and nutrition security of the EU food system—an integrated approach. *Sustainability,* 10, 4271. Doi:10.3390/su10114271.

Are We Being Served?

A Tool for Regional Food and Farm Policy Evaluation

This checklist has been adapted from a tool developed in 2006 by the **Northeast Ag Works!** project, a region-wide NESAWG collaboration to propose, promote and support public policies that sustain and foster our region's agriculture and food system. At the time, NESAWG and its project colleagues believed that giving greater voice to regional issues and needs would ensure more equitable and responsive state and federal policies and programs.

The purpose of this checklist is to assess how a policy serves a particular region. Use it to evaluate policy proposals as well as existing policies – statutes, bills, programs, rules, regulations and directives.

Regionalism has emerged as a powerful principle in public policy. It is a framework that:

1. Responds to regional differences and needs; and
2. Encourages regional approaches and solutions.

A regionalist approach to public policy addresses appropriateness, flexibility and equity across regions. The assumption is that regions are different. *Good public policies must reflect and respond to regional differences.* They should not unfairly hurt, disadvantage or ignore certain regions or sectors within those regions.

In applying this tool, not every category or item will apply. This checklist is not exhaustive. It is meant to stimulate analysis about whether and how a policy is:

1. *Appropriate* for the region (or a sector of the region)
2. *Flexible* to respond to the region's unique characteristics and needs
3. *Equitable* – does it distribute resources *fairly*, not necessarily *equally*

1. Demographic and recipient characteristics

____ Do the policy's funding criteria depend on population numbers, number of program recipients, or demographics that would advantage or disadvantage our region? (e.g., formulas based on population versus rates of food insecurity)

____ Does the policy take into account regional differences in the cost of living? Should it? How? Are the differences addressed equitably? (e.g., Farmers' Market Nutrition Program)

2. Economic and community development

____ Is there support for where food production occurs in urban, peri-urban, and rural areas? In what ways might it disadvantage?

____ How does the policy define and address *rural* issues (e.g., rural county "out migration" versus suburban "in migration")?

____ Does the policy address region-specific barriers and opportunities for farm entry? (e.g., cost of land, access to training, succession planning assistance, credit, etc.)

____ Does the policy foster business structures and arrangements that are appropriate for our region? In what way(s)? (e.g., futures, farming contracts, cooperatives)

____ Does the policy seek to address gaps in agri-food infrastructure (e.g., regional processing, inspection and distribution)

____ Does the policy hinder or support purchasing of food and agriculture products within a locale or region?

3. Farm viability and markets

____ Are the program eligibility criteria and processes appropriate for our region's types and scale of farming?

____ How would this policy affect different agriculture sectors and their needs, *in our region*?

- New/beginning
- Limited resource
- Small/entrepreneurial
- Middle-size/family farms
- Large/specialized
- Exporters

____ Does the policy inappropriately bar or disadvantage certain types or sizes of farming operations? (e.g., eligibility criteria) How?

____ Would the policy support our region's comparative advantages, directly or indirectly? How? What is the supporting evidence?

____ Does the policy take into account regional differences in commodity and farm product prices? How? Are the differences addressed equitably?

____ Does a regional approach address interstate or intrastate commerce issues? How?

4. Natural Resources

____ How well suited is the scope of the policy's targeted resource, prescribed practices, assessment and eligibility criteria to our region's landscape and its needs? (e.g., soil benefits index in CSP, prescribed buffer practices for CREP)

____ How does the policy promote the flexibility needed to address local and regional natural resource priorities and concerns? (e.g., Chesapeake Bay, Lake Champlain)

____ Does the policy encourage, enable, or reward regional collaboration to address regional natural resource concerns? How?

____ Does the policy fairly and equitably regulate the natural resource issue it addresses across regions? How?

5. Production

____ Does the policy take into account regional differences in costs of production? How?

____ Does the policy take into account regional differences in commodities produced? How? Are the differences addressed equitably? (e.g., "program" crops, non-program crops and "specialty" crops)

____ Does the policy allow/foster regionally appropriate/unique production practices?

____ Does the policy appropriately address production, human resource, market, and other risks relevant to our region?

6. Political

____ Is regional (interstate) cooperation promoted? How?

____ How is the development of regional networks and solutions encouraged?

____ In what ways and to what extent does the policy remove, create or exacerbate inter-regional tensions? (e.g. dairy, water issues)

____ Does the policy allow or encourage regional identification of priorities and/or solutions? Is there adequate flexibility?

____ Is program eligibility tied to definitions (e.g. definition of rural, metro, specialty crop, etc.) that disadvantage our region or parts of our region? How is eligibility defined and how might that definition restrict or promote access to producers in our region?

7. Other/general

____ Is the need being addressed consistent with the needs of our region?

____ Does the policy leverage a state participation/match/contribution? Is this an undue burden to the state? What are the requirements and formulas and do they disadvantage our region?

____ Is the distribution of competitive grants programs allocated fairly across regions? (e.g., review criteria for competitive grant programs)

____ Do research and extension programs and resources accommodate regional needs and priorities? Do they encourage regional (multi-state) collaboration?

____ Does the policy allow/encourage flexibility and decision-making within regions? How?

____ How does the policy allow for and encourage states or regions to control implementation? (e.g., block grants)

____ Do program evaluation criteria and reporting requirements account for regional differences?