

Food Systems Resilience Planning and the Climate Crisis

Defining Concepts and Terminology



PHOTO COURTESY OF OKO FARMS



Center for Agriculture
& Food Systems
VERMONT LAW & GRADUATE SCHOOL

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About the Center for Agriculture and Food Systems

Vermont Law and Graduate School's Center for Agriculture and Food Systems (CAFS) uses law and policy to build a more sustainable and just food system. With local, regional, national, and international partners, CAFS addresses food system

challenges related to food justice, food security, farmland access, animal welfare, worker protections, the environment, and public health, among others. CAFS works closely with its partners to provide legal services that respond to their needs and develop resources that empower the communities they serve. Through CAFS' Food and Agriculture Clinic and Research Assistant program, students work directly on projects alongside partners nationwide, engaging in innovative work that spans the food system. Visit vermontlaw.edu/cafs to learn more.



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Summary

This resource is the first in a series intended for local, regional, and state planners and policy makers, as well as food policy councils and advocacy groups tasked with addressing the multi-dimensional and disparate impacts of climate change in their respective jurisdictions. Common understanding of resilience typically has more to do with emergency response and preparedness. One goal of this resource is to demonstrate that short-term risk management is not sufficient, especially for those most affected by climate change impacts. Specifically, this resource addresses the need for equity-centered food systems resilience as an essential component of climate crisis response in the short and long term, with a focus on healthy food access.

I. Food systems resilience and the climate crisis

Due to the increasing frequency and magnitude of multi-system shocks from the climate crisis and other major events, city and regional planners, policy groups, and policymakers are focused on the concept of **resilience** to predict, assess, and improve how systems and the actors within them prepare for and cope with disruption.¹ The impact of COVID-19 and political conflict such as the Russia-Ukraine war on global food and nutrition security, health, and food supply chains have also sparked a renewed interest among **food system** workers, farmers, advocates, researchers, and eaters in building equitable and resilient local and regional food systems to prevent devastating and disparate impacts.²



A **food system** is made up of all the people, processes, and activities involved in food production, processing, distribution, consumption, and composting and waste management (also known as the stages of the food system). This includes the social, economic, political, and environmental drivers that influence them. Food systems also operate across multiple spatial, temporal, and jurisdictional dimensions.³ These dimensions may include geographic and climate boundaries, short-term and long-term supply and demand dynamics, and interactions between federal, state, and municipal legislation and regulation.⁴



The definition of **resilience** according to the United States Agency for International Development is “the ability of people, households, communities, countries, and systems to mitigate, adapt to and recover from shocks and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth.”⁵ Many organizations have put forth similar definitions of resilience in the context of food systems. Over time, analysis of food system resilience has shifted away from risks and vulnerabilities and toward pathways that minimize the impacts of system-level stressors and shocks.⁶

The **climate crisis** encompasses the current and projected long-term changes in Earth’s climate, primarily driven by human activities.⁷ Food and agricultural systems contribute to climate change, including activities such as burning of fossil fuels, overapplication of pesticides, deforestation and other land-use changes for concentrated livestock and crop agriculture, and other large-scale industrial agricultural practices.⁸ These activities have resulted in increased concentrations of greenhouse gasses in the atmosphere, rising global temperatures, ocean acidification, more frequent and intense



PRESTON KERES, USDA/FPAC

A field on a diversified fruit, vegetable, and livestock farm in Loxahatchee Groves, Florida.

Different types of diversified agricultural production can be an essential mitigation and adaptation strategy to build climate resilience.

weather events, loss of biodiversity, and other negative impacts to natural, agricultural, and human systems.⁹ At the same time, different types of diversified agricultural production can be an essential mitigation and adaptation strategy to build **climate resilience**.¹⁰ For example, transitioning away from concentrated animal feeding operations and continuous grazing systems to livestock-integrated diversified crop operations with managed rotational grazing systems can have farm- and community-level benefits to soil, ecosystem, animal, and human health.¹¹

Definitions matter

The language and terminology used in laws and policies can have a lasting impact by shaping understanding across sectors and over time. This makes it important for new concepts and terms to be defined in food systems resilience policies to ensure laws are effective, efficient, and clear. When terms are left undefined and are ambiguous, those implementing the law may fail to meet the intended purpose. CAFS' [Healthy Food Policy Project](#) provides a [policy drafting companion](#) and a resource specifically on [drafting definitions](#) to support advocates and policymakers in writing healthy food access policies, including recommended practices for incorporating definitions of essential terminology.¹²

Food systems have many interconnected parts making them consistently vulnerable to shocks and hazards like extreme weather and pests. A seemingly isolated disruption in one area (e.g., on-farm crop pest infestation, animal disease, or a political conflict on the other side of the globe) can cause devastating impacts on the whole system. When these existing hazards are exacerbated by climate change, the impacts ripple out beyond any single disruption and can affect multiple dimensions of household- and community-level food and nutrition security¹³—food availability,¹⁴ accessibility,¹⁵ utilization,¹⁶ and acceptability.¹⁷

The ecological, economic, and health impacts, however, are distributed unevenly across regions, sectors, and populations. Individuals working in “climate-exposed” sectors such as small-scale farmers, farmworkers, and fishing communities, or people living in regions more prone to extreme weather events and natural disasters—from droughts and excessive heat in the Southwest to extreme flooding in the Northeast—disproportionately experience the effects of system shocks and impacts to their food and nutrition security, work, and livelihoods.¹⁸ In addition, due to centuries of racial injustice and systems of oppression, those most vulnerable to climate change impacts are also those who have historically been prevented from exercising **food sovereignty** and owning means of production in food and agriculture systems,¹⁹ including households with low incomes and Black, Indigenous, and other people of color (BIPOC) communities.



The River Fire burns through the hills of Salinas, California, with workers in the agricultural fields below.

Food sovereignty and food justice

While many scholars have long described the U.S. food system as “broken” with calls to “fix” its defects, others have pointed out that the food system is functioning just the way it was designed—built on the theft of land and genocide of Indigenous peoples to generate wealth for a select few.²⁰ The food system lacks resilience and fundamentally fails to provide equitable access to healthy food to all people. Concepts such as food sovereignty and **food justice** have been used for decades to describe what a racially just, fair, and sustainable food and agriculture system looks like.²¹ With the rapid emergence of the climate crisis, these concepts have continued to be guiding principles for understanding what a resilient food system is and how to cooperatively build resilient systems that ensure the right for all communities to define their own food and agriculture systems.²²

The work of the [Climate Justice Alliance](#) (CJA) on food sovereignty illustrates the urgent need for these intersecting frameworks to reach justice-centered climate goals for our food future. CJA follows food sovereignty principles as part of a “just transition to healthy, resilient communities and a regenerative economy through the practice and scaling out of agroecology.”²³

Along with the effects of the climate crisis, the United States is also facing high rates of food and nutrition insecurity,²⁴ lack of affordable housing,²⁵ and inaccessible healthcare, all of which further contribute to negative public health outcomes.²⁶ Often the communities most hard hit by extreme climate events simultaneously lack access to healthy food, affordable housing, and healthcare. Environmental impacts such as poor water and air quality are being exacerbated by climate change.²⁷ Again, these interrelated crises and effects of climate change are falling disproportionately on socially and economically disenfranchised groups.²⁸

Extractive and degrading food and agricultural practices in the dominant food system, perverse economic incentives, and competing social, political, and environmental influences at the federal, state, and local levels directly and indirectly contribute to the climate crisis. This makes equity-centered food systems resilience planning a unique and critical strategy for mitigating and adapting to climate change. Although common understandings of resilience typically focus on emergency response and preparedness, one of the goals of this resource is to demonstrate that short-term risk management is not enough, especially for those most impacted by climate change impacts.



Farmers harvesting eggplants at an urban farm in Far Rockaway, New York.

PRESTON KERES, USDA

Equity-centered food systems resilience planning is a unique and critical strategy for mitigating and adapting to climate change.

Climate impact and response in New England

In July 2023, historic rain and flooding in the northeastern United States devastated rural farming operations across the region, threatening the livelihood of agricultural producers, farmworkers, and community food and nutrition security.²⁹ Total crop loss and massive infrastructure and equipment damage left primarily small and diversified farmers in a position of emergency recovery without a meaningful safety net.

These types of farms are more likely to invest in and implement agricultural practices that mitigate climate and extreme weather impacts, even without significant risk management support from the government. Traditional agricultural production, financial, and price risk³⁰ management tools available to farmers, such as the United States Department of Agriculture (USDA) Federal Crop Insurance Program (FCIP), are not viable for these types of farms due to the program's administrative complexity and lack of consideration for small-scale farming operations.³¹ However, larger monocropped commodity farms that can cause the most environmental damage also have the most shelter from risk under FCIP, creating a perverse economic incentive. Further, FCIP can penalize farms that regularly rely on its subsidies but want to move toward more climate-friendly agricultural practices.³²



Homes and farms submerged in floodwaters in Richmond, Vermont, after record rains fell in 2023.

As smaller and more diversified agricultural producers across the United States continue to experience ongoing emergencies due to extreme weather, there is increasing consideration for rebuilding with an eye toward long-term resilience planning.³³ Part of that long-term planning includes policy advocacy to improve existing risk mitigation strategies, like FCIP, to acknowledge and reward the role small, diversified farms play in climate mitigation and adaptation through effective and tailored risk management.³⁴



Climate resilience is the act of preparing, responding, coping, mitigating, and adapting to the impacts of climate change.³⁵ Climate resilience strategies can include energy and transportation infrastructure upgrades, innovative water and land management, emergency preparedness and response plans, long-term climate action planning, and other jurisdiction-level strategies to enhance natural and human systems resilience and ensure long-term sustainability in the face of a changing climate.³⁶

Other resources to support equity-centered food systems resilience efforts

Johns Hopkins Center for a Livable Future’s [Food System Resilience Planning Guide](#) provides guided support for local governments building food system resilience in a way that promotes equitable and just food systems.

The USDA’s [Local and Regional Food Systems Resilience Playbook](#) outlines best practices for supporting local and regional food systems resilience in emergency response through a framework of equitable resilience.

Facilitating Power’s [Spectrum of Community Engagement to Ownership](#) illustrates a pathway for assessing and radically altering community engagement efforts to support equitable community-driven solutions.

Equity-centered food systems resilience planning can also strengthen societal and ecological responses in a way that guarantees food security, public health, human rights, and social stability for all.³⁷ Efforts to build food systems resilience must be designed and implemented with broad consultation, advice from, and deference to communities most impacted by climate change and the outcomes of food systems resilience plans and policies (see Table A for descriptions of inclusivity, structural equity, and intergenerational equity).

Wildfire impact on food security in Maui

In 2023, catastrophic wildfires fueled by hurricane winds decimated West Maui, substantially impacting agricultural productivity and food security on the island. While Maui imports the overwhelming majority of its food—up to 90 percent—the wildfires have impacted the very small agricultural areas across Maui, including plots of land producing the majority of crops grown for local consumption like bananas, taro, and sweet onion.³⁸ In fact, the combination of altered ecosystems to support sugarcane and pineapple monocropping, loss of active farmland, and increasing shuttered and fallow plantations over the last several decades has contributed to a less resilient local food

supply chain and increased vulnerability to wildfires.³⁹

In response to the wildfires, an ad hoc coalition of nonprofits, food banks, and churches worked together to address emergency food and nutrition needs across Maui.⁴⁰ This coalition created an emergency feeding taskforce and is continuing to work on closing food insecurity gaps in Maui and preparing for future crises.⁴¹ Other groups were focused on supporting agricultural producers. For example, the Hawai‘i Farmers Union United released the “Maui Producer Impact & Support Survey” to assess the breadth of the impact and identify what Maui producers need in terms of immediate recovery support.⁴²



AIR FORCE MASTER SGT. ANDREW JACKSON

The view from an Army National Guard helicopter performing aerial water bucket drops on the Island of Maui to assist the fight against wildfires, Maui, Hawai‘i, 2023.

II. What does food systems resilience mean?

Food systems resilience is an emerging field with evolving terminology. Groups involved in this work are using different words to describe similar ideas about the characteristics of a resilient food system. For example, Food System Resilience UK's framework for food system resilience considers the system's robustness and its ability to recover and reorient before or after a disruption.⁴³ The U.S. Climate Resilience Toolkit considers a system's tendency to be adversely affected by a hazard (vulnerability), the degree to which the system may be impacted by a hazard (sensitivity), and its capacity to recover from a disruption (resilience), including adaptive and mitigation capacity.⁴⁴ The Center for a Livable Future's Resilience Planning Guide offers a vital equity lens including the role procedural, distributional, structural, and intergenerational equity plays in food system resilience planning.⁴⁵ The USDA's Local and Regional Food Systems Resilience Playbook uses a framework for equitable resilience and emphasizes that resilience is "an ongoing process, rather than a definitive outcome."⁴⁶

A resilient food system is one that can mitigate and adapt to climate change impacts—both in the short and long term—in ways that are inclusive and equitable.

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The role of equity-centered food systems resilience planning

Persistent built-in food system inequities undermine long-term resilience efforts. Resilience is often conceptualized as the ability to return to a normal state after a disruption. But policies that allow some people within a food system to return to a previous food-, nutrition-, or economically insecure state after a system shock or disruption are not inclusive, equitable, or resilient. This reality poses the question:

How can a strong, inclusive food system exist if some people in that community are experiencing hunger and lack access to good jobs, affordable housing, and healthcare?

There are multi-sectoral and multi-racial alliances, coalitions, and groups in the United States explicitly connecting food justice and climate response efforts to other human rights movements, advocating that these issues—access to land, housing, employment, health and medical care, and food—and their solutions are fundamentally connected to one another.⁴⁷

Inclusive and equitable efforts that promote food system resilience recognize that not everyone in a community or region needs the same things to reach and maintain a food- and nutrition-secure state. For some people, that may mean better transportation options to reach food access points. Others may need access to affordable housing, childcare, or jobs that pay a living wage. Even so, there is an identified need for public health and nutrition policies to shift away from individual behavior change models for race- and income-based disparities that lead to outcomes like food and nutrition security and toward systems change models that address systemic racial, wealth, and income inequities.⁴⁸ This includes addressing systems and processes broadly preventing access to land, housing, jobs, health and medical care, and food based on race, ethnicity, or income.

To move beyond emergency response and sustain and improve current social, economic, and agricultural systems, long-term equity-centered climate action planning and resilience planning is critical. And while the ongoing climate crisis will



JOSH COLLIGAN, USDA

Natural Resource Conservation Service staff visit a farm in St. Louis, Missouri, that has received Environmental Quality Incentives Program (EQIP) funds for a high tunnel operation.

continue to force municipalities, states, and federal government to administer emergency responses, it is essential that after the emergency response period ends, governments continue to dedicate time and resources toward equity-centered climate action and food systems resilience planning with comprehensive yet realistic implementation considerations.⁴⁹

Across sectors, equity-centered resilience planning involves meaningful consultation with and deference to most impacted communities while assessing risk, determining vulnerabilities, and identifying short-, intermediate-, and long-term strategies for improving resilience of a given system. Resilience strategies may involve establishing new municipal or agency priorities, infrastructure investment, policy audits and reforms (e.g., reviewing policies that incentivize or prohibit certain behaviors), improving coordination across programs, clarifying or expanding **urban agriculture** land use activities, investing in skill- and capacity-building among implementing agencies, or redistributing existing resources toward resilience initiatives.

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What is urban agriculture and what role does it play in food systems resilience?

Existing definitions of urban agriculture are broad and can thus encompass a wide variety of agricultural activities occurring in an urban setting—from home and community gardens to urban farms, including hydroponics and vertical farming.⁵⁰ The scale, method, location, and goals of production further complicate a working definition for urban agriculture.⁵¹ At the same time, urban agriculture has a long history as a tool implemented by disenfranchised communities practicing food sovereignty principles.⁵²

Planners and policymakers have increasingly prioritized urban agriculture through municipal zoning reform as a way to reduce barriers for urban farmers and increase community- and household-level food production within cities.⁵³ Increasing the food produced within urban centers, such as vertically farmed leafy greens or backyard root vegetables, can play a role in strengthening food systems resilience by improving overall system diversity and redundancy (See [Table A](#) for descriptions of resilience characteristics). However, it is important to consider the unique limitations of different types of urban agriculture, especially in an emergency. For instance, vertical farms growing leafy greens under LEDs and refrigerating after harvest are vulnerable to a loss of electricity due to a storm or extreme temperature-related power grid failure in ways that vegetables grown in community and backyard gardens may not be.⁵⁴ On the other hand, greens grown in a sheltered temperature-controlled environment are protected from different hazards such as hail or wind that exposed gardens and farms are not.

When planners and policymakers reform municipal zoning codes to promote urban agriculture, it is critical to be inclusive of methods that improve both system diversity and emergency response capacity by permitting commercial (i.e., urban farms) as well as community- and household-level production (i.e., home and community gardens).⁵⁵

Strategies utilized in resilience planning for other sectors such as transportation, energy, economic development, land use, housing, and parks and recreation are relevant to food systems resilience planning. Because food systems impact urban and regional land use, utilize transportation networks, and are part of healthy local and regional economies, approaching food systems planning with an intersectional lens is key.⁵⁶



A community garden near Cascade Park, Seattle, Washington.

III. The characteristics of a resilient food system

Building on CAFS’ *Food Systems Resilience: Concepts and Policy Approaches*⁵⁷ report and the work of The Center for a Livable Future and Food System Resilience UK, the table below provides an update to and overview of the six characteristics of a resilient food system (awareness and preparedness, diversity, redundancy, connectivity, response capacity, and adaptivity). It also includes three additional characteristics related to process and equity (inclusivity, structural equity, and intergenerational equity) (See Table A). The examples provided in the table are not a comprehensive overview of options, but rather a few illustrative examples for consideration.

Table A. Resilience characteristics and examples



Resilience Characteristic	Examples of Food System Activities and Outcomes
 <p>Awareness and Preparedness means that stakeholders have knowledge of food system assets, liabilities, and vulnerabilities that informs decision-making and planning for disaster preparedness.</p>	<ul style="list-style-type: none"> • Regular assessment and analysis of food system assets, liabilities, and vulnerabilities • Emergency and Hazard Mitigation Plans that include food access considerations • Emergency food cross-sector and interagency working groups and coalitions • Prioritizing climate resilience-promoting agricultural production research
 <p>Diversity means the food system is composed of a variety of elements serving a <i>similar</i>, but not the same, purpose.⁵⁸</p>	<ul style="list-style-type: none"> • A variety of supports available to producers for marketing and selling their products (e.g., multiple market channel opportunities, access to value-added equipment) • A diversity of farm sizes and methods of production (e.g., rural, urban, indoor growing) • A diversity of scales of distribution (local, regional, national), and processing (on-farm services, small-scale capacity facilities, commercial kitchens, industrial) activities are supported and encouraged • A variety of food options available at food access points to meet a diversity of cultural and dietetic needs • A variety of food retail options, such as farmers markets, independent grocers, mobile markets, and supermarkets⁵⁹ • A variety of transportation options available to food access points such as active and reliable bus routes, safe bike lanes, walkable and ADA accessible sidewalks, and parking lot infrastructure

Table A. Resilience characteristics and examples (Continued)




Resilience Characteristic	Examples of Food System Activities and Outcomes
 <p>Redundancy is a type of diversity that means the food system is composed of multiple elements that can serve the same purpose, so that if one element fails, other elements are available to serve the intended purpose.⁶⁰</p>	<ul style="list-style-type: none"> • Several local and regional farms that produce the same types of foods • Communities with access to multiple food hubs—at local, regional, and national scale—for aggregating, storing, and distributing food • Neighborhoods with more than one grocery store with the same inventory in walking distance⁶¹ • Multiple food pantries with the same inventory serving overlapping demographics and geographies
 <p>Connectivity means that different parts of the food system communicate with one another and are connected and integrated.</p>	<ul style="list-style-type: none"> • Regular communication between food banks and emergency response actors during a crisis⁶² • Coordination and communication across food systems groups (e.g., food policy councils, task forces, interagency working group) • Facilitated information sharing among and between food system actors (e.g., farmers, processors, food banks, consumers) • Alignment of policies and regulatory mechanisms across jurisdictions for land, water, and other natural resource management
 <p>Response capacity means that there are available “back-up” resources to respond to a disruptive event. This includes social, financial, natural, and political resources.⁶³</p>	<ul style="list-style-type: none"> • Strong community networks, including ongoing capacity building • Reserve funds at the household or community level, including strong local microfinance institutions • Emergency government support • Stores of shelf stable food and water

Table A. Resilience characteristics and examples (Continued)



Resilience Characteristic	Examples of Food System Activities and Outcomes
 <p>Adaptivity means that food system elements are flexible and may be modified, changed, or used for new purposes during disruptive events.</p>	<ul style="list-style-type: none"> • Resources in place to support farmers in transitioning toward climate resilience-promoting agricultural practices, including technical assistance, training, and investment • Government-provided waivers to operate school meal programs outside of normal hours⁶⁴ • Schools, churches, and other community infrastructure used as emergency feeding locations • School meals packaged and provided to students via school bus delivery routes • Breweries shifting canning operations to canned water for emergency response⁶⁵ • Food hubs retooling packing lines for family-sized emergency ration boxes, rather than wholesale packing (e.g., USDA Farmers to Families Food Box vendors)
 <p>Inclusivity means that food system resilience planning and policymaking engages those most impacted by food system resilience policies and efforts while ensuring food system benefits and burdens are equitably distributed⁶⁶</p>	<ul style="list-style-type: none"> • Local government food system resilience planning work is done in partnership and co-owned by community partners, and community members are compensated for their engagement in the process (e.g., locally led adaptation principles are utilized, childcare is provided during community meetings)⁶⁷ • Food system resilience actions prioritize resources to communities that experience the greatest inequities, disproportionate impacts, and have the greatest unmet needs⁶⁸ • Food system resilience planning engages supply chain experts including shippers, packers, distributors, and large and small grocery store chains
 <p>Structural equity means that food system resilience planning and policies that uproot long-term embedded social, political, legal, and economic structures that perpetuate inequitable food system and resilience outcomes⁶⁹</p>	<ul style="list-style-type: none"> • Local government offers unrestricted grants to projects supporting communities most impacted by food-related injustices⁷⁰ • Policies and projects are aimed at reducing barriers to interconnected structural inequities, including access to land, capital, and other production inputs; affordable housing; health and medical care; and livable wages

Table A. Resilience characteristics and examples (Continued)

Resilience Characteristic	Examples of Food System Activities and Outcomes
 <p>Intergenerational equity means that food system resilience planning and policies assess actions through the lens of climate change and natural resource management to conserve resources for future generations⁷¹</p>	<ul style="list-style-type: none"> • Youth and young people have ownership over the development, implementation, and evaluation of food systems resilience actions⁷² • Water, land use, and agricultural policy decisions account for intergenerational impacts • Trade-offs related to food system resilience outcomes consider the rights and opportunities of future generations compared to current ones⁷³

Incorporating the characteristics in Table A into food systems resilience assessment and planning work is vital. Early assessment and planning activities may include mapping out systems-level resilience goals and outcomes as well as assessing which parts of the food system exhibit resilience characteristics and where there is room for growth. While assessment and planning processes are the focus of this resource, the implementation of food systems resilience plans results in substantive progress on resilience-related outcomes. Accordingly, it is important to identify relevant jurisdictions, actors, and other entities responsible for carrying out the activities described in food systems resilience plans to ensure they are implemented.



Food system resilience outcomes will look different depending on the context and goals of any particular municipality or region. Goals may include those that explicitly consider food and nutrition security dimensions and outcomes, such as improved food availability, accessibility, utilization, and acceptability. Local and regional level goals may also be driven by other economic, social, political, and environmental factors, and lead to broader system and public health activities or outcomes like the development of a climate action plan or economic development plan. These broader plans offer opportunities for integrating food system-specific resilience goals and strategies, with inclusivity and equity at the center.

However, emergency and climate action plans do not by default address food systems resilience characteristics or goals. Food systems resilience plans and implementation include distinct goals, strategies, and activities that go beyond emergency food assistance and distribution. These may include reforming municipal zoning code to increase urban agriculture on public and privately-owned land; strategic coordination and collaboration across agencies, sectors, and jurisdictions; centering experience and knowledge of Indigenous communities; investing in BIPOC-led food justice networks; and supporting local economies.⁷⁴ Ultimately, emergency planners must work closely with food system actors and experts and those most impacted by climate change impacts and food systems resilience outcomes to integrate resilience characteristics and goals into their emergency plans.

Plants grow at Oko Farms, a diversified urban farm and aquaponics operation in Brooklyn, New York.

PHOTO COURTESY OF OKO FARMS

It is also worth noting that food systems embodying the resilience attributes in Table A are not inherently inclusive and do not necessarily address structural and intergenerational inequities.⁷⁵ Planners, policymakers, and advocates must make intentional efforts to include communities most impacted by food security and climate change in the planning and decision-making process and understand that this process requires ongoing work, engagement, and consultation. When the food system stages—from production to post-consumption waste management—are inclusive and adaptations to climate change impacts are **locally led**⁷⁶ such that people have the power and freedom to actively shape their future, food systems resilience is strengthened.⁷⁷

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Locally led adaption

Locally led adaptation is emerging as an approach to facilitate more “bottom-up” planning that considers the power dynamics present between local communities, institutions, and state agencies as well as the tensions at play between a variety of development priorities.⁷⁸ Locally led adaptation (LLA) is guided by eight principles and is defined as adaptation that is “defined, prioritized, designed, monitored, and *evaluated by local communities themselves*, enabling a shift in power to local stakeholders, resulting in more effective adaptation intervention.”⁷⁹ For the full list of LLA principles, visit the [Global Center on Adaptation](#).

Long-term resilience planning and coordinated resilience projects and policies can better position communities to handle system disruption or emergencies. At the same time, strong local and regional food systems support community responses and adaptations to disruption or emergencies. In particular, well-connected networks and relationships between food system stakeholders and communities, including established channels of communication, make it easier for communities to respond and adapt when a disaster or disruption occurs while also upholding long-term resilience goals.⁸⁰ And, while strong local and regional food systems are an important piece of building food systems resilience, they are part of a global food system—one that includes the connectivity and integration of national and global supply chains to reinforce a system’s diversity, redundancy, and response capacity.



A small farm growing several Asian specialty crops in Singer, California.

LANCIE CHEUNG USDA

IV. Conclusion

A resilient food system has diverse, redundant, and adaptive components and connected food system actors, networks, and infrastructures with adequate emergency response capacity. Most importantly, a resilient food system is inclusive and is designed in a way that addresses structural, distributional, and intergenerational equity impacts. Long-term food system resilience is further dependent on the existence of aligned goals and resilience of other economic, environmental, social, political, and governmental systems—those impacting the health, safety, and livelihood of all people. Aligning efforts across these overlapping systems requires a shared understanding of what food systems resilience is and what role building equity-centered food systems can play in supporting resilience efforts, ensuring access to healthy food, and responding to the climate crisis in the short- and long-term.

The climate crisis is increasingly causing devastating and disparate impacts across the food system. This points to the need to move beyond emergency response and disaster mitigation management and toward more strategic investment in and implementation of long-term equity-centered food systems resilience planning. In addition to shared language, city and regional planners, policy groups, and policymakers pursuing food systems resilience planning as a strategy for mitigating and adapting to climate change need comprehensive and practical ways to implement plans, including examples of resilience-promoting policy tools and strategies as well as pathways for network coordination, communication, and organization.

For more food systems resilience resources, visit CAFS' [Food Systems Resilience Project](#). This resource is the first in a series. The next resource in this series will dig into what policy tools and strategies are available to communities and regions for building more resilient food systems and healthy food access.



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Corona Farmers Market in Queens, New York is one of the most dynamic and diverse farmers markets in the city and is steps off the subway and mass transit system for the city.

Endnotes

- 1 Jenileigh Harris & Emily J. Spiegel, *Food Systems Resilience: Concepts & Policy Approaches*, CTR. FOR AGRIC. & FOOD SYSTEMS, 5 (2019), <https://clf.jhsph.edu/projects/food-system-resilience/resilience-planning-guide>.
- 2 Nurith Aizenmann, *The Impact of the Ukraine War on Food Supplies: 'It Could Have Been So Much Worse'*, NPR (Feb. 27, 2023) <https://www.npr.org/sections/goatsandsoda/2023/02/27/1159630215/the-russia-ukraine-wars-impact-on-food-security-1-year-later>; Monika Zurek et al., *Food System Resilience: Concepts, Issues, and Challenges*, 47 ANNUAL REVIEW OF ENV'T & RES. 511, 513 (2022).
- 3 Zurek, *supra* note 2, at 513.
- 4 *Id.*
- 5 John Hoddinott, *Understanding Resilience for Food and Nutrition Security*, INT'L FOOD POLICY RESEARCH INST., 3 (2014).
- 6 Harris & Spiegel, *supra* note 1, at 12.
- 7 Global Climate Change, NASA, <https://climate.nasa.gov/effects/> (last visited Jan. 26, 2023); Hoesung Lee et al., *Synthesis Report of the IPCC Sixth Assessment Report*, IPCC, 4 (2023), https://report.ipcc.ch/ar6syr/pdf/IPCC_AR6_SYR_SPM.pdf.
- 8 *Id.*; *Pesticides and Climate Change: A Vicious Cycle*, PESTICIDE ACTION NETWORK, 2-3 (2023), <https://www.panna.org/wp-content/uploads/2023/02/202308ClimateChangeEng.pdf>.
- 9 Lee et al., *supra* note 7, at 12.
- 10 Albie Miles & Casey Hoy, Editorial: Achieving Food System Resilience and Equity in the Era of Global Environmental Change, 6 FRONTIERS IN SUSTAINABLE FOOD SYSTEMS, 2023, at 5-7.
- 11 Elizabeth Spratt et al., *Accelerating Regenerative Grazing to Tackle Farm, Environmental, and Social Challenges in the Upper Midwest*, 76 JOURNAL OF WATER AND SOIL CONSERVATION, 2021, at 15A-17A.
- 12 *Policy Drafting Companion*, HEALTHY FOOD POLICY PROJECT, <https://healthyfoodpolicyproject.org/policy-drafting-companion-guide> (last visited Jan. 26, 2023).
- 13 Hans Pörtner et al., *Technical Summary*, IPCC, 49 (2022), https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_TechnicalSummary.pdf. Food security is achieved “when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.” *Rome Declaration on World Food Security and World Food Summit Plan of Action*, FAO (Nov. 13, 1996), <https://www.fao.org/3/w3613e/w3613e00.htm>. Building off of the United Nations Food and Agriculture (FAO) universally adopted definition of food security, the United States Department of Agriculture (USDA) has broadened its work on food security to include nutrition security. Nutrition security is “when all Americans have consistent and equitable access to healthy, safe, affordable foods essential to optimal health and well-being. *Food and Nutrition Security*, USDA, <https://www.usda.gov/nutrition-security> (last visited Jan. 26, 2024). Food and nutrition security represents a standard of well-being that resilient food systems should seek to achieve. *Chapter 2. Food Security: Concepts and Measurement*, FAO, <https://www.fao.org/3/y4671e/y4671e06.htm> (last visited Jan 26, 2024).
- 14 Food availability is the physical availability of food and is determined by the level of food production in a given area, including domestic production and imports as well as sources of food aid. Zurek, *supra* note 2, at 17.
- 15 Food accessibility considers the economic, social, and physical access to food and includes factors such as the financial status of households, affordability of food products, access to reliable transportation, and accommodating work schedules. Zurek, *supra* note 2, at 17.
- 16 Food utilization considers the ability to use food to support human health. Factors relevant to utilization include food’s nutritional value as well as the ability to prepare, consume, and store food. Zurek, *supra* note 2, at 17.
- 17 As food and nutrition security work has evolved over the last 50 years, there have been calls to incorporate other key components to the framework, such as agency and sustainability. Building off of work such as that from the Center for a Livable Future, CAFS considers food utilization to be inclusive of food acceptability, meaning food is nutrient-dense and safe to eat and includes a person’s food preferences and choices and the food’s religious and cultural relevance. Zurek, *supra* note 2, at 5, 17; Jennifer Clapp et al., *Viewpoint: The Case for a Six-Dimensional Food Security Framework*, 106 ELSEVIER 102164, 102164 (2022); *Food System Resilience: A Planning Guide for Local Governments*, JOHNS HOPKINS, 14, <https://clf.jhsph.edu/projects/food-system-resilience/resilience-planning-guide>.
- 18 Lee et al., *supra* note 7, at 6.
- 19 Adam Calo et al., *Achieving Food System Resilience Requires Challenging Dominant Land Property Regimes*, 5 FRONTIERS IN SUSTAINABLE FOOD SYSTEMS, 2021, at 2.
- 20 LEAH PENNIMAN, *FARMING WHILE BLACK*, 6-7 (2018); Tracy Frisch, *To Free Ourselves, We Must Feed Ourselves*, THE SUN (July 2019), <https://www.thesunmagazine.org/issues/523/to-free-ourselves-we-must-feed-ourselves>.
- 21 *Towards Equitable and Just Food Systems: Exploring Food Justice, Food Sovereignty, and Ending Food Apartheid Policy & Practice*, HEALTHY FOOD POLICY PROJECT, <https://healthyfoodpolicyproject.org/towards-equitable-and-just-food-systems>, (last visited Jan. 28, 2024).

- 22 *Food Sovereignty, A Manifesto for the Future of Our Planet*, LA VIA CAMPESINA (Oct. 13, 2021), <https://viacampesina.org/en/food-sovereignty-a-manifesto-for-the-future-of-our-planet-la-via-campesina/>.
- 23 *What is Food Sovereignty?*, CLIMATE JUSTICE ALLIANCE, <https://climatejusticealliance.org/workgroup/food-sovereignty/> (last visited Jan. 28, 2026).
- 24 *Food Security and Nutrition Assistance*, USDA, <https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/food-security-and-nutrition-assistance/> (last visited Jan. 28, 2024); Alisha Coleman-Jensen et al., *Food Insecurity Rates are Relatively High for Participants in Housing and Urban Development (HUD) Assistance Programs*, USDA, <https://www.ers.usda.gov/amber-waves/2020/november/food-insecurity-rates-are-relatively-high-for-participants-in-hud-federal-housing-assistance-programs/> (last visited Jan. 28, 2024).
- 25 *No State Has an Adequate Supply of Affordable Rental Housing for the Lowest Income Renters*, NAT'L LOW INCOME HOUSING COALITION, <https://nlihc.org/gap> (last visited Jan. 28, 2024).
- 26 Elizabeth A. Dobis & Jessica E. Todd, *The Most Rural Counties Have the Fewest Health Care Services Available*, USDA (Aug. 1, 2022), <https://www.ers.usda.gov/amber-waves/2022/august/the-most-rural-counties-have-the-fewest-health-care-services-available/>; Malerie Lazar & Lisa Davenport, *Barriers to Health Care Access for Low Income Families: A Review of Literature*, 35 J. Cmty. Health Nursing 28, 28-37(2018).
- 27 *Climate Change Impacts on Air Quality*, EPA, <https://www.epa.gov/climateimpacts/climate-change-impacts-air-quality> (last visited Jan. 28, 2024); *Climate Adaptation and Source Water Impacts*, EPA, <https://www.epa.gov/arc-x/climate-adaptation-and-source-water-impacts> (last visited Jan. 28, 2024).
- 28 *Climate Change and the Health of Socially Vulnerable People*, EPA, <https://www.epa.gov/climateimpacts/climate-change-and-health-socially-vulnerable-people> (last visited Jan. 28, 2024); cites from FN 5-7
- 29 Carolina Drake, *Small Farmers in Post-Flood New England Are Starting to Rebuild, But Climate Extremes are Here to Stay*, FOODPRINT (Aug. 17, 2023), <https://foodprint.org/blog/climate-extremes/>.
- 30 *Risk in Management*, EPA, <https://www.ers.usda.gov/topics/farm-practices-management/risk-management/risk-in-agriculture/> (last visited Jan. 28, 2024).
- 31 Drake, *supra* note 31.
- 32 Grey Moran, *How Crop Insurance Prevents Some Farmers From Adapting to Climate Change*, CIVIL EATS, (Sep. 20, 2023), <https://civileats.com/2023/09/20/how-crop-insurance-prevents-some-farmers-from-adapting-to-climate-change/>.
- 33 Drake, *supra* note 31; Mikaela Lefrak et al., *Vermont Farmers Reckon with Total Crop Loss Following Floods*, VERMONT PUBLIC (July 18, 2023), <https://www.vermontpublic.org/show/vermont-edition/2023-07-18/vermont-farmers-reckon-with-total-crop-loss-following-floods>.
- 34 See, e.g., NSAC's 2023 Farm Bill Platform, NAT'L SUSTAINABLE AGRIC. COAL., <https://sustainableagriculture.net/publications/2023-farm-bill-platform/> (last visited Jan. 28, 2024); *Priorities for the 2023 Farm Bill*, NAT'L FARMERS UNION, 1-2 (2022), <https://nfu.org/wp-content/uploads/2022/08/2023-Farm-Bill-Priorities-08092022.pdf>; LSP 2023 Farm Bill Platform, LAND STEWARDSHIP PROJECT, 1-22 (2022), <https://landstewardshipproject.org/wp-content/uploads/Farm-Bill-Platform-2023-Final.pdf>; Erin Parker et al., *Gaining Ground*, Indigenous Food and Agric. Initiative, 1-135 (2022), https://www.nativefarmbill.com/_files/ugd/8b3589_763e8879ac2842c0baa45c586ddfd83a.pdf.
- 35 *What is Climate Resilience?*, UNION OF CONCERNED SCIENTISTS (June 6, 2022), <https://www.ucsusa.org/resources/what-climate-resilience>; *Glossary*, U.S. CLIMATE RESILIENCE TOOLKIT, <https://toolkit.climate.gov/content/glossary> (last visited Jan. 26, 2023) (see "adaptation," "mitigation," "resilience").
- 36 Lee et al., *supra* note 7, at 8-11; *What is a Climate Action Plan?*, CITY OF BURLINGTON, <https://www.burlingtonvt.gov/Sustainability/CAP> (last visited Jan. 26, 2023).
- 37 Peter Newton et al., *What is Regenerative Agriculture? A Review of Scholar and Practitioner Definitions Based on Processes and Outcomes*, 4 FRONTIERS IN SUSTAINABLE FOOD SYSTEMS, 2020, at 1-9.
- 38 Ayurella Horn-Muller, *Hawai'i Wildfires' "Downward, Spiral-Like Impacts" on Food*, AXIOS (Aug. 21, 2023), <https://www.axios.com/2023/08/21/hawaii-wildfires-downward-spiral-like-impacts-on-food>.
- 39 Katie Rodriguez, *How Centuries of Extractive Agriculture Helped Set the Stage for the Maui Fires*, CIVIL EATS (Aug. 23, 2023), <https://civileats.com/2023/08/23/how-two-centuries-of-extractive-agriculture-helped-set-the-stage-for-the-maui-fires>; Lena Easton-Calabria, *After Maui Fires, Food Security Is a Major Concern – And Opportunity*, THE MESSENGER (Aug. 23, 2023), <https://themessenger.com/opinion/after-maui-fires-food-security-is-a-major-concern-and-opportunity>.
- 40 *Building a Maui Food System for the Future*, HAWAII BUSINESS MAGAZINE (Apr. 8, 2024), <https://www.hawaiibusiness.com/maui-food-security-community-response-initiative/>.
- 41 EMERGENCY FEEDING TASKFORCE FOR MAUI, <https://eftformaiui.org/> (last visited May 8, 2024).
- 42 *Maui Response*, HAWAII FARMERS UNION UNITED, <https://hfuui.org/maui-response/> (last visited Jan. 28, 2024).
- 43 Zurek, *supra* note 2, at 518.
- 44 *Glossary*, U.S. CLIMATE RESILIENCE TOOLKIT, <https://toolkit.climate.gov/content/glossary> (last visited Jan. 26, 2023).

- 45 Food System Resilience: A Planning Guide for Local Governments, JOHNS HOPKINS, 12, <https://clf.jhsph.edu/projects/food-system-resilience/resilience-planning-guide>.
- 46 *The Local and Regional Food Systems Resilience Playbook*, USDA AGRIC. MARKETING SERV., <https://storymaps.arcgis.com/stories/8aaa431dad2f41d0afc72d157c865775> (see “Equitable Resilience” and “Executive Summary”).
- 47 *Heal Platform for Real Food*, HEAL FOOD ALL., <https://healfoodalliance.org/platformforrealfood/> (last visited Jan. 28, 2024); CLIMATE JUSTICE ALLIANCE, *supra* note 25; Rafter Ferguson, *Why We Can’t Separate Justice and Sustainability in the Food System*, UNION OF CONCERNED SCIENTISTS (Jan. 31, 2019), <https://blog.ucsusa.org/rafter-ferguson/why-we-cant-separate-justice-and-sustainability-in-the-food-system/>.
- 48 *Talking About Disparities*, FRAMEWORKS INST., 1-12 (2009), <https://www.frameworksinstitute.org/wp-content/uploads/2020/03/disparitiesmessagebrief.pdf>.
- 49 A new resource is being developed on the topic of policy tools and strategies for building a resilient food system. *Food Systems Resilience*, VT. L. AND GRADUATE SCHOOL, <https://www.vermontlaw.edu/academics/centers-and-programs/center-for-agriculture-and-food-systems/projects/food-systems-resilience> (last visited Jan. 28, 2024).
- 50 *Zoning For Urban Agriculture: A Guide for Updating Your Community’s Laws to Support Healthy Food Production and Access*, HEALTHY FOOD POLICY PROJECT, 6-7 (2024), <https://healthyfoodpolicyproject.org/wp-content/uploads/Zoning-for-Urban-Agriculture-1.pdf>.
- 51 *Id.* at 7.
- 52 *Id.* at 4.
- 53 *Id.* at 13.
- 54 See, e.g., *Texas Indoor Growers Fight Through Power Outages to Save Crops*, GREENHOUSE GROWER (Feb. 21, 2021), <https://www.greenhousegrower.com/production/texas-indoor-growers-fight-through-power-outages-to-save-crops/>.
- 55 *Zoning For Urban Agriculture: A Guide for Updating Your Community’s Laws to Support Healthy Food Production and Access*, *supra* note 50, at 7.
- 56 *Food Systems*, AMERICAN PLANNING ASS’N, <https://www.planning.org/knowledgebase/food/> (last visited Jan. 28, 2024).
- 57 Harris & Spiegel, *supra* note 1, at 19.
- 58 JOHNS HOPKINS, *supra* note 45, at 19.
- 59 *Id.*
- 60 *Id.*
- 61 *Id.*
- 62 *Id.*
- 63 Laura Lengnick, *Cultivating Climate Resilience on Farms and Ranches*, SUSTAINABLE AGRIC. RESEARCH & EDUC., 16-19 (2018), <https://www.sare.org/wp-content/uploads/Cultivating-Climate-Resilience-on-Farms-and-Ranches.pdf>; JOHNS HOPKINS, *supra* note 45, at 19.
- 64 JOHNS HOPKINS, *supra* note 45, at 19.
- 65 Mike Snider, *Budweiser, Coors Sending 500,000 Cans of Water For Hurricane Florence Relief*, USA TODAY (Sep. 13, 2018), <https://www.usatoday.com/story/money/business/2018/09/13/hurricane-florence-budweiser-miller-coors-water/1287889002/>.
- 66 JOHNS HOPKINS, *supra* note 45, at 19.
- 67 *Id.*; *Locally Led Adaptation*, GLOBAL CTR. ON ADAPTATION, <https://gca.org/programs/locally-led-adaptation/> (last visited Jan. 28, 2024).
- 68 JOHNS HOPKINS, *supra* note 45, at 19.
- 69 *Id.*
- 70 *Id.*
- 71 *Id.*
- 72 *Id.*
- 73 Zurek, *supra* note 2, at 514.
- 74 *Baltimore City Food Resilience Strategy*, CITY OF BALTIMORE, 1-2, <https://planning.baltimorecity.gov/sites/default/files/Baltimore%20City%20Food%20Resilience.pdf>; *Plan for a Resilient Food System*, SAN DIEGO CTY. FOOD VISION 2030, <https://sdfoodvision2030.org/the-vision/objectives/plan-for-a-resilient-food-system/> (last visited Jan. 28, 2024); *North Carolina Food System Resilience Strategy*, NORTH CAROLINA FOOD RESILIENCE ADVISORY BOARD, 1-69, <https://cefs.ncsu.edu/wp-content/uploads/NCFoodResiliencyStrategy-August-2021-1.pdf?x77888>.

75 Laura Enthoven & Goedele Van den Broeck, *Local Food Systems: Reviewing Two Decades of Research*, 193 AGRICULTURAL SYSTEMS, 2021, at 1-11.

76 M. Feisal Rahman et al., *Locally Led Adaptation: Promise, Pitfalls, and Possibilities*, 52 AMBIO 1543, 1543-1557.

77 Zurek, *supra* note 2, at 520.

78 M. Feisal Rahman et al., *supra* note 76, at 1543-1557.

79 *Id.*

80 USDA AGRIC. MARKETING SERV., *supra* note 46.