



Local and Regional Food Systems for Rural Futures

RUPRI Rural Futures Lab
Foundation Paper No. 1

November 2010

Jennifer Jensen

Local and Regional Food Systems for Rural Futures

Foundation Paper No. 1

November 2010

Jennifer Jensen, RUPRI Rural Futures Lab

Rural Futures Lab Foundation Papers are intended to present current thinking on the economic drivers and opportunities that will shape the future of rural America. They provide the foundation upon which it will be possible to answer the question that drives the Lab's work – What has to happen today in order to achieve positive rural outcomes tomorrow?

Executive Summary

Food matters. As individuals and as a society, our choices about the production, processing, distribution, and consumption of food can make us more or less healthy. The systems we use to create and consume food impact our bodies, environment, economies, and communities.

Over the past century, the U.S. food system has changed drastically. Rural communities have always played an important role in the production and processing of food, and thus rural America has been the frontline for many of the changes in agricultural technologies; farm and policy structures; and methods of food processing, distribution, and even consumption. The bounty of the changing food system has not always produced a healthier population, environment, or rural economy, however.

Concerns about the outcomes of industrial-style food production and processing, emerging inequities in food distribution, and public health problems associated with consumption patterns have led to new ideas for a more sustainable food system. Local and regional food systems have been re-emerging within the American food system as communities and consumers test out what they hope are sustainable ways to move food from farm to table. Local and regional foods are supported by different groups for many different reasons, including:

- To generate *economic development* in their communities by encouraging “buy local” campaigns and promoting local and regional entrepreneurship.
- To connect local food with social justice issues and better public health outcomes related to *food security*.
- To address *food safety* problems associated with the spread of disease through large-scale agricultural production by using the shorter supply chains of regional production systems.
- To pursue *environmental sustainability* through their local food systems, which consumers perceive to be more likely to embrace organic or other sustainable methods.
- To build more *sense of community* by inviting social interaction around local farm markets and community decision making.

The promise of local and regional food is great, but there is only limited research available on some of these goals. Critics and advocates alike have noted that smaller scale systems do not automatically create more just or environmentally sustainable practices, and many questions remain unanswered

about the challenges and opportunities within local and regional food systems. In response, researchers and communities are working toward testing and measuring the outcomes of food systems at all levels.

The future of the system is difficult to predict. The sustained and rising popularity of local and regional food systems among diverse interests indicates that smaller-scale food systems will continue to be important in community life. For rural Americans in particular, food systems offer special opportunities and challenges. Rural communities and entrepreneurs will continue to contribute to food systems at all scales, but the question is whether they will prosper from their hard work.

Starting with this paper, the RUPRI Rural Futures Lab hopes to explore the opportunities and challenges for rural people in the local and regional food movement, and food systems in general. This paper takes a wide-angled look at the changes within the U.S. food system, including differences between local, regional, and larger scale food systems, and what research and on-the-ground examples tell us about the benefits and drawbacks of the different types of food systems.

In the longer term, the RUPRI Lab and its partners will investigate how food systems can be a key economic driver for rural communities looking to extract the best social, economic, and environmental outcomes from our complex food system. RUPRI's Lab may contribute to the field with future research on policy barriers to rural participation in local and regional food systems, or on preconditions or approaches that create better rural outcomes. The Lab can support good on-the-ground efforts by writing up promising practices and case studies, and promoting cross-regional learning. Our hope is to contribute a rural policy perspective to the ongoing discussion among experts, policymakers, practitioners, and communities who are pursuing an improved overall food system.

Introduction

Food is a major player in the U.S. and global economy. In 2009, Americans spent \$1.034 trillion dollars on food (USDA, 2009a). We have more choices in the supermarket aisle than ever before, and more types of markets to choose from (Tropp et al., 2008). At the same time, Americans are spending less of our total income on food than perhaps any other nation because our system produces cheap, plentiful food products (USDA, 2009b). However, the bounty of the U.S. food system has not necessarily produced a healthier population, environment, or rural economy.

Recently, more Americans have begun paying attention to where their food comes from, how it is made, and who benefits or suffers from its production and consumption. Groups across the U.S. are working together to create local and regional systems of food production for diverse reasons. At the same time, new research has begun to illuminate the number and variety of linkages between the food system and many other policy areas that affect the economic, social, and environmental health of U.S. communities.

The RUPRI Rural Futures Lab believes that local and regional food systems can contribute to the well-being of rural communities and the nation as a whole. This paper is not interested in pitting “industrial” against “alternative” styles of food production, but rather exploring ways to produce the best outcomes from our food system using all appropriate geographic scales and production methods. To do so, this document will examine the benefits and challenges of food systems in the U.S. from multiple perspectives, including how to define and describe food systems; how farm structures and practices have changed along with our evolving food systems; and the impact of our current systems on social, environmental, and economic health and well being. Then the paper will examine the potential benefits of local and regional food systems, particularly for rural regions, along with identifying current relevant policies and future research needs that support and challenge our food system at all levels. This document will serve as a foundation for future work of the Lab examining policies and practices that can be pursued to reach the best possible outcomes for the future of rural America¹.

What are food systems?

A “food system” is a process that includes the production of agricultural goods, purchasing and processing of those goods, distribution and marketing of value-added products, end-user preparation and consumption, and waste disposal (Pirog, Van Pelt, Enshayan & Cook, 2001). It is a complex process that includes every one of us as stakeholders, operates at multiple geographic scales, and impacts (and is impacted by) the economic, social, and environmental health of all communities.

Categories of food systems are often defined by their geographic reach (such as global, national regional, or local) or the methods they use to produce food (industrial, small-scale, organic, etc.). These categories tend to overlap in policy and on the ground, and it has been firmly established that “local” and other definitions are used in a wide and sometimes contradictory manner (Martinez et al., 2010; Ruhf & Clancy, 2010). Continuing to clarify the practical and theoretical distinctions among local, regional, and large-scale food systems will help to identify the benefits and challenges of our current

¹ The author thanks the following reviewers for their comments and ideas to improve this paper and help shape our work in food systems: Mary Hendrickson (University of Missouri), Deborah Kane (Ecotrust), David Kay (Community and Regional Development Institute, Cornell University), Heidi Mouillesseaux-Kunzman (Community and Regional Development Institute, Cornell University), and Richard Pirog (Leopold Center for Sustainable Agriculture, Iowa State University).

food system at multiple levels, as well as ways in which those levels work together to make up our food system as a whole.

Local and regional food systems

The difference between “local” and “regional” food systems is negotiable, because there is no agreed-upon definition of either concept, and the field is still evolving. In general terms, a *local food system* comprises the actors and process of growing and processing food near its end market, the consumer. Most people agree that “local” is defined by geographic proximity. Of course, “proximity” might mean food is consumed within 100 miles of its place of production, such as by the “locavore” definition of the New Oxford American Dictionary, or within 400 miles or within the state where it was produced (U.S. government, 2008).

Some researchers say “local” food can be identified by certain types of market arrangements that connect farmers directly or nearly directly to consumers (Martinez et al., 2010). Others argue that both local and regional food systems encompass actors using direct marketing methods as well as intermediary marketing methods, where middlemen (such as wholesalers) buy food from producers to process, transport, or otherwise distribute final products to consumers (King et al., 2010; D. Kane, personal communication, 2010). Examples of direct-to-consumer markets include farmers markets or community supported agriculture (CSA) farms, where customers buy shares of a farm’s production in return for regular deliveries during the growing season. Intermediary marketing can include wholesalers as well as direct-to-institution arrangements like farm-to-school or farm-to-hospital programs. Measuring the flows of food products through these marketing channels is one way research is often conducted on food systems, so researchers tend to incorporate them into the definitions of the types of systems they are studying.

Consumers and the general public, on the other hand, tend to emphasize characteristics of their food system as part of the definition. For example, some consumers cite the importance of small-scale farms, locally value-added products, and the choice of non-commodity foods as reasons to participate in local food systems (D. Kay, personal communication, 2010). Some consumers (perhaps mistakenly, depending on their local markets) equate local with organic foods. The many associations tied to local foods contribute to the ongoing questions about exact definitions for the concept (Martinez et al., 2010).

Overall, local food systems make up a very small but growing part of our total food system. In 2007, direct-to-consumer agricultural sales were less than one half of one percent of total agricultural sales in the U.S. However, there is little doubt that local food systems are growing in terms of consumer access and direct sales. An ERS report notes that “according to the 2002 Census of Agriculture, the value of direct-to-consumer food sales in the United States grew 37 percent between 1997 and 2002—from \$592 million to \$812 million—reflecting the enormous growth in the number and accessibility of direct-to-consumer marketing outlets” (Tropp et al., 2008, p. 7). Farmers markets and CSAs have become much more prevalent since the mid-1990s (Tropp et al., 2008). Direct marketing is not the only indicator of local food systems, but it is often used as a proxy to measure them in economic terms. Other indicators to measure the growing prevalence of local food choices include the number of farm to school projects or local food cooperatives (such as buying clubs). Finally, recent research has found that local food is mostly produced on small farms in or near urban places, and local systems “involve small farmers, heterogeneous products, and short supply chains in which farmers also perform marketing functions, including storage, packaging, transportation, distribution, and advertising” (Martinez et al., 2010, p. iv).

Some authors differentiate *regional food systems* from local systems to emphasize the need for local foods to scale up to be sustainable or self-reliant. Self-reliance, defined as “supplying as much of the food in a region as is physically possible without degrading the resource base” (Ruhf & Clancy, 2010, p. 6), is cited as a theoretical objective of regional food movements, though many local actors would argue that they, too, seek self-reliance.

Like local food systems, there is no standard definition for a region. Regional boundaries are fluid, and can be defined according to the needs of the area—by administrative jurisdictions, economic relationships, or other self-defined reasons. One example of a self-identified region is defined by the Southwest Iowa Farm and Food Initiative (2010):

The initial definition of [our] Southwest Iowa region is based on a community landscape, history, and culture, and includes these counties: Adams, Adair, Cass, Guthrie, Audubon, Shelby, Pottawattamie, and Montgomery. However, a regional food system is complex and dynamic. It will change and/or grow determined by community leaders, infrastructure, food policy, and all partners in the food system.

In theory, a regional approach to food systems (or any system) is place-based, which recognizes that regions are different due to cultural, geographic, climactic, and other location-specific influences. As a policy framework, regionalism says that policies should allow for and even celebrate the differences among regions to promote their individual competitive advantages and solve cross-jurisdictional problems (Hance, Ruhf & Hunt, 2006; Dabson, 2010).

In the context of regional food systems, regions are described as having a wider land base, more varied food products, and larger markets than local systems (Clancy & Ruhf, 2010). Advocates emphasize that regions are a good unit of analysis for measuring land use needs and priorities because agricultural issues are regional issues: “topography, water availability, land and other inputs, farm scale, crop options, and market proximity are operable at the regional level” (Clancy & Ruhf, 2010).

Regional food systems advocates argue that “local is a necessary but not sufficient component” (Ruhf & Clancy, 2010, p. 5) of a self-reliant food system. They envision regions as made up of multiple local systems. In practice, regions can be a larger partner to local systems, offering opportunities to scale up and diversify local production. The diversity and redundancy of multiple “nested” food system scales may bring more resilience to our food system as a whole. For rural America in particular, the regional approach may benefit more remote communities by connecting them to local food systems that would have otherwise existed apart from them.

Interconnected food systems

Larger scale food systems, like the national food system, operate at a scale that is not place-based. “National” and “global” food systems are based on geographic scale and political jurisdictions. The terms “agro-industrial” or “conventional” food systems generally refer to the methods used in agricultural production and processing. These terms often assume high-efficiency, large-scale production based on the industrial principles of economies of scale, narrow diversity of crops, and a scientific approach to nutrition and food processing (Hanson & Hendrickson, 2009). The many definitions and names for large-scale food systems are highly interrelated and often used interchangeably.

Overall, it is important to note that the categories of local, regional, and large-scale food systems are interconnected and evolving. The varying definitions of food systems illuminate the diversity of ways we can access our food, and they reflect historical trends and new consumer demands.

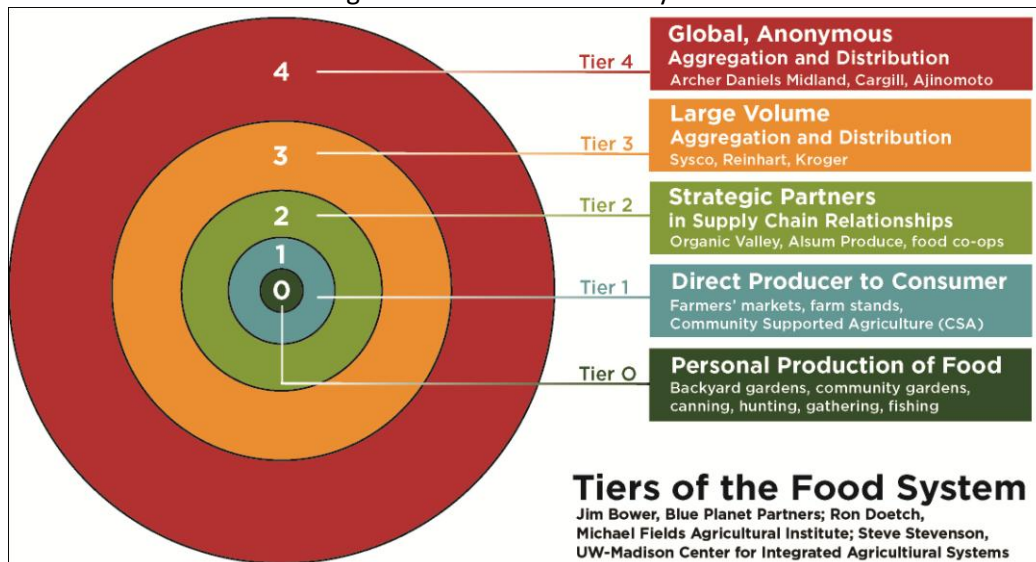
The rising popularity of local food markets and growing concern for food security, food safety, environmental sustainability, and regional collaboration present an opportunity for re-examining our food system as a whole. It is the Lab’s perspective that local and regional food systems cannot replace the national or global systems, but can complement them. For example, where local and regional food systems are limited by seasonal effects and climate, wider scale systems are necessary to continue offering consumers a wide variety and quality of foods in all seasons. On the other hand, global food systems make all regions equally vulnerable to economic or energy shocks in one place. As an example, “the 2007/2008 commodity crisis underscored the vulnerability of the global food system to shocks from extreme weather events, energy and financial markets, as well as government interventions in the form of export bans and other measures designed to avoid domestic adjustment to global scarcity” (Hertel, 2010, p. 1).

The Lab is interested in working across scales to create an overall stronger, more just, more sustainable system. In a critique of the wider sustainability debate that Newman and Dale (2005) say often boils down to “small is beautiful” versus “bigger is better”, they offer a call for engagement on multiple system scales:

Given that we now live in a complex, coevolving socioecological system (Norgaard, 1994), the notion that we could successfully wall off our communities and activities into isolated local enterprises is unlikely, especially given global economic interdependencies with accelerating tendencies to large scale. As Berkes (2006) observes, small-scale systems are rarely free of external drivers, and it is only by accepting the need to engage on many scales that we can successfully respond to challenges in ways critically linked to community resilience.

This vision brings us to the Tiers of the Food System diagram (see Figure 1) recently created by Bower et al. (2010) at the University of Wisconsin (UW)-Madison’s Center for Integrated Agricultural Systems. The diagram illustrates how food systems can “nest” inside each other and build up to a coherent whole.

Figure 1. Tiers of the Food System



Source: UW-Madison Center for Integrated Agricultural Systems. Used with permission.

The question for this paper is not whether local or regional food can feed us all, but how smaller scale systems can fit into the wider food system, and how the overall system can be altered to generate the

best outcomes for us all. For rural America in particular, the question is how best to engage in the food system to create economic, social, and environmental benefits for rural populations and the nation. To understand how to change the system, and which direction to go, we must understand the system as it is now and our goals for the future. This paper is the first step for the RUPRI Rural Futures Lab toward ongoing research and engagement on the topic of food systems as an economic driver for rural America.

Changes and challenges in the U.S. food system

Today, the U.S. produces nearly \$300 billion worth of agricultural products per year (USDA, 2007a). To produce so much food, our food system has been transformed over the last century (Dimitri, Effland & Conklin, 2005). Changes in agricultural technologies, farm and food system structures, and consumer demands have had far-reaching implications for rural America and the food system as a whole.

Prior to World War I, Americans largely relied on seasonal, local, minimally processed foods for their meals (Martinez et al., 2010). Technological improvements in refrigeration, transportation, and agricultural production techniques have vastly increased the efficiency of food production in the U.S. Our agricultural system produces more food at lower cost than ever before. Since 2000, Americans have spent less than 10% of their income on food per year, even when global food prices rose in 2008 (USDA, 2009a). Food production and processing have become more specialized, and food imports have risen. The food system has become increasingly national and global in scope, and the scaling up of the system has had major implications for the structure of our food system and its effects on rural communities, public health, and national well-being.

Structural changes

Several trends in the overall food system are consolidation among producers and processors, vertical integration along the supply chain, contracting among farmers and buyers, and differentiation in food retailing and distribution.

- *Consolidation* is the control of certain processes in the food system by fewer firms. For example, four companies own 64% of the pork-packing industry, and 83% of the beef-packing industry (Hendrickson & Heffernan, 2005). At the farm level, agricultural consolidation means that fewer farms are producing greater shares of American agricultural output (USDA, 2007b), and they are growing less diverse crops and varieties than ever before (Christensen, 2002).
- *Vertical integration* occurs where single or cooperating firms control multiple steps along the food production supply chain—from the purchase of agricultural inputs (like seeds or pesticides) to the management of the farms themselves to the distribution systems and food processing plants. Examples of vertical integration include farmers who collectively own their input supply, marketing, or processing cooperatives, or private firms such as a citrus producer that owns both the orange groves and processing plant (MacDonald & Korb, 2008).
- *Contractual arrangements* to manage relationships between farmers and their buyers are increasingly used between producers and processors or other buyers. In 2005, 41% of agricultural sales were contracted, up from 28% in 1991 (MacDonald & Korb, 2008). Contracts can benefit farmers by reducing their risks related to fluctuations in commodity prices or yields or ensuring a buyer for perishable goods in a thin market. On the other hand, contracting can pose its own risks by reducing competition among buyers and limiting production choices and economic returns for farmers (MacDonald & Korb, 2008).

- Increased *differentiation among retailers* has resulted from new marketing methods and consumer demands for more diverse shopping options. Americans buy their food products from a wider array of places, including grocery stores, supercenters, dollar stores, and farmers markets.

In particular, consolidation and vertical integration of the agriculture and food industry mean that decision making about farming and food processing is consolidated into fewer hands, and the money earned is concentrated there, too. These structural changes have had big impacts on all parts of the food supply chain and food policy, with diverse outcomes for farmers and consumers.

Current challenges in the U.S. food system

Some agriculture experts say that many of the current practices and structure of the food system are not sustainable over the long term (see, for example, Hanson & Hendrickson, 2009; Kirschenmann, 2010; Imhoff, 2010). Many of our sustainability challenges are not limited to large-scale agriculture and can be problems in local systems, too. The issues associated with our food systems can, however, be amplified by large-scale industrial production. Independent of the scale of the agricultural supply chain used, we should be holding all food production to certain standards of sustainability.

The emerging problems associated with the food system are categorized below according to the triple-bottom line approach, which seeks to identify social, environmental, and economic outcomes for communities. Many of these issues cut across the three categories, such as the economic costs of food safety problems that affect public health. Each of the examples presented are only briefly noted to illustrate the interconnected nature of the food system with many other aspects of our lives, and the breadth of challenges we face. For further reading on each issue, a citation or website is provided.

The **social challenges** of the food system include public health issues, food safety concerns, and equity and vulnerability among certain populations and possibly the food system as a whole. The following social challenges all have economic implications, too:

Food insecurity and public health	<ul style="list-style-type: none"> • Households using emergency food pantries rose from 3.9 to 5.6 million between 2007 and 2009 (Andrews, 2010). • Food insecurity in the U.S. disproportionately affects vulnerable populations such as rural or inner-city communities, low-income or minority groups, and children or the elderly (www.feedthefuture.org). For example, remote rural areas are likely to be “food deserts” where healthy fresh food is difficult to access (Straccuzzi & Ward, 2010). • Weight problems and corresponding public health issues have risen. One third of adults and one fifth of children in the U.S. are obese or overweight (Kettel Khan et al., 2009; www.cdc.gov/obesity).
Environmental health	<ul style="list-style-type: none"> • Antibiotic use in food animal production has contributed to resistant strains of bacteria (World Health Organization, 2002). Resistant strains have been found in the food supply and in humans, with “adverse human health consequences” (Frieden, 2010). • Maintaining a safe food supply during weather emergencies or potential threats to homeland security have led to questions about the vulnerability of the increasingly consolidated food system (American Planning Association, 2007).

Food safety problems	<ul style="list-style-type: none"> Recent outbreaks of salmonella in mass-produced eggs (Davey, 2010) and E-coli in spinach cause concern among consumers and remain an important priority for the U.S. government (www.foodsafetyworkinggroup.gov). Vulnerable populations such as the elderly and children tend to suffer the worst consequences of unsafe food products (Donaghy, Grifo, Halpern & Moline, 2010).
Demographic changes	<ul style="list-style-type: none"> The need for and treatment of agricultural laborers are linked to immigration policy (www.fb.org/issues/docs/immigration10.pdf; www.farmworkerjustice.org). An aging farm population and high entry costs of farming raise questions about how a new generation of farmers can afford to enter the industry (Goeller, 2007). Rural population decline and youth outmigration occurs as a result of declining labor markets and wages in rural communities (Swenson 2009). As urban and suburban areas expand into rural and agricultural areas, conflicts arise among farm neighbors in relation to nature of production (noise, smells, slow moving vehicles, etc.) and the rising value of land (http://edis.ifas.ufl.edu/fe549). On the other hand, the new neighbors present opportunities for direct marketing of farm products.

Environmental challenges of the food system center around unsustainable resource use, pollution problems, and decreasing diversity in agricultural ecosystems:

Pollution and waste	<ul style="list-style-type: none"> Over time, the use of pesticides and fertilizers can contaminate our water sources, land, and air (Gilliom et al., 2006). Over one billion tons of pesticides are used in the U.S. per year (U.S. Environmental Protection Agency [EPA], 2007). Huge contained animal feeding operations (CAFOs) (www.ansc.purdue.edu/CAFO) create large amounts of manure waste and other byproducts that can pollute the air and water around them (Oluski & Adeola, 2007). CAFOs are also major users of antibiotics as growth stimulators. Forty to 50% of food produced in the U.S. never gets eaten, creating waste for landfills and loss for society (http://www.endhunger.org/food_waste.htm).
Energy and resources	<ul style="list-style-type: none"> Although energy use in agricultural production has declined since the 1970s, energy costs make up an average of 14% of production costs, so farmers are sensitive to changes in the price of gas and other energy sources (Schnepf, 2004). Farm economics are increasingly influenced by ethanol, wind, or gas production that supplements or competes for agricultural land and products (USDA-CSREES, 2007). Worldwide, 18% of greenhouse gases arise from livestock production and contribute to climate change (Steinfeld et al., 2006). Beef and lamb are the biggest greenhouse gas producers, followed by swine and poultry (http://www.leopold.iastate.edu/research/marketing_files/LCA.html) Heavy use of water in agricultural irrigation is depleting aquifers (RUPRI Rural Futures Lab's case study of Ogallala Commons, 2010).

Biodiversity and farmland	<ul style="list-style-type: none"> Decreasing crop and seed stock diversity results in less biodiversity in agricultural ecosystems and increased vulnerability of crops to disease and pests. Corn alone is planted on 25% of U.S. cropland (Christensen, 2002). Between 2002 and 2007, over four million acres of farmland were lost to housing and other developments (farmland.org). Varied rural landscapes can provide wildlife habitat and aesthetic pleasure while providing ecosystem services like water source protection and carbon sequestration.
---------------------------	---

The **economic challenges** of food systems therefore relate to the consolidation of agriculture, questions about monopolistic practices, and the economic costs of many of the social, health, and environmental concerns above:

Consolidation	<ul style="list-style-type: none"> Current agriculture policies and structural changes often favor large-scale farms. It is increasingly difficult for traditional mid-size family farms to compete in consolidated commodity markets (Kirschenmann et al., n.d.; Hinrichs, 2010). Rural financial wealth leaks out of the community when local and rural people lose ownership of farmland and agricultural supply chains (Kelly & Ratner, 2010). Some farmers under contract to vertically integrated agribusiness firms have less control over their production methods and markets (MacDonald & Korb, 2008), and production decisions may be made by external economic stakeholders with little connection to the farming community (Kirschenmann et al., n.d.).
Subsidies	<ul style="list-style-type: none"> The Congressional Budget Office estimates for FY 2008-2012 that the cost for commodity programs was \$36.5 billion. Subsidies for commodity farmers tend to go to high-income farmers (USDA, 2003). Tension between agriculture subsidies and rural development needs create a false dichotomy between farmers and rural communities (RUPRI, 2007).
Hidden externalities	<ul style="list-style-type: none"> The hidden costs of large-scale system are many, such as a new report that estimates that foodborne illness costs the nation about \$152 billion annually (Scharff, 2010). Growth in factory farms and CAFOs raise questions about the desire for economic efficiency over environmental problems such as massive waste disposal, or social problems like the ethical implications of CAFO practices (Imhoff, 2010).

Benefits and challenges of local and regional food systems

Our food system challenges are not insurmountable, however, and the increased awareness of these challenges has given rise to myriad new solutions. While not all of the challenges can be addressed by local and national food systems, many communities and regions have started with these smaller scale systems to test out possible solutions. This section identifies the main goals of local and regional food systems, and identifies supporting or challenging research where it is available.

➤ Economic Development

In the current system, rural communities “lose hundreds of millions of dollars each year because they import food from far away, or because farmers spend more money raising food commodities than they get back from the marketplace” (Meter & Rosales, 2001). Building local and regional food systems may help capture some of those losses. The economic benefits of local and regional food systems include opportunities for small farmers and more wealth retained in rural economies. Challenges include insufficient regional food infrastructure and connecting remote rural communities to regional or local food systems.

Farmers gain economic benefit from local food systems in several ways:

- Local food systems offer *more opportunities and control for small and diversified producers*. They provide outlets for smaller-scale farmers who produce more diverse and differentiated products and on-farm, value added or processed products, and they allow farmers to make more decisions about the methods of production and processing that they use (Martinez et al., 2010).
- Small-scale producers *learn entrepreneurial business skills* through local and regional markets that may contribute to long-term rural economic development (Feenstra et al., 2003). Farmers who participate in farmers markets gain skills in customer service, pricing, and marketing, as well as business confidence. Direct marketing may encourage “a climate of entrepreneurship and risk-taking” (Gale, 1997, p. 25) in rural communities with longer term economic benefits for rural communities.
- Some consumers are willing to pay *premium prices for specialty products* such as organic or locally produced foods, and producers in local and regional markets have taken advantage of this trend. Some consumers are increasingly savvy about the origins of their food and are willing to pay for the features they seek (Martinez et al., 2010).
- Once local producers are established and their products are recognized as desirable, they may have *opportunities to scale up* to larger distribution systems in the region. Small scale producers have new opportunities to grow their business when regions pursue farm-to-school or other programs that connect institutions to local farmers. Across the nation, grocery retailers are increasingly willing to try local products as a way to distinguish themselves in the increasingly saturated retail industry (Tropp et al., 2008). For example, the retailing giant Walmart recently committed to selling 9% of its produce from local (defined as in-state) sources by 2015, which will double their current local produce sales (Clifford, 2010). This change presents an opportunity for small and mid-size farmers, but it raises questions about the conditions Walmart and other large retailers will require from suppliers in terms of the scale, reliability, price, quality, availability, and other characteristics of their farms and products.

Rural communities themselves benefit when more wealth is retained in or attracted to the local economy through food products that are produced, processed, and consumed in the region. Agricultural tourism can bring dollars from urban and other outside visitors (Gale, 1997). Within communities, University of Iowa economist Dave Swenson has consistently found that replacing “imported foodstuffs” (2009, p. 1) with locally grown and processed produce, meat, and eggs can create jobs and boost local retail returns in agriculture and related industries in several regions of Iowa (Swenson, 2010a; Swenson, 2010b). He uses an import substitution framework to analyze the predicted benefits of substituting externally grown fruit and vegetables with locally produced and marketed goods. Similarly, farmers markets and other direct marketing methods have been shown to benefit local and regional economies (Brown & Miller, 2008). They provide economic diversity and help keep local dollars in the economy.

Martinez et al. (2010) cite multiple studies where money spent at a farmers market results in increased income, sales, and job growth in the local economy. Finally, Ecotrust in Portland, Oregon, has found a multiplier effect for a school lunch project that bought local food (Kane & Kruse, 2009). Import substitution through local and regional food systems in many forms has been shown to help retain wealth in communities and regions, including in rural places.

Beyond direct marketing, the *lack of regional food processing and distribution infrastructure* is an important challenge and opportunity for smaller scale food systems. A bottleneck for local meat producers is a lack of local or regional processing facilities (Cloud, 2010). This infrastructure challenge is limiting the growth and economic benefits of regional animal production. For example, Swenson found that if a rural region in Iowa “were to add small meat slaughtering and processing capacities to accommodate an increase in locally produced lamb/goat and poultry consumption, each locker plant would add 5.1 jobs to the region, as well as \$178,937 in labor incomes” (2009, p. 1). Stronger regional and local systems may also be maintained by using existing rural “anchor institutions” like schools or hospitals to support the local food economy and provide opportunities for regional farmers to scale up and/or cooperate for their economic benefit. It is unclear, however, if regional distribution systems may also benefit rural communities by helping to stem the trend of disappearing rural groceries, or if local farmers markets are contributing to that trend.

For rural audiences in particular, a real concern about local and regional food systems is the difficulty for *remote rural places* to benefit. Research in the U.S. shows that local food systems tend to be near urban areas (Martinez et al., 2010). This finding emphasizes the interdependent nature of urban and rural communities, but it also leads to a concern about the participation of remote rural communities. Some regional advocates note that “re-regionalized” food systems have effectively included remote rural communities (Marsden, 2010).

➤ Food Security and Public Health

Research has found that the environmental, social, and economic factors that influence food insecurity influence public health outcomes (Baker, Schootman, Barnidge & Kelly, 2006; Cheadle, Psaty, Curry, Wagner, Diehr, Koepsell & Kristal, 1991; Nord, Andrews & Carlson, 2009). Health problems related to food insecurity include malnutrition on the one hand, and rising obesity rates on the other. Many new ideas for combating food insecurity and public health problems are being tested at local levels.

At the household level, local and regional food systems *may help improve the diet of Americans*. Community participants in direct market systems tend to eat a wider variety and greater quantity of fresh produce than the general American population. Brown and Miller (2008) cite multiple studies that show consumers who participate in local CSAs,

What is Food Security/Insecurity?

“Food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.” (1996 World Food Summit)

Food security framework: Four elements

The current international understanding of the issue says that for a household or community to be food secure, their food supplies must be

- *available,*
- *accessible,*
- *stable,* and
- people must have the capacity to *effectively utilize* those supplies.

(<http://www.feedthefuture.gov/commitment.html>)

Food insecurity is a complex issue that stems from a wide range of social, environmental, and economic factors. Poverty, governmental policies, business practices, and weather events can all cause or contribute to food insecurity at multiple scales, from the household to national or even continental levels. Food insecurity can be chronic or temporary (FAO, 2008).

for example, improved their food shopping, preparation, and eating habits. On the other hand, recent claims that local food is more nutritious have been questioned in research, and continue to be explored (Harvard Medical School, 2010).

A major concern about local food systems is whether the benefits accrue only to those who can pay for them, *leaving low-income Americans behind*. The barriers to consumers for participating in local food systems have been identified as affordability, lack of culturally-appropriate foods, and a lack of cooking knowledge (Martinez et al., 2010), all of which map onto the food insecurity framework (see text box on previous page). There is limited empirical data available on the ability of local and regional food systems to help combat food insecurity or other social issues across demographic lines. Critics and even advocates of localization have rightly noted the rise of an assumption that Born and Purcell (2006) call the “local trap”: “the assumption that local is inherently good” (2006, p. 195). Assuming local or regional systems always create better social or environmental outcomes will not inevitably lead to the desired impacts for food systems. Food systems advocates must be explicit about applying the values they want to see in food production or distribution, no matter the scale.

One community-level example where social inclusion is made an explicit goal of a local food system is Will Allen’s Growing Power project (www.growingpower.org). Growing Power is an urban agriculture project that seeks to create a community food system across income and racial barriers based on education and inclusion. The 17-year-old organization focuses primarily on creating more varied food choices and better educated consumers (and growers) among diverse communities in Milwaukee, Chicago, and now beyond. To scale up their activities, Growing Power also connects with rural farmers in the Wisconsin-Illinois region. More research is necessary to look at the food security and public health outcomes of promising projects like Growing Power.

➤ **Environmental Sustainability**

The environmental benefits of local and regional food systems are a contentious area that researchers and practitioners are currently testing. The environmental sustainability of the food system is a major question for agriculture today. At the same time, the “local trap” also applies to assumptions about the perceived environmental benefits of local and regional food systems. Research has found that “local” often connotes more sustainable or environmentally friendly to consumers (Martinez et al., 2010), though such assumptions can sometimes be unfounded. Nonetheless, advocates hope that local systems can improve agricultural and ecosystem diversity and reduce pollution and waste from industrial practices. Local and regional systems’ best contribution to the sustainability movement may be the testing ground provided by many communities trying out new ideas across the country.

Smaller scale systems may *improve agricultural and ecosystem diversity* in the landscape. The practice of monoculture is associated with large-scale agriculture. Smaller farms, which make up most of the producers in local food systems, tend to produce more diverse products and use a wider variety of seeds and crops (Martinez et al., 2010). Likewise, mid-size farms have been found to offer a range of ecosystem services and relative economies of scale, but they are struggling to compete in the increasingly consolidated agriculture industry (Kirschenman, Stevenson, Buttel, Lyson & Duffy., n.d.). To address these issues, the “Agriculture of the Middle” research agenda examines “the problem of the disproportionate disappearance of midsize farms and ranches in the U.S., and the markets and infrastructure needed to maintain their viability” (Clancy & Lehrer, 2010, p.1). Finally, the loss of good agricultural land to urban and suburban development (USDA, 2009c) is a concern among rural

communities, and future research should address how local systems help protect acres at risk for such development.

In addition, some current practices among industrial agricultural producers have created pollution and contributed to topsoil erosion and other negative *environmental and public health impacts*. For example, CAFO operations are increasingly under scrutiny in the U.S. for air and water pollution issues related to the high density of animals in one place. Since 2003, the American Public Health Association (2007) has supported a moratorium on new CAFO development until the environmental and public health impacts are better understood. Future research on the ecological impact of food systems should include the prevalence of water, air, and soil conservation practices by producers at all scales.

The evidence for *relative energy use among local or regional foods* is not resolved. Local and regional food products travel less far, or create fewer “food miles”, than many agricultural products in the national and global supply chains. Some research has found that locally produced foods generate a smaller carbon footprint through less transportation (Pirog et al., 2001). This comparison is highly dependent on the processes and methods of the systems, however. Where local systems use less energy efficient transport vehicles, or where processing the food is less efficient, small scale systems can use more energy per food item to grow, transport, or process than those in the large-scale systems (Martinez et al., 2009). Yet transportation makes up a smaller percentage of energy use in a “life cycle assessment” of food systems (see p. 15) than food processing and household consumption and storage (Heller & Keoleian, 2007). Production methods and climate issues are also important in the calculation of energy use in food systems. For example, some (especially large-scale) production and processing methods use large quantities of energy embodied in animal feed, fertilizer and pesticide quantities used, heating of greenhouses, food packaging, and refrigeration.

In the future, we can expect smaller scale systems to improve their carbon footprint with regional infrastructure and improved practices. At the same time, an expectation that all foods can and should be produced locally or that all people will eat purely according to local seasons may be unrealistic according to recent analyses of regional food systems like the Greater Philadelphia Food System Study (Delaware Valley Regional Planning Commission [DVRPC], 2010). Based on their own climate, land base, and production capacities, different regions will have to address the question of when local/regional or national/global systems are appropriate.

➤ **Food Safety**

Some people worry over the food safety problems associated with the *spread of disease through large-scale agricultural production*, and they hope to use the shorter supply chains of regional production systems to keep track of where their food comes from. Overall, America enjoys one of the safest food systems in the world (Donaghy et al., 2010), but recent salmonella and E. coli bacteria outbreaks have raised questions about that status in the future. A new report by the Union of Concerned Scientists finds that “globalization creates foodborne outbreaks today that are more widespread and difficult to contain than in the past” (Donaghy et al., 2010). They recall the 2009 salmonella outbreak in peanut butter paste, which required the nationwide recall of 3,918 food products.

Consumers are increasingly interested in the origins and safety of their food. Local and regional food systems currently have the advantage of a *positive public perception* of food safety. The Leopold Center for Sustainable Agriculture recently surveyed consumers and found that “85 and 88 percent of

respondents, respectively, perceived local and regional food systems to be somewhat safe or very safe, compared to only 12 percent for the global food system” (Pirog & Larson, 2007).

Despite this perception, smaller scale markets *do not necessarily have the capacity to report and identify sources of foodborne pathogens*. Local, direct markets may not need extensive trace-back systems if consumers are buying direct from farmers, but localized outbreaks may be harder to identify. Regional food systems that hope to incorporate indirect marketing methods for scaled-up systems must address food safety. Where consumers are attracted to local foods because they believe that they know more about the system used to produce it, regions need to create effective trace-back mechanisms and/or food labeling to assure food safety and quality information (Martinez et al., 2010).

➤ **Community Development and Resilience**

Another important hope for local and regional food is to contribute to community development and regional resilience. In a review of literature on farmers markets and CSAs, Brown and Miller (2008) found that farmers and local consumers cited *a sense of community* as the most frequently cited benefit of direct markets.

At the community level, smaller scale food systems may allow for *local action and policymaking*. For example, food policy councils “bring together stakeholders from diverse food-related sectors to examine how the food system is operating and to develop recommendations on how to improve it” (Food Security Coalition, n.d., para. 1). Food policy councils can take action at the community or state level. Theoretically, the more community members and stakeholders are involved in food systems issues, the more democratic the system can be. Some preliminary research has shown that representative membership is still a challenge among food policy councils, but the idea shows promise (Harper et al., 2009). Research by the Leopold Center for Urban Agriculture has also found that developing local food networks can increase leadership capacity and networking for communication and funding access in communities (R. Pirog, personal communication, 2010).

Local and regional food systems have *created space for a new generation of farmers* to participate in agriculture and their communities. Brown and Miller (2008) note several producer surveys that find farmers market vendors in New Jersey are younger than the average farmer in the U.S., while CSA producers across 43 states were more likely to be female and were ten years younger than the average U.S. farmer profiled in the 1997 U.S. Census of Agriculture. Research on the profitability of small farms shows, however, shows that most rely on off-farm income sources, though it is not possible from the Census data to distinguish hobby farmers from entrepreneurial start-ups (USDA, 2007c). For the enthusiasm and hope for local and regional food systems to work, policymakers and community development practitioners need to find ways to distinguish between the two types of small farmers, and help entrepreneurial farmers find ways to make their farms sustainable in the long term.

Local food marketing also *educates the local community* on the sources of their food. “By making local food more visible in public spaces, [farmers markets] educate customers on the potential for and seasonal limits of local food” (Brown & Miller, 2008). As demand for local food grows, producers grow a greater diversity of foods within the region, which is necessary for a functional regional food system as well as contributing to local food self-reliance. Among consumers, having a choice among food sources is important for community resilience and food safety reasons in the context of an increasingly consolidated and corporate food system (Stamer, 2010). The increasing use of genetically modified

foods presents another challenge to consumers and markets, and local and regional systems may provide a voice and a choice for consumers with concerns about these issues.

Moving forward: Research, policy, and practice

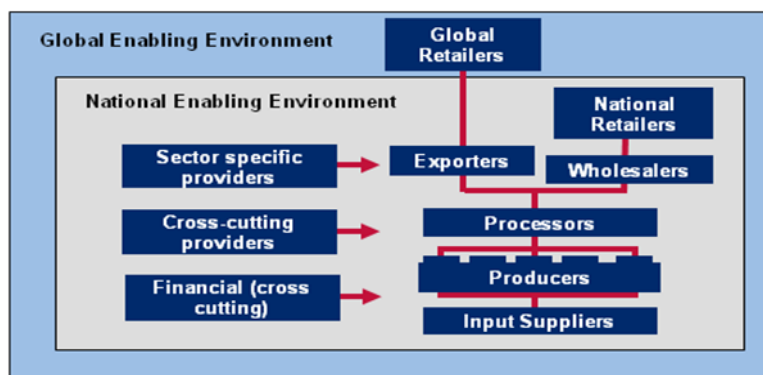
Goals of food security, food safety, and community or economic development through local or regional food systems all require a much more comprehensive understanding of our current systems. This section first outlines a few ways researchers have begun to measure and talk about existing food systems. Later, it lays out current and upcoming policies and programs that can affect our food systems at all scales.

Measuring food systems

Identifying and measuring any system is a complex process. Food systems are made up of many distinct processes and stakeholders involved in growing, processing, distributing and consuming food, but we have seen that they are also highly related to other important systems such as energy, ecosystems, and public health. There are several ways that researchers are exploring the nature and potential of food systems. These include value chain analysis, life cycle assessments, and case studies on regional food systems.

Value chain analysis is used in economic development activities as a tool to identify gaps, bottlenecks, and other problems (or opportunities) within a complex production system such as a food system. A value chain “is a network of companies or collaborating players who work together to satisfy market demands for specific products or services” (Value Chain Partnerships, 2009). Value chains are based on industrial supply chains, which typically focus on maximizing economic outcomes (NetMBA, n.d.). Though value chains are still a market-based approach, they have been adapted to include positive social or environmental outcomes, too. Organizations in the U.S. are using the concept to improve regional food system efforts (Value Chains Partnerships network) or show where rural places contribute to food production (Feser & Isserman, 2010; Sweitzer, Hamilton & Sevielle, 2008). Figure 2 depicts a generic value chain diagram that helps to visualize the many stakeholders, processes, and enabling structures involved in the production of a good.

Figure 2. A diagram of a simple value chain structure used by the U.S. Agency for International Development (USAID).



Source: USAID Briefing Paper, 2008.

Life cycle assessments attempt to analyze “the environmental impacts of products in a ‘cradle-to-grave’ fashion” (Pirog et al., 2001, p. 8) by measuring energy consumption along the entire life cycle (or supply

chain) of a product. The Environmental Protection Agency promotes the use of LCA to help businesses, policy-makers, and civil society “make more informed decisions through a better understanding of the human health and environmental impacts of products, processes, and activities” (U.S. EPA, 2010). This type of analysis has been helpful for assessing the environmental impacts of the national food system, for example (Heller & Keoleian, 2000), and it may be equally helpful to assess local and regional environmental impacts.

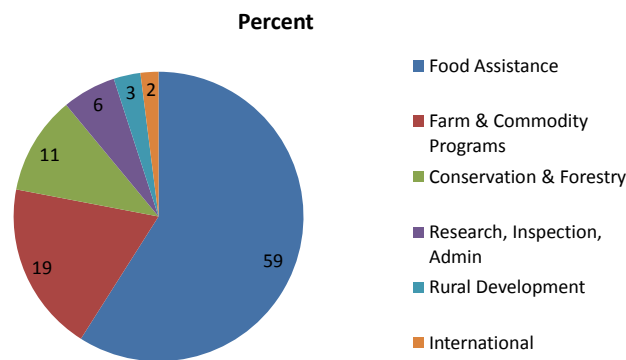
Finally, case study research on regional food systems incorporates measures of the current food needs, supplies, and flows, and estimates the capacity to produce food within regions. The Greater Philadelphia Food System Study (DVRPC, 2010) and the statewide analysis of the Minnesota food system (Meter, 2009) offer working examples of how to measure the needs and capabilities of current systems. These case studies help regions to identify land use limitations, consumer demand patterns, and potential local and regional partners for future action.

Food policy

Policy plays an important role in agriculture and the food system as a whole. Some policies that affect food are driven by interests far outside the food system, such as immigration law. National, state, and local level programs affect food systems, and can strengthen or weaken local and regional efforts.

The most influential piece of national policy related to food is the Food, Conservation and Energy Act of 2008 (known as the Farm Bill). This is a highly complex piece of omnibus legislation that encompasses 15 titles covering policy issues as varied as nutrition assistance, environmental conservation, agricultural production, and rural development. Figure 3, below, depicts how the USDA’s \$89 billion budget was allocated among major program categories in fiscal year 2008.

Figure 3. USDA Budget Breakdown, Fiscal Year 2008



Source: USDA.

Most of the USDA budget is dedicated to food assistance programs, mainly for the Supplementary Nutrition Assistance Program (SNAP), an anti-hunger program. Nineteen percent is dedicated to farm and commodity programs, which subsidize the production of corn, cotton, wheat, soybeans, and rice. The subsidies have been the target of considerable criticism, both for their trade-distorting features (with particular impact on developing countries), and for the incentives they provide for large scale agribusiness. These incentives, especially for corn, fuel the production of highly processed foods that are seen as a principal cause of obesity. Adjustments to these programs in the next Farm Bill in 2012-2013 could have a significant impact on local and regional food systems, including strengthening their

connections to SNAP recipients, placing greater emphasis on public health and wellness, and shifting the balance between the different food system levels.

Other food-related policies are often in the news today. Two pieces of legislation recently debated at the national level include a food safety bill and new regulations for animal production in CAFOs and other factory farms. It is not unusual for food regulation to arise out of newsworthy health threats, so the current federal system is extremely fragmented. As a result, the USDA and FDA handle the majority of food safety issues, but “nearly a dozen other federal agencies are responsible for smaller components of the food safety system. This complex national enterprise is supplemented by many state and local food safety programs, which often serve as the front line for enforcement and response” (Donaghy et al., 2010, p. 4).

Many food systems advocates believe that state, regional, and local policies and programs have the potential to be innovative and locally responsive, and therefore may serve as the best vehicle for future policy efforts. States can promote food systems as part of their economic development initiatives. For example, the Vermont Sustainable Agriculture project seeks to build the state’s agricultural economy and food system through a “Farm to Plate Initiative”, which also fits into a statewide green jobs effort (Vermont Sustainable Jobs Fund, 2010). State and local governments also choose how to source food for major institutions like schools, hospitals, and prisons. Where such institutions have made local food part of their sourcing plan, the hope is to provide a steady and often scaled up customer base for local and regional producers, and more nutritious food for school kids, hospital visitors, and other institutionalized people (USDA, 2010). There are an estimated 2,255 farm-to-school programs in the U.S. today (Farm to School, 2006), and the number is growing. At this time, there is very little empirical data about the economic or health outcomes of these programs.

Conclusions and ongoing questions

The benefits of local action and economic development are demonstrable, but many questions remain about the economic viability, social impact, and environmental sustainability of local, regional, and larger scale food systems. This section draws out the major themes for the Lab’s future consideration.

Rural futures: The Lab is interested in building sustainable wealth among rural communities and regions, and local and regional food systems appear to be an opportunity area for this goal. Questions for future work in this area may be:

- What is the value of rural areas to national well being and regional resilience? Which tools, such as value chain analysis and life cycle assessment, can help measure the contribution of rural regions to the food system?
- How can rural people create and keep wealth derived from food production, processing, and distribution in their regions? How can remote communities better participate?
- What are the constraints to producer participation in regional food systems? For example, what prevents small farmers from scaling up to regional markets, or commodity farmers from setting aside some of their product for local and regional use?
- What policy actions have regions successfully used to overcome known barriers to building and scaling up local and regional systems?

Regional collaboration and urban-rural interdependence: The Lab hopes to demonstrate that a strong and sustainable economy in rural America is a necessary component of national well-being. Questions about regional issues and the connections between urban and rural America include:

- What do regional food systems look like today in terms of their economic reach, social inclusion, and environmental impacts? For example, what do regional food systems contribute to economic development in rural America or to public health outcomes in inner cities?
- Do local and regional food systems help protect good agricultural farmland from development? What are the ecosystem services we derive from agricultural regions, and how can we quantify and protect them?
- Are local food systems connecting small or mid-size rural producers to urban consumers? Using the “Agriculture of the Middle” framework, what policies are helping to drive mid-size farmers out of business?
- How can we use the “Tiers of the Food System” model to examine when a local or regional food scale is more appropriate, and when globally produced food is a better option?

Next generation: An important consideration for the Lab is the next generation of rural Americans.

- How we can support new and young farmers, and the transfer of farms between generations?
- How do young people fit into the local and regional food movement and food value chains?
- How can we improve public health outcomes related to food and nutrition among children and young adults?

Social equity: An important lens through which the Lab looks at potential economic drivers is social equity, or the extent to which disadvantaged people and places are able to derive benefit in income and well-being. Questions we may ask include:

- How can minority, Native American, or low-income rural populations more fully participate in and benefit from local and regional food systems?
- How can the Lab support efforts to connect healthy lifestyles projects with food systems development?

Entrepreneurship & innovation: Farmers, like many stakeholders in the agricultural value chain, have always been entrepreneurs. Based on RUPRI’s experience with entrepreneurship in rural communities, the Lab may pursue the following inquiries:

- How can policymakers and communities encourage entrepreneurship within local and regional food systems in rural regions?
- How do innovations in renewable energy and sustainable farming systems contribute to food systems? What are the compatibilities and incompatibilities between food system and energy system policy goals?
- Can agricultural entrepreneurs benefit from participating in and promoting climate change mitigation and ecosystem services through diversity and new technologies on their farms?

Using some of these questions and responses to this paper as a basis, the RUPRI Rural Futures Lab will continue to explore how the Lab can contribute to the food system movement and rural advancement. The Lab and its partners will continue to investigate how food systems can be a key economic driver for rural communities looking to extract the best social, economic, and environmental outcomes from our complex food system. Some ideas for future Lab projects include:

- Identify and publicize good examples of regional food systems that include rural communities and producers.
- Work across regions of the U.S. to help better understand why certain food system efforts are more effective, and how those approaches can be applied elsewhere.
- Support research and practices that emphasize local or regional ownership and decentralization within agriculture.
- Help identify where communities and regions can gain leverage in the food system (by gaining access to markets or inputs, improving decision making processes in regulation and community food systems, etc.).

Works Cited

- American Planning Association (APA). (2007, May). Policy guide on community and regional food planning. Retrieved August 2010 from <http://www.bractrf.com/documents/APAPolicyGuide-CommunityandRegionalFoodPlanning.pdf>
- American Public Health Association (APHA). (2007). Toward a healthy, sustainable food system. Retrieved July 2010 from <http://www.apha.org/advocacy/policy/policysearch/default.htm?id=1361>
- Andrews, M. (2010, December). More Americans relied on food assistance during recession. *Amber Waves: The Economics of Food, Farming, Natural Resources and Rural America*. Washington, DC: Economic Research Service (ERS), U.S. Department of Agriculture (USDA). Retrieved November 2010 from <http://www.ers.usda.gov/AmberWaves/December10/Findings/FoodAssistance.htm>
- Baker, E. A., Schootman, M., Barnidge, E. & Kelly, C. (2006, July). The role of race and poverty in access to foods that enable individuals to adhere to dietary guidelines. *Preventing Chronic Disease*, 3(3), 1-11.
- Berkes, F. (2006). From community-based resource management to complex systems. *Ecology and Society* 11(1), 45.
- Born, B. & Purcell, M. (2006). Avoiding the local trap: Scale and food systems in planning research. *Journal of Planning Education and Research*, 26, 195. DOI: 10.1177/0739456X06291389
- Bower, J., Doetch, R., Fields, M. & Stevenson, S. (2010, August). Tiers of the food system [graphic]. University of Wisconsin-Madison Center for Integrated Agricultural Systems.
- Brown, C. & Miller, S. (2008, November 5). The impacts of local markets: A review of research on farmers markets and community supported agriculture (CSA). *American Journal of Agricultural Economics*, 90, 1296-1302. DOI: 10.1111/j.1467-8276.2008.01220.x
- Cheadle, A., Psaty, B. M., Curry, S., Wagner, E., Diehr, P., Koepsell, T. & Kristal, A. (1991). Community-level comparisons between the grocery store environment and individual dietary practices. *Preventative Medicine*, 20, 250-261.
- Christensen, L. A. (2002). Soil, nutrient, and water management systems used in U.S. corn production. *Agriculture Information Bulletin*, 774. Washington, DC: ERS/USDA. Retrieved on August 28, 2010 from www.ers.usda.gov/Publications/aib774
- Clancy, K. & Lehrer, N. (2010, May). A priority research agenda for agriculture of the middle. Retrieved September 2010 from www.agofthemiddle.org
- Clancy, K. & Ruhf, K. (2010). Is local enough? Some arguments for regional food systems. Agricultural and Applied Economics Association (AAEA), *Choices: The Magazine of Farm, Food, and Resource Issues*, 25(1). Retrieved June 2, 2010, from <http://www.choicesmagazine.org/magazine/article.php?article=114>
- Clifford, S. (2010, October 14). Wal-Mart to buy more local produce. *The New York Times*. Retrieved November 2010 from <http://www.nytimes.com/2010/10/15/business/15walmart.html>
- Cloud, J. (2010, May). The fight to save small-scale slaughterhouses. *The Atlantic*. Retrieved June 2010 from <http://www.theatlantic.com/food/archive/2010/05/the-fight-to-save-small-scale-slaughterhouses/57114>
- Dabson, B. (2010). Perspectives on regional collaboration. Rural Futures Lab Foundation Paper. Columbia, MO: Rural Policy Research Institute (RUPRI).

- Davey, M. (2010, August 26). Iowa town is tense as U.S. ties farm to Salmonella. *The New York Times*. Retrieved August 2010 from <http://www.nytimes.com/2010/08/27/us/27eggs.html>
- Delaware Valley Regional Planning Commission (DVRPC). (2010, January). Greater Philadelphia food system study. Retrieved June 2010 from <http://www.dvrpc.org/reports/09066A.pdf>
- Dimitri, C., Effland, A. & Conklin, N. (2005, June). The 20th Century transformation of U.S. agriculture and farm policy. Economic Information Bulletin No. 3. Electronic Publication: ERS/USDA.
- Donaghy, T., Grifo, F. T., Halpern, M. & Moline, H. (2010, September). Driving the fox from the henhouse: Improving oversight of food safety at the FDA and USDA. The Scientific Integrity Program of the Union of Concerned Scientists. Retrieved October 2010 from http://www.ucsusa.org/assets/documents/scientific_integrity/driving-fox-from-henhouse-food-safety-report.pdf
- Donald, B., Gertler, M., Gray, M. & Lobao, L. (2010, June). Re-regionalizing the food system? *Cambridge Journal of Regions, Economy and Society*, 3, 171-175. Retrieved September 2010 from <http://cjres.oxfordjournals.org/content/3/2/171.full.pdf+html>
- Farm to School. (2006). *Farm to School*. Retrieved October 2010 from <http://www.farmtoschool.org>
- Feenstra, G., Lewis, C., Hinrichs, C., Gillespie, G. & Hilchey, D. (2003). Entrepreneurial outcomes and enterprise size in U.S. retail farmers' markets, *American Journal of Alternative Agriculture*, 18, 46-55.
- Feser, E. & Isserman, A. (2009, February). The rural role in national value chains. *Regional Studies*, 43(1), 89-109.
- Food and Agriculture Organization (FAO). (2008). Food security information for action, Practical Guides. Retrieved September 2010 from www.foodsec.org/docs/concepts_guide.pdf
- Food Security Coalition. (n.d.) North American Food Policy Council Webpage. Retrieved in September 2010 from <http://www.foodsecurity.org/FPC/>
- Frieden, F. (2010, July 13). Letter to Congressional Subcommittee on Health, House Committee on Energy and Commerce. Retrieved in September 2010 from <http://www.livablefutureblog.com/wp-content/uploads/2010/08/2069918-chairman-pallone.pdf>
- Gale, F. (1997). Direct farm marketing as a rural development tool. *Rural Development Perspectives*, 12(2), 19-25. Washington, DC: ERS/USDA. Retrieved August 3, 2010 from <http://151.121.68.30/Publications/rdp/rdp0297/rdp0297d.pdf>
- Gilliom, R. J., Barbash, J. E., Crawford, C. G., Hamilton, P. A., Martin, J. D., Nakagaki, N., Nowell, L. H., Scott, J. C., Stackelberg, P. E., Thelin, G. P. & Wolock, D. M. (2006, March). Pesticides in the nation's streams and ground water, 1992-2001. Circular 1291. Washington, DC: U.S. Geological Service. Retrieved September 2010 from <http://pubs.usgs.gov/circ/2005/1291/>
- Goeller, D. (2007). Barriers to farm/ranch business succession. Retrieved from University of Nebraska, Department of Agricultural Economics web site: http://digitalcommons.unl.edu/agecon_cornhusker/336
- Hance, A., Ruhf, K. & Hunt, A. (2006). Regionalist approaches to farm and food system policy: A focus on the Northeast. Belchertown, MA: Northeast Sustainable Agriculture Working Group and The Northeast Ag Works! Project.

- Hanson, J. D. & Hendrickson, J. R. (2009). Toward a sustainable agriculture. In Franzluebbers, A.J. (Ed.), *Farming with Grass: Achieving Sustainable Mixed Agricultural Landscapes* (pp. 26-36). Ankeny, IA: Soil and Water Conservation Society.
- Harper, A., Shattuck, A., Holt-Gimenez, E., Alkon, A. & Lambrick, F. (2009). Food policy councils: Lessons learned. Oakland, CA: Food First Institute for Food and Development Policy. Retrieved June 2010 from http://foodsecurity.org/pub/Food_Policy_Councils_Report.pdf
- Harvard Medical School. (2010). *Is local food more nutritious? It depends*. White paper. Cambridge, MA: Author. Retrieved September 2010 from <http://chge.med.harvard.edu/programs/food/nutrition.html>
- Heller, M. C. & Keoleian, G. A. (2000, December 6). Life cycle-based sustainability indicators for assessment of the U.S. food system. Report No. CSS00-04. Ann Arbor, MI: University of Michigan, School of Natural Resources and Environment, Center for Sustainable Systems.
- Hendrickson, M. & Heffernan, W. (2005, January). Concentration of agricultural markets. Retrieved from University of Missouri-Columbia web site: <http://www.foodcircles.missouri.edu/CRJanuary05.pdf>
- Hertel, T. W. (2010, July 6). The global supply and demand for agricultural land in 2050: A perfect storm in the making? AAEA Presidential Address, pp. 1-59.
- Hinrichs, C. C. (2003). The practice and politics of food system localization. *Journal of Rural Studies*, 19, 33-45.
- Imhoff, D. (Ed.). (2010). The CAFO reader: The tragedy of industrial animal factories. Watershed Media. Berkeley and Los Angeles, CA: University of California Press.
- Kane, D. & Kruse, S. (2009, April 2). Ecotrust Testimony in Support of HB 2800. Submitted to the House Committee on Agriculture, Natural Resources, and Rural Communities.
- Kelly, M. & Ratner, S. (2009, November). Keeping wealth local: Shared ownership and wealth control for rural communities. For the Ford Foundation's Wealth Creation in Rural Communities. Retrieved September 2010 from <http://www.yellowwood.org/Keeping%20Wealth%20Local.pdf>
- Kettel Khan, L., Sobush, K., Keener, D., Goodman, K., Lowry, A., Kakietek, J. & Zaro, S. (2010). Recommended community strategies and measurements to prevent obesity in the United States. 58 RR07, pp. 1-26. Center for Disease Control (CDC). Retrieved September 2010 from <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5807a1.htm>
- King, R. P., Hand, M. S., DiGiacomo, G., Clancy, K., Gomez, M. I., Hardesty, S. D., Lev, L. & McLaughlin, E. W. (2010, June). Comparing the structure, size, and performance of local and mainstream food supply chains. ERR-99. Washington, DC: ERS/USDA.
- Kirschenmann, F. (2010). *Cultivating an ecological conscience: Essays from a farmer philosopher*. Constance L. Falk (Ed.), University Press of Kentucky.
- Kirschenmann, F., Stevenson, S., Buttel, F., Lyson, T. & Duffy, M. (n.d.) Why worry about the agriculture of the middle? Retrieved from Agriculture of the Middle website: http://www.agofthemiddle.org/archives/2005/08/why_worry_about.html
- Ladd, C. (2010, March 30). Giant greenhouses mean flavorful tomatoes all year. *The New York Times*. Retrieved November 2010 from <http://www.nytimes.com/2010/03/31/dining/31tomato.html>

- Lagerberg, C. & Brown, M. T. (1999, December). Improving agricultural sustainability: The case of Swedish greenhouse tomatoes. *Journal of Cleaner Production*, 7(6), 421-434.
- Leopold Center for Sustainable Agriculture. (n.d.) *Lifecycle Assessment and Related Research*. Retrieved November 2010 from http://www.leopold.iastate.edu/research/marketing_files/LCA.html
- MacDonald, J. M. & Korb, P. (2008). *Agricultural contracting update: 2005*. Economic Information Bulletin No. (EIB-35), 1-37. Washington, DC: ERS/USDA. Retrieved September 13, 2010, from <http://www.ers.usda.gov/publications/eib35/>
- Marsden, T. (2010). Mobilizing the regional eco-economy: Evolving webs of agri-food and rural development in the UK. *Cambridge Journal of Regions, Economy and Society*, 3, 225-244. Retrieved September 2010 from <http://cjres.oxfordjournals.org/content/3/2/225.full.pdf+html>
- Martinez, S., Hand, M., Da Pra, M., Pollack, S., Ralston, K., Smith, T., Vogel, S., Clark, S., Lohr, L., Low, S. & Newman, C. (2010, May). *Local food systems: Concepts, impacts and issues*. Economic Research Report No. 97. Washington, DC: ERS/USDA.
- Meter, K. (2008, October). Local food as economic development. Retrieved from the CRC web site: crcworks.org
- Meter, K. (2009, October 7). *Mapping the Minnesota food industry*. Prepared for Blue Cross Blue Shield of Minnesota, Center for Prevention. Retrieved from Crossroads Resource Center (CRC) web site: crcworks.org.
- Meter, K. & Rosales, J. (2001). Finding food in farm country: The economics of food and farming in Southwest Minnesota. Community Design Center, Hiawatha's Pantry Project. Retrieved September 2010 from <http://www.crcworks.org/ff.pdf>
- NetMBA. (n.d.) *The Value Chain*. Retrieved September 2010 from <http://www.netmba.com/strategy/value-chain>
- Newman, L. & Dale, A. (2005). Large footprints in a small world: Toward a macroeconomics of scale. *Sustainability: Science, Practice, & Policy*, 5(1), 9-19. Retrieved June 3, 2010, from <http://ejournal.nbii.org/archives/vol5iss1/0803-011.newman.html>
- Nord, M., Andrews, M. & Carlson, S. (2009, November). Household food security in the United States, 2008. Economic Research Report No. 83. Washington, DC: ERS/USDA. Retrieved November 2010 from <http://www.ers.usda.gov/publications/err83>
- Norgaard, R. (1994). *Development Betrayed: The End of Progress and a Co-evolutionary Envisioning of the Future*. New York: Routledge.
- Oluski, O. & Adeola, O. (2007, August). The possibility for reducing water pollution resulting from concentrated animal feeding operations and the impact of phytase. ID-355-W in Contained Animal Feeding Operations series, West Lafayette, IN: Purdue University and Purdue Extension. Retrieved in September 2010 from <http://www.ces.purdue.edu/extmedia/ID/cafo/ID-355-W.pdf>
- Pirog, R. & Larson, A. (2007). Consumer perceptions of the safety, health, and environmental impact of various scales and geographic origin of food supply chains. Leopold Center for Sustainable Agriculture, Iowa State University. Retrieved September 2010 from http://www.leopold.iastate.edu/pubs/staff/consumer/consumer_0907.pdf

- Pirog, R., van Pelt, T., Enshayan, K. & Cook, E. (2001, June). Food, fuel, and freeways: An Iowa perspective on how far food travels, fuel usage, and greenhouse gas emissions. Leopold Center for Sustainable Agriculture, Iowa State University.
- Ruhf, K. & Clancy, K. (2010, September). It takes a region... Exploring a regional food systems approach: A working paper. Northeast Sustainable Agriculture Working Group (NESAWG). Retrieved September 2010 from www.nefood.org
- Rural Policy Research Institute (RUPRI). (2007, October 3). Why rural development initiatives are critical to the future of American farm families: Seven considerations for committee review. Presented to U.S. Senate Committee on Agriculture, Nutrition and Forestry.
- Scharff, R. L. (2010). Health-related costs from foodborne illness in the United States. Produce Safety Project. Retrieved September 2010 from <http://www.producesafetyproject.org/admin/assets/files/Health-Related-Foodborne-Illness-Costs-Report.pdf-1.pdf>
- Schnepf, R. (2004, November). Energy use in agriculture: Background and issues. Congressional Research Service (CRS) report for Congress, Order Code RL32677. Retrieved September 2010 from <http://www.nationalaglawcenter.org/assets/crs/RL32677.pdf>
- Southwest Iowa Farm and Food Initiative. (n.d.) Retrieved August 2010 from <http://www.swiffi.org/>
- Stamer, E. (2010, August 23). Math lessons for Budiansky: Industrial concentration vs. local choice. In *Food fight: Do locavores really need math lessons?* Retrieved from Grist website: <http://www.grist.org/article/food-fight-do-locavores-really-need-math-lessons/P2>
- Steinfeld, H., Gerber, P., Wassenaar, T., Castel, V., Rosales, M. & de Haan, C. (2006). Livestock's long shadow. Rome, Italy: Food and Agriculture Organization of the United Nations. Retrieved September 3, 2010, from <http://www.fao.org/docrep/010/a0701e/a0701e00.HTM>
- Steward, H. (2006, August). How low has the farm share of retail food prices really fallen? ERR-24, 23 pp. Washington, DC: ERS/USDA. Retrieved September 10, 2010, from <http://www.ers.usda.gov/publications/err24/>.
- Stracuzzi, N. & Ward, S. (2010, Spring) What's for Dinner? Finding and affording healthy foods in New Hampshire communities. New England Issue Brief No. 21, pp. 1-16, Carsey Institute, University of New Hampshire. retrieved June 2010 from http://www.carseyinstitute.unh.edu/publications/IB_Stracuzzi-Ward_Healthy_Food.pdf
- Sweitzer, S., Hamilton, H. & Sevellie, D. (2008, July). Value chain best practices: Building knowledge for value chains that contribute to the health of source communities. Wealth Creation in Rural Communities, Phase One Reports. Funded by the Ford Foundation. White River Junction, VT: Sustainable Food Lab.
- Swenson, D. (2009). Investigating the potential economic impacts of local foods for Southeast Iowa. Ames, IA: Leopold Center for Sustainable Agriculture, Iowa State University. Retrieved September 2010 from www.leopold.iastate.edu/research/marketing_files/seiowa.html
- Swenson, D. (2010a). The economic impact of fruit and vegetable production in southwest Iowa considering local and nearby metropolitan markets. Leopold Center for Sustainable Agriculture, University of Iowa. Retrieved September 3, 2010, from www.leopold.iastate.edu/research/marketing_files/swiowa.html

- Swenson, D. (2010b). Selected measures of the economic values of increased fruit and vegetable production and consumption in the Upper Midwest. Leopold Center for Sustainable Agriculture, Iowa State University. Retrieved November 2010 from http://www.leopold.iastate.edu/research/marketing_files/midwest.html
- Tropp, D., Ragland, E. & Barham, J. (2008, July). Supply chain basics: The dynamics of change in the U.S. food marketing environment. Agriculture Handbook 728-3. Washington, DC: USDA Agricultural Marketing Service (AMS). Retrieved on September 10, 2010 from <http://www.ams.usda.gov/AMSV1.0/getfile?dDocName=STELPRDC5070995>
- U.S. Agency for International Development (USAID). (2008, January). The Value Chain Framework: Briefing Paper. Funded through the Accelerated Microenterprise Advancement Project (AMAP). Access at http://www.microlinks.org/ev_en.php?ID=21629_201&ID2=DO_TOPIC
- U.S. Department of Agriculture (USDA). (2003, March). Agriculture Factbook: 2001-2002. Retrieved August 2010 from <http://www.usda.gov/factbook/2002factbook.pdf>.
- USDA. (2007a). *2007 U.S. Census of Agriculture: Economics*. Retrieved from National Agricultural Statistics Service (NASS) website: http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/Fact_Sheets/economics.pdf
- USDA. (2007b). *2007 U.S. Census of Agriculture: Farm Numbers*. Retrieved from NASS website: http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/Fact_Sheets/farm_numbers.pdf.
- USDA. (2007c). *2007 U.S. Census of Agriculture: New Farms, New Farm Operators*. Retrieved from NASS website: http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/Fact_Sheets/new_farms.pdf
- USDA. (2009a). *Briefing Rooms: Food CPI and Expenditures: Table 7*. Retrieved from ERS/USDA website: http://www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/Data/Expenditures_tables/table7.htm
- USDA. (2009b). *Briefing Rooms: Food CPI and Expenditures: 2009 Table 97*. Retrieved from ERS/USDA website: http://www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/Data/Table_97/2009table97.htm
- USDA. (2009). Summary report: 2007 national resources inventory. Washington, DC: USDA Natural Resources Conservation Service, and Ames, Iowa: Center for Survey Statistics and Methodology, Iowa State University. Retrieved from http://www.nrcs.usda.gov/technical/NRI/2007/2007_NRI_Summary.pdf
- USDA. (2010). *Farm to School*. Last modified April 26, 2010. Retrieved from USDA website: <http://www.fns.usda.gov/cnd/F2S/>
- USDA-Cooperative State Research, Education, and Extension Service (CSREES). (2007, March). The human and social dimensions of a bioeconomy: Implications for rural people and places. Discussion Paper. Retrieved November 2010 from http://www.csrees.usda.gov/about/white_papers/pdfs/bioeconomy_discussion_paper.pdf
- U.S. Environmental Protection Agency (EPA). (2007, May). *Pesticides: The EPA and food security*. Retrieved September 2010 from <http://www.epa.gov/pesticides/factsheets/securty.htm>
- U.S. EPA. (2010, August). *Life cycle assessment (LCA)*. Retrieved September 2010 from <http://www.epa.gov/nrmrl/lcaccess/index.html>
- U.S. government. (2008). Food, Conservation, and Energy Act of 2008 (2008 U.S. Farm Bill), Section 6015, Pub.L. 110-234, 122 Stat. 923. Enacted May 22, 2008, H.R. 2419.

Value Chain Partnerships. (2009). *Value Chain Partnerships: An Iowa-based network for food and agriculture work groups*. Retrieved from Value Chain Partnerships website:
<http://www.valuechains.org/files/additionalinfo/vcp2page.pdf>

Vermont Sustainable Jobs Fund. (2010). *Vermont Sustainable Jobs Fund*. Retrieved October 2010 from
<http://www.vsjf.org>

World Health Organization (WHO). (January 2002). Use of antimicrobials outside human medicine and resultant antimicrobial resistance in humans. Fact sheet N°268. Retrieved on September 2010, from
<http://www.who.int/mediacentre/factsheets/fs268/en/>