

Cultivating a Sustainable and Resilient Food Future**

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Summary

A growing awareness of the costs of industrial food in the latter half of the 20th century drove a search for solutions that emerged as the sustainable agriculture movement. Over this same time period, global movements of food accelerated in an increasingly specialized and concentrated global industrial food system. Current national and international policy clearly favors the continued consolidation and concentration of this system, despite widely accepted evidence that these characteristics create critical sustainability challenges, as well as new evidence that this specialization and consolidation creates barriers to the resilience of the global food system. This maladaptive path is doubly destructive; not only does it finance the continued development of the existing system, it also squanders the resources needed to finance a transition to a more sustainable global food system. Resilience science offers a novel framework and a set of concepts uniquely suited to the challenges of managing food systems under conditions of high uncertainty and dynamic change. Although research exploring food system resilience is only just beginning, initial results suggest that, compared to industrial food systems, sustainable food systems are more resilient while providing a host of other natural resources, social, and financial benefits to the communities they serve. By drawing on thirty years of sustainable food systems development and recent insights from resilience science, a sustainable and resilient food future is possible through policies designed to transform the global industrial food system into a resilient global network of sustainable food systems serving local and regional populations.

Current realities

The United States industrial food system has proven remarkably adaptable over the last 150 years, responding to a diversity of production conditions across North America to supply commodities to national and international markets. This success has been largely achieved through continuous financial, natural, and social subsidies such as direct and indirect payments designed to stabilize production, recover from disaster, and reduce environmental harms; public support for education, research and development that serves the agricultural industrial complex; and natural resource subsidies produced through the degradation of soil, water, and air quality, biodiversity, ecosystem services; and social resource subsidies through the degradation of the health and well-being of local communities both at home and abroad.

In the latter half of the 20th century, a growing awareness of the environmental and social harms of an increasingly specialized and concentrated U.S. food system led to a search for solutions that emerged as the sustainable agriculture and food systems movement. This work focused on understanding the sustainability challenges created by the changing structure, function, and purpose of the U.S. food system during a period of intense industrialization and globalization that began to accelerate in the 1980's. In the early years of the 21st century, awareness of the multiple benefits of local and regional food systems to community well-being increased as physicians, dieticians, public health specialists, and municipal planners explored land use, transportation, and economic development issues and advocated for increased access to healthy, nutrient-dense foods.

Recent empirical research confirms that sustainable systems are as productive as industrial systems, are less vulnerable to global environmental change, and have a greater capacity to restore the degraded natural and social resources that are crucial to community resilience. Sustainable food systems are now widely accepted as a core component of sustainable development strategies by many regional, national and international organizations promoting sustainable and resilient development of rural and urban areas.

Despite widespread awareness of the multiple benefits of sustainable food systems and new evidence that the global industrial system is uniquely vulnerable to climate change and other 21st century challenges, national and international agricultural policy clearly favors the continued development of a global industrial food system. This puts global society squarely on a maladaptive path by investing in a food system that cultivates unprecedented vulnerability to global environmental change and threatens the sustainability and resilience of communities throughout the world.

Scientific opportunities and challenges

In contrast to the current use of the word in popular culture, *resilience* involves more than just the ability to “bounce back” from a disturbance, shock, or change. Resilience also means having the capacity to make adjustments that avoid or reduce potential damages and take advantage of the opportunities created by change. Resilience is the capacity of the system *to respond* to disturbances to avoid or limit damage, *to recover swiftly* when disturbances cause damage, and *to undergo transformation* when needed to sustain the system as conditions change.

With roots in complexity and systems science, resilience science offers a novel framework and a set of concepts uniquely suited to the challenges of managing social ecological systems under conditions of high uncertainty. Resilience science is well grounded in ecological theory and has a long history of development in natural resource management. Resilience science clarifies and extends sustainability concepts to include dynamic change and has identified a number of qualities that promote sustainability in natural and social-ecological systems: diversity, modularity, tightness of feedbacks, and high levels of all types of capital — natural, human, social, physical and financial. These qualities enhance the capacity for self-organization, learning, and innovation, which are essential behaviors of resilient systems. Sustainable food systems and the communities they serve exhibit all of these qualities, while industrial food systems do not.

Recently, scientists and practitioners have applied resilience theory to understand and manage so-called “wicked problems” such as climate change, poverty, and food security. A number of new analytical tools are currently under development to support the application of resilience theory to agricultural and food system design, assessment, and management including: a set of proposed food system design criteria; adaptive management; the application of the adaptive cycle to business and governance; and sustainability and resilience assessment based on ecological network analysis. These tools appear to be widely-applicable, scale-neutral, and equally useful in education, research and development, private business, policy-making, and government program management.

Although the existing knowledge base in sustainable food systems supports resilience theory, the application of resilience science to food system design and management is novel. Until resilience concepts are validated through additional research and development, there are many legitimate concerns about the application of resilience theory in public policy and programs. Strong objections to resilience science are also expected to arise because its theories require the examination of several neoclassical economic assumptions, including: the overemphasis on land and labor efficiency, the myth of unlimited growth, the utility of externalizing the costs of industrial harms, and a disregard for the dangers of concentrated wealth and complex global networks.

Policy issues

Local and regional actions, supported by enabling policies at local, regional, national, and international levels, can put the global industrial food system on a path to resilient food future. The recommendations below build on existing USDA programs and integrative initiatives, and international partnerships (*examples listed in italics at end of each bullet*) that engage local and

regional governments, educational and research institutions, businesses, and community-based organizations to address 6 significant levers of change:

- Redirect USDA credit and crop insurance programs to support farmers and ranchers using ecosystem-based, diversified production and marketing practices, especially small and mid-sized farms supplying local and regional markets. *FSA's Direct Operating Loans Program; RMA's Whole Farm Revenue Protection Program.*
- Expand incentives and rewards for producers that help protect and restore ecosystem services that enhance sustainability and resilience of U.S. food systems. *NRCS Agricultural Conservation Easement, Conservation Stewardship, and Regional Conservation Partnership Programs; FSA Conservation Loan and Conservation Reserve Programs.*
- Redirect economic development investments to promote the re-regionalization of the U.S. food system. *AMS's Farmers Market and Local Food Promotion and Specialty Crops Block Grant Programs; NIFA's Community Food Projects Program; RBCS Value Added Producer Grants; SRDO Rural Business Development Grants; Local Foods, Local Places Initiative.*
- Redirect agricultural education, research, and extension investments to support sustainable food systems. *NIFA's Sustainable Agriculture, Research and Education Program; NCAT's National Sustainable Agriculture Information Service; Know Your Farmer, Know Your Food Initiative.*
- Expand nutrition assistance and education programs that support sustainable food systems. *FNS Farmers' Market Nutrition, Farm to School Grant, School and Community Gardens, and DoD Fresh Programs; NIFA Food Insecurity Nutrition Incentive Grants Program; Healthy Food Financing Initiative.*
- Redirect U.S. international development investments to support collaborative development of sustainable and resilient regional food systems worldwide. *Global Partnership on Nutrient Management; Feed the Future; North American Pollinator Protection Campaign; Local and Regional Food Aid Procurement; USAID-SANREM Innovation Lab.*

References

- Lengnick, L. (2015). New Times, New Tools: Managing for Resilience. In *Resilient Agriculture Cultivating Food Systems for a Changing Climate*. Gabriola Island, BC: New Society.
- Lengnick, L., Miller, M., & Marten, G. G. (2015). Metropolitan foodsheds: A resilient response to the climate change challenge? *Journal of Environmental Studies and Sciences J Environ Stud Sci*, 5(4), 573-592. doi:10.1007/s13412-015-0349-2
- Izac, A., Egelyng, H., Ferreira, G., (2009). Options for enabling policies and regulatory environments. In *Agriculture at a Crossroads: International assessment of agricultural knowledge, science and technology for development (IAASTD): global report / edited by Beverly D. McIntyre . . . [et al.]* [http://www.unep.org/dewa/agassessment/reports-IAASTD/EN/Agriculture%20at%20a%20Crossroads_Global%20Report%20\(English\).pdf](http://www.unep.org/dewa/agassessment/reports-IAASTD/EN/Agriculture%20at%20a%20Crossroads_Global%20Report%20(English).pdf)

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