

Local Self-Organizing in Resilient Systems

Locally owned processing and marketing systems based on ecologically sound production systems are the foundation of sustainable food systems.¹

Is your system owned cooperatively? Do you know who and what businesses are around you? Are you working with your neighbors? Do you work with any state or government organizations to lobby for political changes? Are you active with local groups like a farmers work exchange? What are you doing to foster and improve local connectivity?

Natural systems are self-organized based on interactions of local components. Self-organization is a process where order and coordination arise out of components of an initially disordered system. This process is spontaneous and not directed or controlled by any agent or subsystem inside, or outside, of the system. Self-organizing systems are encountered in many scientific areas including biology, chemistry, geology, sociology and information technology, and considerable research has been undertaken to study them.²

Self-organization of matter generates much of the complexity of the inorganic world, from molecules to galaxies. Self-organization in living systems is evident in the formation of proteins, the spindle apparatus and other micro-tubular forms, the cell membrane and various vesicular forms, and in the construction of the nests of social insects—to name some of the more intensively studied systems.³

Self-organization unites components at a particular scale into an orderly, emergent pattern, whether as a tornado, a solar system, a soil food web or any creative innovation.

Natural systems develop organization without an outside agent to insure local organization. Biological systems often function with mechanisms of decentralized control in which the numerous subunits of the system—the molecules of a cell, the cells of an organism, or the organisms of a group—adjust their activities by themselves on the basis of local information.⁴

Planetary systems, organic cells, and animal societies show self-organization at various scales. What is local is relative to the scale of the system. At different scales, local can be magnitudes of difference in distance. Local for a country is bordering nations. Local for a community is farms around it. Local for rhizobia is a few inches of soil. Local for a planet is its solar system. Local to a solar system can be the galaxy. Local to a garlic bulb is its bed. What is local to a garlic farmer?

¹ Worstell, J., 1995. Southern Futures: Opportunities for Sustainable Agricultural Systems. Almyra, AR: Delta Land & Community. Also available at: <http://mysare.sare.org/mySARE/assocfiles/483Southern%20Futures.pdf>

² For overviews of this research see, for example, Camazine et al., 2003. Self-Organization in Biological Systems, Princeton University Press.

³ Edelmann, J.B. and M. J. Denton, 2007. The uniqueness of biological self-organization: challenging the Darwinian paradigm. Biol Philos, 22:579–601.

⁴ Seeley, T.D., 2002. When Is Self-Organization Used in Biological Systems? Biol. Bull. 202:314–318.

From a systems perspective, local is, therefore, more about self-organization than about distance. Local is the scale at which a system can self-organize with other complementary systems. Self-organization in our food system has occurred over vast distances through the interaction of huge agribusinesses. We show below that such far-flung systems can never create food systems which are resilient for small farmers or for consumers. Survival of individual small farms or individual consumers is of no concern to agribusinesses operating at a global scale. However, the global agribusiness depends on the survival on consumers. If the global company is only extracting profit by providing inputs, then the outputs of the consumers have no market and the resilience of the global company is gradually undermined through destruction of the local economy. Destruction of local food economies and subsequent increase in famine is too often the result of provision of food aid from outside for famine stricken countries.⁵ Transportation technology can make distances short but only by introducing the risk of multiple disturbances which no system can withstand. Moreover, even if the production cost of those items is lowered to an extreme low, the distribution costs often outweigh the savings⁶.

Urbanized civilizations which only extract from rural areas eventually collapse as the rural resource base is eroded. If not based on complementary support to local producers, such systems will collapse. The self-organizing of living systems means that centralization is a powerful driver in food systems. However, we need not accept this tendency as inevitable.

The following will show how a system which is decentralized, modular, and redundant can withstand and overcome a system which does not support small, local farmers. In resilient systems, each locally self-organized system is a unique innovation, but a conservative innovation based on past successes. Self-organization leads to innovative redundancy. That is, a system organizes itself locally with one output always being new units of the same type—creating redundancy. But these new units, to condition resilience, are not cookie cutter version of original. They are all unique and innovative, though conserving the successful innovations of the past. So the redundancy is not just replacement, but always replacement with something slightly different. In an agricultural community this could take the form of a new apprentice over time changing the system slightly, or dramatically, to integrate new ideas that the original farmer wouldn't have included themselves.

In the final section of this chapter, we will focus on one particular sector (meat processing) to show how self-organization at any scale will only survive if there are no competing organizations around which operate at a higher scale. Local food stores thrived until corporations operating at larger scales ran them out of business. To survive, small producers must join forces to create emergent wholes at a higher scale, but this can only happen if a group of small producers are complementary and compatible. If the component systems are too diverse, they won't be able to work together and will fail. If anyone of them is too selfish, then others will fail and the emergent system will collapse.

Food systems and local organization. Systems generated by man are often not locally organized on the farm scale. Food systems in the U.S. became notoriously lacking in local organization in the latter half of the 20th century. The reasons are many. Consumers want cheap food and supermarkets who want high profits. Big box stores competing for market share have learned to force farmers to meet their

⁵ <http://www.feedthefuture.gov/>

⁶ Ralph Borsodi- In his book "The Distribution Age" For a full reading visit this website:
<http://www.soilandhealth.org/03sov/0303critic/030308borsodi.dist.age/030308toc.htm>

standards and accept low returns. Even buyers which pay reasonable prices dictate that small farmers must be GAP certified and pay horrendous insurance bills before they can sell one tomato⁷.

The only way to meet both desires is to lower quality and increase volume. So the Hard Times, Hard Tomatoes⁸ story unfolded where lower quality food was grown on larger and larger farms run by huge corporations. Economies of scale can't be finessed in commodity production. Once a product or process becomes commodified, those with access to the most capital will win⁹. Small family farms disappear.

For large corporations to achieve economies of scale in production, they must transport foods long distances. Fruit and vegetable breeders have produced tougher and tougher food which resembles packaging more than the food.

Many books and movies, more every day, document this trend. In recent years, it's a blizzard¹⁰. Though best-selling authors may overstate their cases to sell books: the industrial food systems "has triggered the homogenization of our society... has hastened the mauling of our landscape, a widening of the chasm between rich and poor, fueled an epidemic of obesity, and propelled the juggernaut of American cultural imperialism abroad."¹¹ These books thoroughly document how the industrial food system/university complex has "lured us into choosing diets deficient in nearly everything except calories, supporting practices deceptive in every aspect from advertising to flavoring, and systems that degrade nearly everyone and everything involved. The problems arising from the fast food industry are rooted deeply within American society."¹²

The result of this cultural blizzard is that local food has become politically correct. Nearly every undergraduate is taught local food is best. The trend has reached such a crescendo, that some contend that, "every church wants a farmers market"¹³.

Even Tea Party Conservatives are on the bandwagon. "The future of food is local" is not the motto of a radical earth mother, but by the sentiment of a conservative Republican Arkansas Congressman in public meetings in both 2012 and 2013¹⁴. On June 3, 2013, Wal-Mart announced it planned to double sales of locally grown produce by December 2015¹⁵. Wal-Mart and a rural Republican Congressman are promoting what was once a very suspect alternative agriculture, even among the most ardent sustainable agriculture advocates¹⁶.

⁷ Personal communication 6/18/2012 from Julie Donnelly of Deep Woods Farm in Bradley, County, AR who is very pleased with the price from Whole Foods, had to pay \$1100 for insurance in order to sell to them..

⁸ Jim Hightower, 1973. *Hard Times Hard Tomatoes*, Rochester, VT: Schenkman Books.

⁹ Worstell J., 1991. *Commodification waxes, sustainability wanes: the case of burley tobacco*. Rural Sociological Society Annual Meetings. August 20, 1991, Columbus, Ohio.

¹⁰ Thirteen examples of recent books on our changing our destructive food system:

<http://www.cornucopia.org/2013/06/13-books-on-the-food-system-that-could-save-the-environment/>

¹¹ Eric Schlosser, 2001. *Fast Food Nation: The Dark Side of the All-American Meal*. Penguin.

¹² ¹² Ikerd, J. 2005. *Eating local: a matter of integrity*. <http://web.missouri.edu/ikerdj/papers/Alabama-Eat%20Local.htm>.

¹³ Christian Shuffield, April 13, 2013, Argenta Farmers Market manager.

¹⁴ U.S. Rep. Rick Crawford represents North Central and East Arkansas and spoke in DC and Jonesboro, AR.

¹⁵ <http://www.arkansasonline.com/news/2013/jun/04/retailer-stock-fresher-produce-20130604/>

¹⁶ Ferd Hoefner, esteemed chief policy analyst for National Sustainable Agriculture Coalition, once dismissed local foods as indefinable and unworthy of legislative support.

Twenty years ago, local food systems were struggling to be born; in some places the struggle continues. Though the first “local food systems” workshop held in the US¹⁷ occurred in the South and the South has virtually unlimited food production capacity, the South is ranked extremely low in prevalence of local food systems.

One prominent 2015 index¹⁸ puts only two of the Southern states (South Carolina and Virginia) in the top half of all US States in presence of local food systems. North Carolina is 28th, Kentucky 29th and the other nine Southern states are ranked in the lowest 11 states. With the exception of the top three states, all other Southern states’ rankings are decreasing.

National data on growth of local foods. Direct-to-consumer marketing amounted to \$1.2 billion in current dollar sales in 2007, according to the 2007 Census of Agriculture, compared with \$551 million in 1997.

Direct-to-consumer sales accounted for 0.4 percent of total agricultural sales in 2007, up from 0.3 percent in 1997. If nonedible products are excluded from total agricultural sales, direct-to-consumer sales accounted for 0.8 percent of agricultural sales in 2007.

The number of farmers’ markets rose to 5,274 in 2009, up from 2,756 in 1998 and 1,755 in 1994, according to USDA’s Agricultural Marketing Service.

In 2005, there were 1,144 community-supported agriculture organizations (CSAs) in operation, up from 400 in 2001 and 2 in 1986, according to a study by the nonprofit, nongovernmental organization National Center for Appropriate Technology. In early 2010, estimates exceeded 1,400, but the number could be much larger.

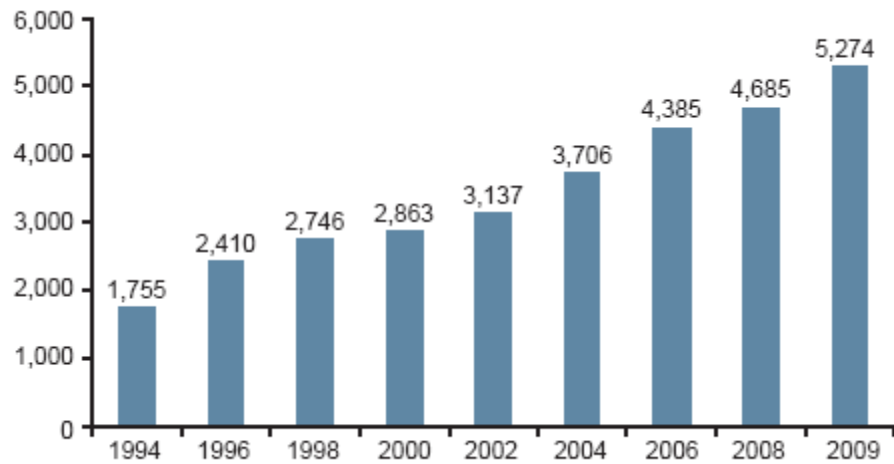


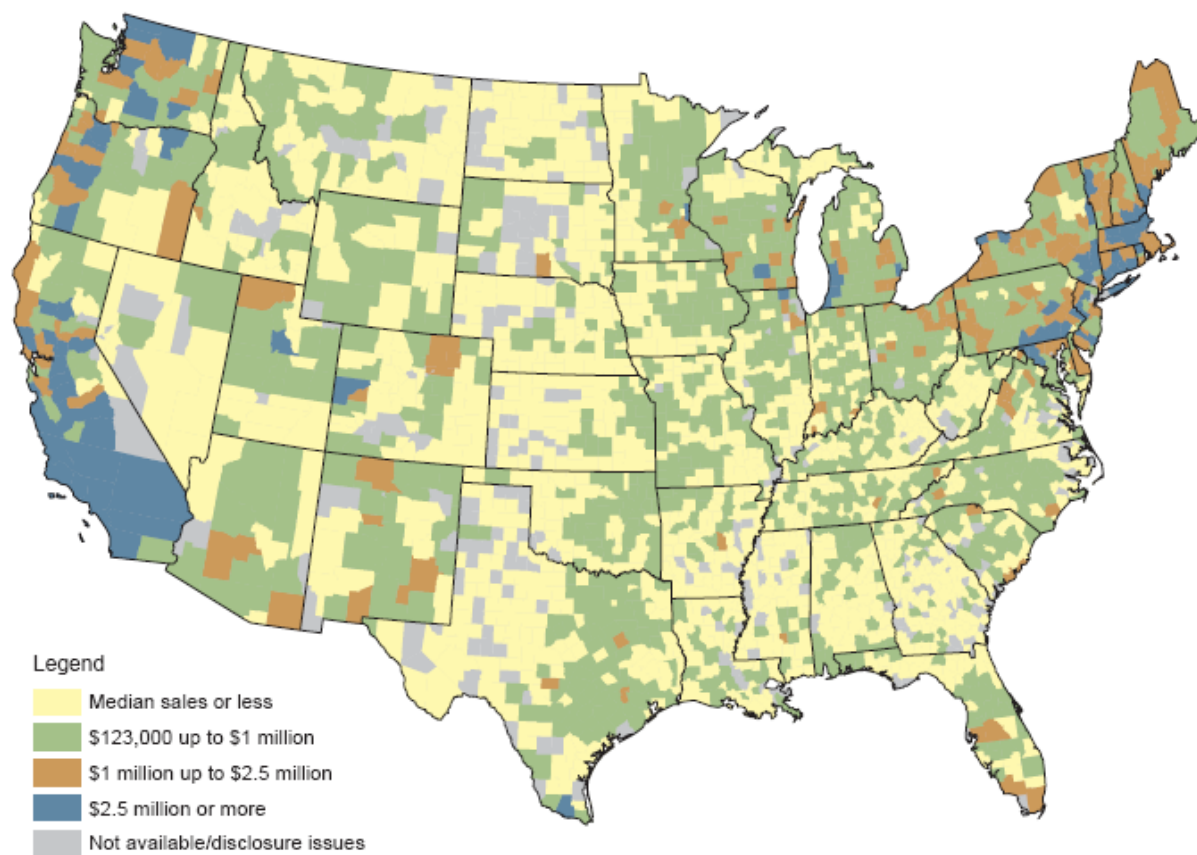
Figure 1 Farmers Markets In the United States U.S. Agricultural Marketing Service

The number of farm to school programs, which use local farms as food suppliers for school meals programs, increased to 2,095 in 2009, up from 400 in 2004 and 2 in the 1996-97 school year, according to the National Farm to School Network. Data from the 2005 School Nutrition and Dietary Assessment Survey, sponsored by USDA’s Food and Nutrition Service, showed that 14 percent of school districts participated in Farm to School programs, and 16 percent reported having guidelines for purchasing locally grown produce.

¹⁷ Held in February 1994 at Williamsburg, VA and summarized in Chapter 11 of Worstell (1995).

¹⁸ <http://www.strollingoftheheifers.com/locavoreindex/>

According to the 2007 U.S. Census of Agriculture, most farms that sell directly to consumers are small farms with less than \$50,000 in total farm sales, located in urban corridors of the Northeast and the West Coast.



In 2007, direct-to-consumer sales accounted for a larger share of sales for small farms, (below \$50,000 in total sales), than for medium-sized farms (total farm sales of \$50,000 to \$499,999) and large farms (total farm sales of \$500,000 or more). Produce farms engaged in local marketing made 56 percent of total agricultural direct sales to consumers, while accounting for 26 percent of all farms engaged in direct-to-consumer marketing. Direct-to-consumer sales are higher for the farms engaged in other entrepreneurial activities, such as organic production, tourism, and custom work (planting, plowing, harvesting, etc. for others), than for other farms. In 2007, direct sales by all U.S. farms surpassed custom work to become the leading on-farm entrepreneurial activity in terms of farm household participation.

According to USDA's local food systems review¹⁹, barriers to local food-market entry and expansion include: capacity constraints for small farms and lack of distribution systems for moving local food into mainstream markets; limited research, education, and training for marketing local food; and uncertainties related to regulations that may affect local food production, such as food safety requirements.

¹⁹ ERS, 2010. Local Food Systems: Concepts, Impacts, Issues. Washington, D.C.: USDA.

The primary conclusion of that first “local food systems” workshop held in the US²⁰ was that “Local food systems will not be created by more research papers by researchers. Rather we need more education by mentors²¹.” Recently one such researcher²², who was also an early advocate of local food systems²³, wholeheartedly agreed that, that conclusion is still valid. This is not to say that the tide has turned. The overwhelming majority of our food system is far from locally self-organized. Globalizers are intent on capturing the desire for local food for themselves. Some ecologically sound producers even make the case that energy consumption is less for lamb eater in England when the lamb is produced in New Zealand instead of Yorkshire.²⁴ Resilience thinking, in contrast, focuses solely on whether a system survives disturbance. Lamb from New Zealand may meet sustainability criteria, but is it resilient? Sustainability criteria are artificial, created by man. Resilience is a natural phenomenon, we can only discover the factors of resilience, and we can’t change them. Lamb shipped half-way across the globe hardly show the local self-organization of ecologically resilient systems.



Figure 2 Common, but inadequate local food system conceptualization.

Summary. Increasingly it appears that Americans, especially young Americans, want to be connected to the land and the people who produce their food. They want to know how their food is being produced and often have very specific requirements for any food they buy.

This growing consumer desire for higher quality, locally grown food is not enough to change the system. The industrial food system still dominates American life. Foreign visitors often bring their own food, having heard horror stories about American food. McDonalds in foreign countries must serve much higher quality food than in the US because consumers require it²⁵.

Our purpose is to understand how local food systems can be recreated in such a fashion that they are sustainable and resilient.

²⁰ Held in February 1994 at Williamsburg, VA and summarized in Chapter 11 of Worstell, 1995. Ibid.

²¹ Worstell, 1995. Ibid, p. 142.

²² Gail Feenstra, personal communication, May 2013.

²³ Feenstra, G., D. Campbell, and D. Chaney, (Eds.) 1997. Community Food Systems: Sustaining Farms and People in the Emerging Economy. University of California SAREP.

²⁴ Fin new Zealand lamb less energy intensive than English lamb

²⁵ Dr. Andrii Ryzhkov, Fulbright Fellow 2012-1013 at University of Colorado from TSATU, Melitopol, Ukraine, personal communications, June 6-9.

What is a locally self-organized food system?

Food system foolishness. Those analyzing our food system have not been immune to the reductionist thought patterns of systems analysis (described in detail in chapter 1). They have broken our food system into components, arranged them in simple flow charts of our industrial food system. The adjacent chart shows a linear conceptualization of food systems from both a process and actor perspective. Although the food supply chain is often described in a linear fashion, beginning with production, processing, and distribution and continuing with marketing, retail, and consumption, the specific variables in each of these subsystems interact with each other in a nonlinear fashion, with many interdependencies and both balancing and reinforcing feedback loops²⁶.

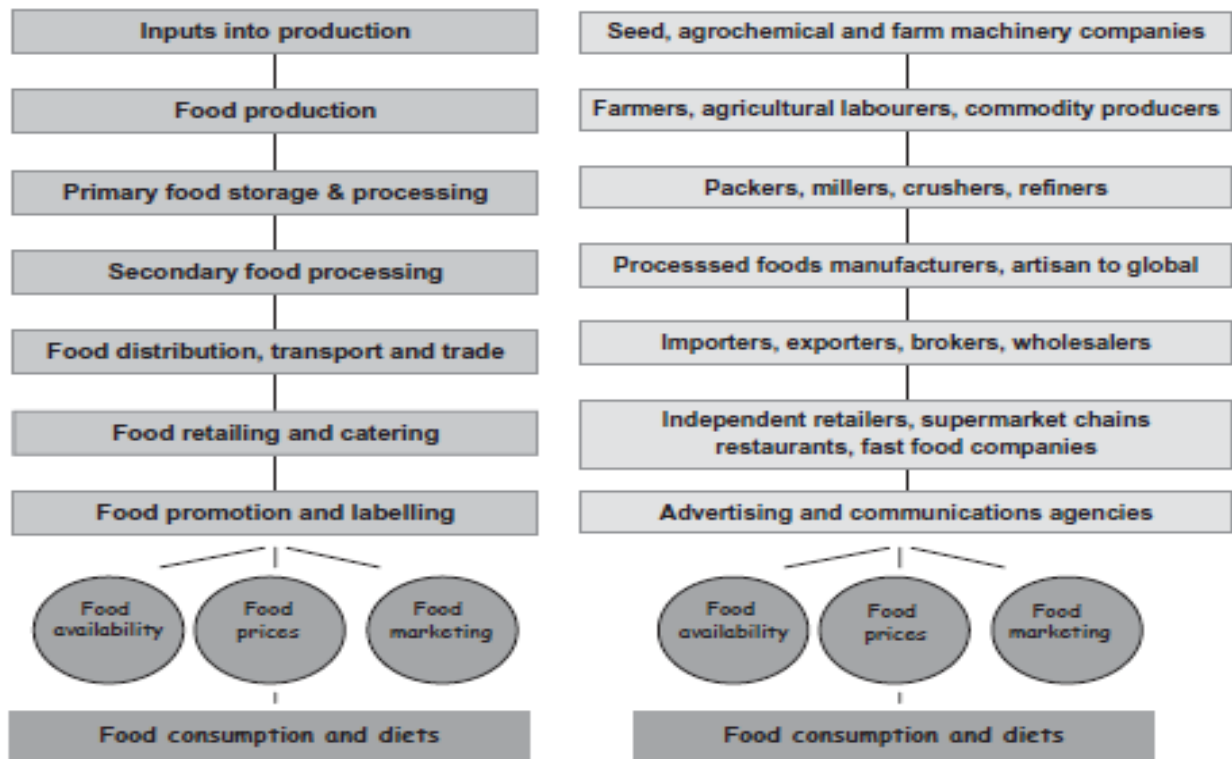
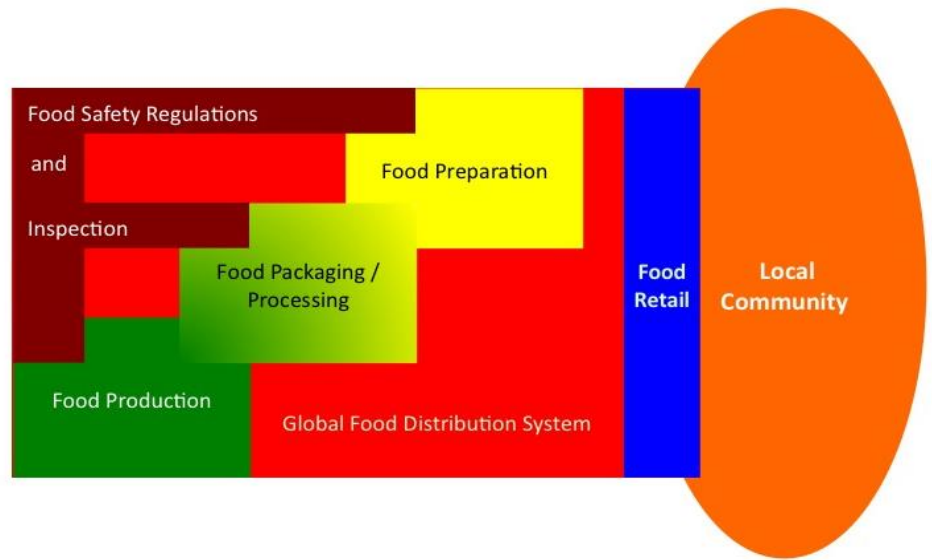


FIGURE 1 A basic food supply chain. (a) Process-based food supply chain. (b) Actor-based food supply chain.

To follow such an always inadequate linear, reductionist, inanimate conceptualization of the food system is to insure that your thinking is inhibited and controlled by those actors in each of the boxes. You will lose ability to understand the system, much less to change it. Those who think less linearly can see more clearly new ways systems can evolve.

²⁶ Malhi, L. et al, 2009. Placed to Intervene to Make Complex Food Systems More Healthy, Green, Fair and Affordable. J of Hunger and Environmental Nutrition, 4:466-476.

A less linear, more realistic vision of the food system shows the interrelationships between various systems (see below). However, this vision still possesses the one assumption alien to resilient local food systems. This assumption is that all food system subsystems eventually become part of the global food distribution system which then provides input to the food retail system which serves the local community.



An alternative approach views the local community as encapsulating all subsystems of the food system without need for the global food distribution system or a distinct food retail system which controls access by the local community processes (see below).



However, given the inevitability of impact from global actors on local systems, an even more effective approach is to view the food system as a result of interrelated physical and biological processes and human decision making, none of which can be separated from each other and boxed in any algorithmic diagram.

Trends in production and marketing of food in the US

As late as 2000, USDA policy papers addressing the evolving food and agriculture system do not mention local foods. USDA viewed our food system as a mature market with changes expected only around the edges. In perplexing contrast to this supposedly stable, mature market, the USDA did recognize a new “consumer driven era” for our food system. They note we are moving toward a more product-based rather than commodity-based system.²⁷ However, there seemed to be not an inkling of insight that a radically different food system is challenging the stable, mature system. Here is a taste of what USDA viewed as important, and which still reflects the pre-local viewpoint of many today:

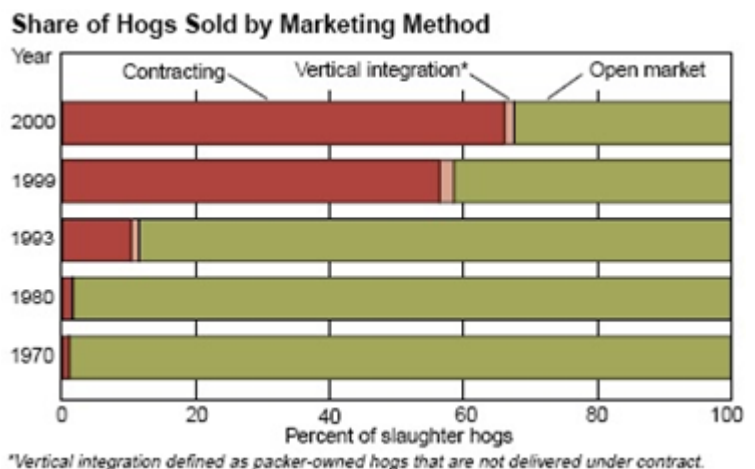
“As our markets mature, we have seen an explosion in new product introductions. Over 12,000 new food products have been introduced annually . . . The supermarket share of grocery food sales that was 78 percent in 1992 had fallen to 70 percent by 1997 as mass merchandisers and warehouse club operators increased their market share from 6 to 12 percent²⁸.”

Nowhere does local appear in this report. Farmers markets are not mentioned. Likewise food production is characterized as adapting to this mature, stable food system dominated by international processing and marketing entities:

“The farm and food industry, of course, is enormously affected by the changing profile of this mature market . . . By establishing direct ties to growers through contracts, food retailers can ensure that they provide specific product qualities tailored to consumer demand. For example, the introduction of convenience pork products, such as pre-trimmed and marinated tenderloins of uniform size and quality, has emerged as the pork industry attempts to interpret and respond to consumer signals²⁹.”

The cognoscenti at USDA saw (and many still see) vertical integration in the pork industry as a feature of the supply chain underpinning creation of products consumers want. No mention is made of the widely observed exploitation and impoverishment of farmers whose only option is to obey the dictates of the giant food integrators.

Many consumers want to support local farmers and buy locally produced food direct from farmers—qualities Tyson and Smithfield cannot produce.



²⁷ USDA/ERS. 2000. Food and Agricultural Policy, p. 16-35.

²⁸ Ibid, p. 19.

²⁹ Ibid, p.19

The vertical integration which dominates most commodity production, can, however, be a tool for profitability for farmers when they integrate production, processing and marketing with a focus on the high quality requirements of relationship marketing. The rest of this report will focus on one food sector as an example of how nearly all foods can benefit from an adaptive systems approach.

Market for locally produced meat. The profitability of a local meat system is dependent on the willingness of consumers to pay a premium for the types of products delivered. Are consumers willing to pay more? Two studies from the University of Kentucky indicate they are³⁰. Participants were told the price of a grocery store product and asked what they would pay for the same product that was produced and processed in Kentucky.

Percent of respondents that would purchase local products at various premiums are shown in the following table.

% premium	40%	20%	None
Ground Beef	15%	63.9%	100%
Steak	20%	51.7%	98.3%
Sausage	34.4%	52.5%	100%

Over half are willing to pay 20% more for any of the locally produced meat products—ground beef, steak or sausage. One third of consumers were willing to pay 40% more for sausage which is locally produced.

A second study with less affluent participants also showed a willingness to pay a premium for locally-produced meat with identical quality to non-local meat. In this study, up to 16% were willing to pay 30% more for various meat products. Up to one third were willing to pay a 20% premium. Finally, well over half were willing to pay 10% more for ground beef (60.8%) rib eye steak (57.6%) and sausage (54.1%).

Based on the results of these two studies, it is clear that consumers are price sensitive when quality is held constant and the only variable is whether a product is locally-grown. However, there appear to be significant groups of consumers who are willing to pay 10-20% more for locally-grown meat. Further research is needed to determine how to position locally-grown brands to appeal to particular types of customers.

³⁰ Burdine, K.H., L. Maynard, and L. Meyer, 2001. Consumer willingness to pay for local meat products. University of Kentucky Extension Publication.

Higher quality for locally-produced meat. The above studies indicate customers will pay more for local meat of equivalent quality. However, many studies indicate that locally produced meat is perceived to be of higher quality. One representative study³¹ had the following results.

	juiciness	flavor	texture	overall
% panelists preferring each product by category				
locally produced ground meat	86.7%	84.5%	84.5%	88.9%
store bought ground meat	13.3%	15.5%	15.5%	11.1%

The overall 70% advantage shows the potential, but the potential will be realized only insofar as enough consumers accessible to a particular local meat producer will pay higher prices for sufficient quantities of natural, locally-produced meat.

Local farmers can offer these new consumers is a better quality product, transparency, freshness, and responsiveness to consumer needs. Integrating the processing, marketing and production will produce a much more efficient operation than the present system. The economic impact of this increased efficiency in producing direct market meat promises to result in at least a two fold increase in returns to the producer/owners according to those trying the system.

Motivation for buying local foods

Why would anyone prefer local foods at a higher price? Local food has a number of different aspects that are attractive to a wide variety of consumers:

1. Freshness. Local fruits and vegetables are usually harvested and sold more quickly so they do not contain the preservatives that are added to products shipped long distances and placed in storage.
2. Taste. Produce that is ripened on the vine has better texture and flavor than produce harvested unripe, then treated with chemicals and ripened during shipping.
3. Nutrition. Nutritional value declines — often drastically — as time passes after harvesting.
4. Improving the local economy. When you buy homegrown food, you circulate your food dollars inside the local area.
5. Strengthening producer/consumer relations. When purchasing food locally, consumers can ask how the product was grown and processed, what chemicals (if any) were used, and any other questions they may have. People tend to trust individuals they know, and they become repeat buyers³².

³¹ Burdine, K.H. 2001. Taste panel to evaluate the consumer acceptability of local meat products. University of Kentucky Extension Publication 2001-15F.

³² Lanford, Ibid.

The British Food Standards Agency³³ lumps freshness and taste into quality and replaces nutrition with health, and adds three additional motivations to the above. FSA suggests that the motivations of different consumer segments in the local food market are:

1. Quality: The perceived superior freshness, and taste, of the food.
2. Community: Support for the local economy and local services.
3. Confidence: Knowledge of the food's source or provenance.
4. Health: Perceptions of food being fresh and using fewer chemicals for maintaining freshness.
5. Green: Concern for environmental sustainability.
6. Pluralist: Options for food shopping, rather than dominance by supermarkets.
7. Enrichment: Diversity of food shopping experiences, including some leisure value.

The majority of respondents to a national study cited freshness (82 percent), support for the local economy (75 percent), and knowing the source of the product (58 percent) as reasons for buying local food at direct markets or in conventional grocery stores³⁴.

Two national studies found that consumers with varying educational and income levels were equally likely to purchase local food³⁵ while other studies have found local food patrons to be more educated and earning above-average income³⁶. Consumers who enjoy cooking, growing a food garden, frequenting health food stores, and purchasing organic food were more likely to buy local food. On the other hand, environmental and health-related attitudes and behaviors, while well received among local food consumers, were not important factors affecting actual food purchases³⁷. Those who frequented direct markets purchased local foods for their quality and freshness³⁸. Not surprisingly, those who placed a greater emphasis on supporting local businesses and producers, or who preferred to purchase fresh rather than processed produce, were more likely to shop at direct markets³⁹.

A survey of Tennessee farmers' markets patrons found that customers frequently visited a farmers' market to support local farmers; to find locally produced foods; for nutritional reasons; and for the freshness, value, and quality of the produce⁴⁰. Consumers were found to associate local food with

³³ Food Standards Agency, 2003 and 2007. Reported in Pearson, D. and A. Bailey, 2012. Exploring the market potential of 'Local' in Food Systems. *Locale: The Australasian-Pacific Journal of Regional Food Studies*, 2:81-103.

³⁴ Food Marketing Institute. 2009. *U.S. Grocery Shopper Trends*, Food Marketing Institute: Arlington, VA.

³⁵ Keeling-Bond, J., D. Thilmany, and C. Bond. 2009. "What Influences Consumer Choice of Fresh Produce Purchase Location?" *Journal of Agricultural and Applied Economics*, 41(1):61-74; .Zepeda, L., and J. Li. 2006. "Who Buys Local Food?" *Journal of Food Distribution Research*, 37:1-11.

³⁶ Eastwood, D.B., J.R. Brooker, and M.D. Gray. March 1999. "Location and Other Market Attributes Affecting Farmers' Market Patronage: The Case of Tennessee," *Journal of Food Distribution Research*, Vol. 30, pp. 63-72.; Govindasamy, R., et al., 1998. *Farmers' Markets: Consumer Trends, Preferences, and Characteristics*, New Jersey Agricultural Experiment Station Report P-02137-7-98, Department of Agricultural, Food, and Resource Economics, Rutgers University, New Brunswick, NJ..

³⁷ Zepeda, L., and J. Li., 2006. "Who Buys Local Food?" *Journal of Food Distribution Research*, 37:1-11.

³⁸ Keeling-Bond et al., *ibid*.

³⁹ Keeling-Bond et al., *ibid*.

⁴⁰ Eastwood et al., *ibid*.

enhancing the local economy and benefiting the environment⁴¹. Farm background was also associated with those consumers that purchased local foods⁴².

Geographical indicators. In a 2005 U.S. consumer survey, 72 percent of respondents believed that geographic characteristics such as soils influence the taste and quality of foods and 56 percent were willing to pay 10 to 30 percent more for local grown (in their state)⁴³.

A national survey in mid-2008 reports that nearly nine out of ten Americans (89 percent) would like to see food stores sell more fruits and vegetables that come from local farms, and over two thirds (69 percent) said they would pay slightly more for such produce⁴⁴. Another consumer study notes in the Midwest that local food freshness was a high priority for consumers who were greatly influenced by local food labels with tag lines noting the travel time from the farm to the shop⁴⁵. A survey of 477 Ohio consumers notes that they were willing to pay at least 30% more for local produce and that the local origin was more important than freshness or farm size⁴⁶. Of course, results of such surveys on willingness to pay may not necessarily translate to actually paying at the market but other trends support these findings.

Some have suggested that the result of our technical advances is more insidious than a loss of diversity and rich flavors. As Wendell Berry⁴⁷ regularly points out "a vast amnesia" occurs as local food systems decay. Decay of local economies and communities follow. Total number of farms in the US has declined from about 7 million in the 1930's to only about a half million by 2000, losing valuable local knowledge and local culture. However, the emerging adaptive systems of farmers markets and Community Supported Agriculture (CSA) operations⁴⁸ and chefs oriented to local foods are driving "local" forward.

Local food system producer motivation

To establish new enterprises, successful rural enterprise facilitators such as Ernesto Sirolli⁴⁹ and Bill Patrie⁵⁰ advise would-be entrepreneurs to focus on three foundations: passion, markets and resources. You must have deep passion for your new business. It must be something you wake up in the middle of the night thinking about and which makes you unable to wait until morning to get to work on. Passion is not enough. Adequate markets and human and physical resources must be available for they advise their clients to embark on an enterprise.

⁴¹ Zepeda, L., and C. Leviten-Reid. 2004. "Consumers' Views on Local Foods," *Journal of Food Distribution Research*, 35:1-6.

⁴² Brown, C., 2003. "Consumers' Preferences for Locally Produced Food: A Study in Southeast Missouri," *American Journal of Alternative Agriculture*, 18:213-224.

⁴³ DeCarlo, Thomas, Rich Pirog, and Veronica Franck (2005) *Consumer Perceptions of Place-Based Foods, Food Chain Profit Distribution, and Family Farms*. Leopold Center for Sustainable Agriculture: Ames, Iowa.

⁴⁴ Deloitte Development, 2008. *Deloitte Food Safety Survey*. Deloitte Development: Washington,

⁴⁵ Pirog, R., 2004. *Ecolabel Value Assessment Phase II: Consumer Perceptions of Local Foods*. Leopold Center for Sustainable Agriculture: Ames, IA

⁴⁶ Darby, Kim, Marvin Batte, Stan Ernst and Brian Roe (2008) *Decomposing Local: A Conjoint Analysis of Locally Produced Foods*. *American Journal of Agricultural Economics*, 90: 476-486.

⁴⁷ Berry, W. 1988. *The Work of Local Culture*. p. 157.

⁴⁸ Robyn Van En Center, 2008. Website on CSAs. Wilson College: Chambersburg, PA Available at <http://www.wilson.edu/wilson/asp/content.asp?id=804>

⁴⁹ Sirolli, E., 1995. *Ripples in the Zambezi*. Murdoch, Australia: Murdoch University.

⁵⁰ Patrie, W., 1998. *Creating Co-op Fever: A rural developer's guide*. USDA/RD publication SR54.

However, passion or motivation is a *sine qua non*. Without it, huge market windows and unlimited resources cannot make an enterprise succeed. Understanding these motivations is necessary to understanding the local food system, which is necessary to intervening to strengthen the local food systems and catalyze resilient local food systems.

Explorations of the motivations of local food system entrepreneurs are hard to come by. Some respected analysts say many are “motivated by the deeper historical commitment . . . to building healthy communities and permanence within society⁵¹.” Some contend that local food system pioneers want to be part of a movement to transform society. They want to be part of a movement, creating something new, something which makes an impact. How do they get so enthused about this? Where is all this energy coming from? Local food system devotion seems to even take on religious tones at times. Certainly churches have been a stalwart foundation of the local food system movement.



“I am learning that what farmers like Fred are doing agriculturally, I need to do theologically and pastorally in the church. Like farmers, our lives have become disintegrated and fragmented by rapid cultural and technological change. Maybe we've imagined the whole world as little more than a medium for growing souls, pushing and pushing until we erode the fertile topsoil that's essential to our faith—justice, goodness, mercy, compassion. Imagine what might change if we thought of the earth and everything in it as part of God's redemptive plan, as an integrated process of life breaking out "on earth as it is in heaven." Maybe even our stop at the dairy aisle and our choice of flour could be fertile ground for faithfulness.”

Parish Collective is one church-based effort specifically focused on establishing local food systems. This group sees:

“There is a tectonic shift happening under the surface of the church in North America. Parishioners are returning to the parish. The greater our individual mobility extends, the greater the world's longing and need for a faith that can be lived out collectively – where we can be present, where there is an embodied practice, where the gospel becomes tangible in a particular place. Inhabit is a conference dedicated these new movements toward practice, presence, and place. . . A *Parish Initiative* begins with a group of Christ-followers who desire to become a faithful presence for parish renewal in their town/village/neighborhood.”

This effort sees local food system work as a “responses to the converging forces of fragmentation that have divided the church from community engagement for the last century.”⁵²

⁵¹ Ikerd, J. 2005. Eating local: a matter of integrity. <http://web.missouri.edu/ikerdj/papers/Alabama-Eat%20Local.htm>

⁵² <http://www.parishcollective.org/parish-collective>

If not religious motivation, political motivation. Local food system devotees may deny any religious motivation, but they are not so quick to deny political motivations. Renowned novelist Barbara Kingsolver⁵³ and her family abandoned the industrial-food pipeline to live a rural life—vowing that, for one year, they'd only buy food raised in their own neighborhood, grow it themselves, or learn to live without it. "A majority of North Americans do understand, at some level, that our food choices are politically charged," wrote Kingsolver, "affecting arenas from rural culture to international oil cartels and global climate change."

Kingsolver advocates the pleasures of seasonal eating, but she acknowledges that many people would view this as deprivation "because we've grown accustomed to the botanically outrageous condition of having everything always." Kingsolver points out that eating what we want, when we want comes "at a price." The cost, she says, "is not measured in money, but in untallied debts that will be paid by our children in the currency of extinctions, economic unraveling, and global climate change."

Kingsolver asserts: "we have dealt to today's kids the statistical hand of a shorter life expectancy than their parents, which would be us, the ones taking care of them." How is our "thrown-away food culture" a detriment to children's health? "We're raising our children on the definition of promiscuity if we feed them a casual, indiscriminate mingling of foods from every season plucked from the supermarket." "Marketing jingles from every angle lure patrons to turn our backs on our locally owned stores, restaurants, and farms. And nobody considers that unpatriotic."

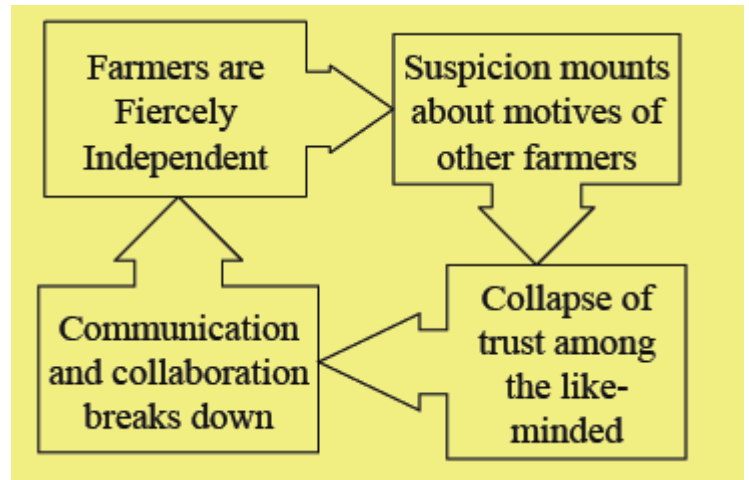
Others attribute the motivation of local food producers to be the result of several movements⁵⁴. The environmental movement encourages people to consider geographic dimensions in their food choices. Long-distance transport of food is considered to contribute to greenhouse gas emissions. The community food-security movement seeks to enhance access to safe, healthy, and culturally appropriate food for all consumers. Challenges to the dominance of large corporations also have contributed to efforts to expand local food. The Slow Food movement, which originated in Italy, is a response to homogenous, mass-produced food production, and the "fast" nature of people's lives, by encouraging traditional ways of growing, producing, and preparing food.

⁵³Kingsolver, B., 2007. *Animal, Vegetable, Miracle*. New York: Harper , and <http://www.animalvegetablemiracle.com/>

⁵⁴ Guptill, A. and J.L. Wilkins., 2002. Buying into the food system: trends in food retailing in the US and implications for local foods. *Agriculture and Human Values* 19: 39-51.

Motivations of producers could provide dozens of social psychological treatises, though none will likely arrive at any definitive conclusion—in part because humans are complex adaptive systems composed of numerous potential states which are modified when measured, as discussed above.

Probably more important than the motivations for producing local food are the motivations which keep many farmers from embodying various qualities of resilient systems. Perhaps the most basic of these is the independence and lack of trust which has become a vicious cycle as shown in the adjacent graphic⁵⁵.



Specific system of local meat processing/marketing

Though the preceding may have given a useful theoretical perspective, systems are only understood by being immersed in them. Every system is unique. Our focus on helping catalyze more resilient local food systems requires in-depth examination of particular systems. It is beyond the scope of anyone to examine all types of local food systems. We have chosen the specific system of local meat production/processing/marketing to attempt to make the concepts of systems resilience more useful.

Many have documented how small meat processors add significant growth to local communities. Perhaps the most thorough is an analysis of Iowa⁵⁶. Farmers are creating local meat production/processing/marketing systems in a variety of ways. Gwin⁵⁷ has developed a typology to summarize different levels of local meat processing systems as shown in the following table.

Bringing local meat and poultry to market requires access to appropriately scaled processing facilities with the skills, inspection status, and other attributes to prepare these products safely, legally, and to customer specifications. Limited local processing infrastructure restricts the supply of local meat and poultry.

Many farmers drive multiple hours one way to their nearest inspected processing facility and bring only a few head at a time, resulting in high transportation and opportunity costs per pound of meat. Farmers may have difficulty getting slaughter dates during processors' busy seasons or they must schedule far in advance. Some small processing facilities may not offer specific services that farmers and their customers' desire.

⁵⁵ Walsh, R. et al. 2011. North Dakota Local Food Systems Initiative.

⁵⁶ Swenson, D. 2011. Exploring Small-scale Meat Processing Expansions in Iowa. Ames, IA: Leopold Center.

⁵⁷ Gwin, L., and A. Thiboumery, 2013. From Convenience to commitment: Securing the Long-term Viability of Local Meat and Poultry Processing. Corvallis, OR: Niche Meat Processor Assistance Network.

At the same time, existing small processors often lack the steady, consistent business they need to be profitable while providing high quality services tailored to individual customers. They often experience significant seasonal variation in demand for their services or animals are not delivered for processing when scheduled. Expense estimates suggest that even a small processing plant providing very basic services must annually process approximately 450 head of cattle or the revenue equivalent in combinations of other livestock, spread out fairly evenly over the year. Operations that offer more sophisticated services require significantly higher volumes, making it more challenging to reach the critical mass of local livestock to support such plants. As a result, local processing is not always available when farmers want it.

Type	Geography	Product	Market	Regulatory*	Roles
Very local	Same or neighboring county	Red meat: frozen meat, whole, half, quarter carcass, paper-wrap. Poultry: whole carcass	Direct pre-sale to consumer. Poultry: sold at the farm	Red meat: any, but typically custom-exempt Poultry: 1000 bird exemption	Buyer pays farmer for live animal pre-slaughter; pays for processing, picks up meat.
Local-independent	Highly variable: from one county to multi-state	Individual cuts & cooked meats vac-packaged or paper wrapped, labeled, fresh or frozen. Poultry: whole carcass, parts	Retail (farmers markets, farm stands, CSA, restaurants) & wholesale (e.g., to retailers)	Red meat: state or Federal inspection. Poultry: 20,000 bird exemption; state or Federal inspection if crosses state lines	Farmer handles marketing and distribution
Regional-aggregated	State-wide, multi-state	Same as above plus primals, subprimals, fixed weight portion cuts, all usually fresh in formed vacuum packaging	Mostly wholesale (to retail, food service, distributors, schools)	Federal inspection, or state inspection if all sales are within that state	Multiple farmers supply regional marketing entity that manages supply chain

Stabilizing and enhancing meat and poultry processing for local markets requires that farmers and processors build more established and predictable business relationships, shifting from “convenience” to longer-term “commitment.” An essential element is that farmers commit, individually or in coordinated groups or brands, to providing the processor with a sufficient, steady supply of livestock to process. Steady business generates steady revenue, which is fundamental to long-term processor viability.

Having key “anchor” customers is an important way for processors to assure a steady volume of business; some processors are their own key customers, providing most or all of the animals they process. Brands or “aggregators” that source livestock from multiple farmers and coordinate the rest of the supply chain can be valuable partners for processors. Aggregators create a steady flow of animals and serve as a central point of communication. They are often in a better position to coordinate consistent scheduling than an individual farmer. Processors can use tools like active scheduling systems, variable pricing, or penalties to assure that throughput is steady, week by week and over the year.

Commitment matters on both sides: processors must demonstrate a commitment to providing, maintaining, and improving quality services. Processors can also help their producer-customers with advice and support with marketing, distribution, and other aspects of their meat businesses. By building these business relationships, processors work more effectively with their customers, build loyalty, and ultimately increase demand for their own services.

Both benefit if producers will commit to 50 or 100 head of cattle a year. The processor can run more efficiently because they know that they can do all 50-100 cattle the same way. The producer gets it cut the way he wants and can have his own processing plant built separately and then not deal with slaughter.

Processing businesses are capital-intensive to start, maintain, and expand. Farmer-processor commitment deepens when farmers, individually or in groups, invest time and money into the processing business. Investment can take the form of loans, stock purchases, equipment financing, or hours of expertise and effort. Effective and continuous communication, about scheduling and services, costs and pricing, meat quality and market conditions, and other aspects of their linked businesses, is essential to developing and maintaining strong business relationships.

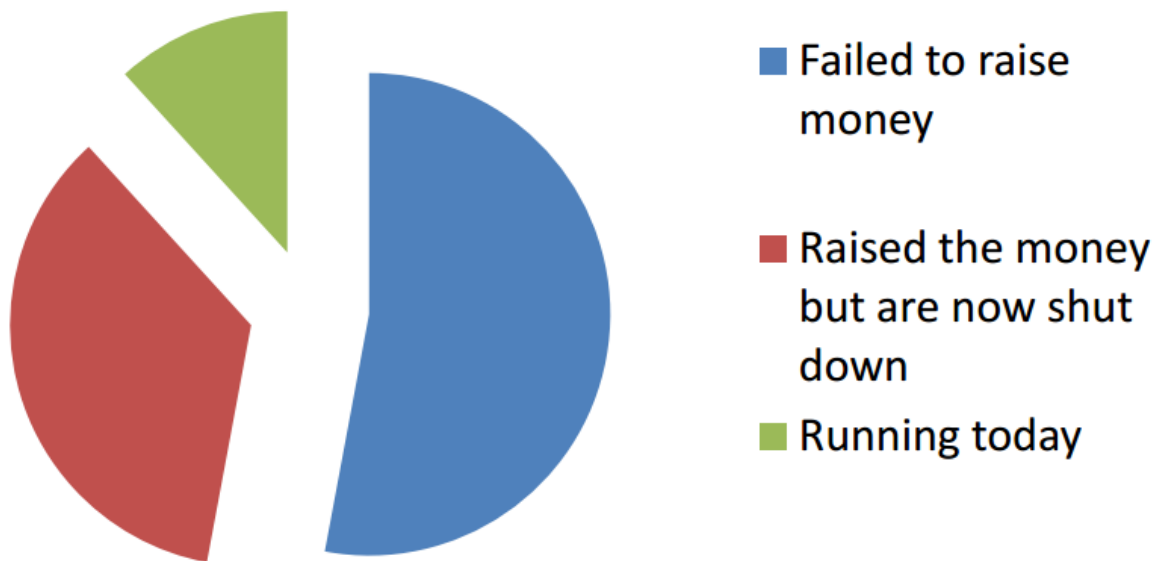
Governmental agencies, non-profits, universities, and others can enhance the resilience of local meat systems by focusing on the five qualities of resilient systems mentioned above—especially establishing high levels of interconnectivity between both farmers and farmers and meat processors. Incubating diverse businesses important to the rest of the supply chain will also contribute to resilience.

Livestock farmers are interested in selling locally for many reasons, including the potential to receive premium prices for their products, a direct connection with consumers, and recognition for their production practices and products. Locally produced food often requires new and different supply chains than conventional food. The required structure of local supply chains depends on the product (e.g., perishable or not) and the market channel (whether farm stands, farmers markets, and Community Supported Agriculture or intermediated direct sales to restaurants, retail, and food service). As perishable products governed by a complex and evolving set of food safety regulations, meat and poultry can require equally complex supply chains involving multiple partners. Meat and poultry processors are essential links in local meat supply chains. Local meat farmers need access to appropriately scaled processing facilities with the skills, inspection status, and other attributes to handle these products safely, legally, and to customer specifications.

New processing ventures built specifically to handle local product often do not survive. Why is this? A key factor is the lack of expertise of farmers attempting to run their own processing plants. Why do farmers want to build their own plants? Existing custom plants are often too small, they're too far away, they're too costly, they're too antiquated, they're too busy—for example, processing deer in the fall. Another complaint: custom processing fees are too expensive. And then there's just kind of a general attitude: producers think they will have better product control if they have their own plant. In addition, the number of USDA inspected plants offering custom processing services to producers is decreasing.

Of those 35 projects assisted by one consultant⁵⁸, over half of them failed to raise sufficient capital as shown in the figure below. Those in the red slice of the pie raised the money but are now shut down for a variety of reasons. If you combine the blue slice with the red slice, you've got a failure rate higher than the national average of start-up businesses.

35 Projects in 13 years



There are five of the 35 that are running today, that are considered successful. Those that failed each have unique reasons why they failed. Every system is unique. But there are some common themes among the failures. First is that they ran out of operating capital and have limited opportunities to find more with investors and lenders. They run into a cash crunch. You can't run the business without cash, so they fold. Second are marketing and sales weaknesses. Most of these projects are supply driven. They need a market and thought the plant was the market. The plant is the tool to reach the market, but the market potential must be established first.

Third, even with sufficient capital and markets, livestock producers often don't have the experience and the skills experience brings to oversee a processing-marketing business. Even if they hire a manager with the right skills, they still have to provide guidance and leadership. If they don't thoroughly understand the meat processing/marketing system, they will make mistakes—often fatal.

Those who succeed set up a functional board of directors who understand their system and the systems impacting theirs. The board of directors should not agree all the time. It takes some people with different experiences to bring in diversity. A board is a system like any other and to be resilient, it needs to possess the five qualities of resilient systems.

One means of creating a resilient system is to unite the producers with an existing successful processor. In other words, the producers purchase the processor. This is the case with several successful farmer-

⁵⁸ DeHaan, K. 2011. "To Build or Not to Build." Presentation on Niche Meat Processor Assistance Network webinar, "To Build or Not to Build," 9-28-11. Available at: <http://www.extension.org/pages/59962/to-build-or-not-to-build:-lessons-learned-from-newprocessing-ventures>

owned processing enterprises, such as U.S. Premium Beef which has now lasted more than 15 years⁵⁹. Similarly, other farmers⁶⁰ expand an existing business, for example, an existing retail store by adding processing, even creating a regional butcher shop making a variety of products. Another example would be one plant family who went ahead and bought another existing plant. It was simply an expansion off an already existing successful business. Nearly all of the successful operations, whether it be new or just modifying or expanding an existing business, have been multigenerational.

As in all resilient agroecosystems, hiring a good manager with the right skills and experience is crucial. The best managers have succeeded in managing similar systems. An example is Dakota Provisions which hired the person who made West Liberty Foods a success⁶¹.

Attracting capital means establishing mutually beneficial relations with capital systems. Most useful are successful producers who have deep pockets. U.S. Premium Beef is an example of that. The producer investors were dedicated. They were quality conscious and that's the case in all successes. They all develop good lender relationships.

Lender relationships are critically important. Oftentimes the lender has had to take the lead role in applying for USDA loan guarantees. In one case⁶² the lender had a borrowing base that was dependent on accounts receivable, and in the local meat enterprise, the accounts receivables got kind of thin. The lender just rolled up his sleeves and went to work helping the business collect on some aging accounts receivables.

Poor lender relations often begins when the enterprise gets into a very precarious situation and lack of trust between lender and borrower does not allow good communication with the lender. Then, the handwriting is on the wall. No business that depends on loans for capital is going to succeed without a good lender relationship.

Don't waste capital while reinventing the wheel. Producer involvement is important, but total ownership is not necessarily the best for the enterprise. Producers produce and almost always don't know enough about processing. They often waste valuable time and money learning processing, making some rookie mistakes. Processing is a skill set with its own unique challenges and problems.

Processing and marketing are difficult systems to develop simultaneously. Starting a processing business at the same time you're starting a marketing business is usually asking for trouble. Managers who understand both systems and have experience doing both can sometimes manage it. Producers are often better at marketing local meat than at processing. Manage the systems you thoroughly understand and let establish good relations with others to manage less familiar systems.

Expansion of existing Processing Plants: 4 strategies

⁵⁹ <http://www.uspremiumbeef.com/>

⁶⁰ Cody Hopkins and Andrea Todt's Falling Sky Farm (www.fallingskyfarm.com) used this approach to become one of the few local meat processing success stories in the Deep South states.

⁶¹ <http://www.cooperationworks.coop/success-stories/value-added-agriculture/dakota-provisions>

⁶² DeHaan, *ibid*.

One well-known meat processing expert advocates four basic strategies when you're in a situation where new processing capacity is the only way you can be in business⁶³

- 1.** I always say, involve an existing processor. Find a regional custom exempt processor or state-inspected processor interested in expansion. And there are some of those, you've just got to find them. Develop a business partnership with them. Maybe they don't even have to be small to growing, maybe they already have a good solid foundation of business and are looking for an equity partner. There's another opportunity.
- 2.** You need a well-designed marketing plan. That should be the absolute first step in the business planning process. I have read a million, well maybe not a million, but I read many, many business plans written by producers. Producers should have involvement in that business planning process, but most of the business plans talked about how the animal was produced, breeds, husbandry process, husbandry plans, that kind of stuff, and very little about how they're going to get it into the marketplace, what is going to set it apart from competition, who are the likely candidates for selling the product, and so on. You can just tell that those projects that have been so focused on production have really an uphill battle in trying to become successful, mainly because there's such a gap in the marketing plan.
- 3.** Involve as many producers with common goals as you can find. They don't have to be your best friends, but they have to have some things in common with you. Obviously, you need them for equity. And obviously you need them for raw materials. If you're supplying customers, what you don't want to do is you don't want to short them. You want to make sure that you have enough production around you to meet both current demand and future demands. It does take a lot of producers to get that done. Of course, the more producers you bring in, the more difficult it is to manage but that's just what you have to deal with.
- 4.** Shore up your equity needs. If you're short on equity, don't start. What oftentimes happens, is that there's enough equity to get a plant built, or there's enough equity to get a plant partnership established, or there's enough equity to get a new piece of equipment bought, but in doing that, they're shorted on operating capital. Most business planners, such as ourselves, will tell you what the minimum amount of operating capital you must have to make this work. Don't short that. If you do, you're going to be in trouble. You're going to run out of cash. Where are you going to find the cash? You're going to go back to your source, or your lender and so on, and that is just very, very, very, very difficult going back to the well.

⁶³ DeHaan, *ibid.*

Happy families are all alike; every unhappy family is unhappy in its own way.⁶⁴ Ecosystems language is similar to Tolstoy's: every resilient system is similar, every failing system is unique⁶⁵. Don't repeat the mistakes of others. Here are thirteen ways local meat processing system have failed⁶⁶.

Thirteen Ways Processing Plants Have Failed

- 1.** We've had issues with too large of a group all with competing interests or ideas. Here's an example of one. They had producers who wanted to do halal services. Another one wanted to focus on the beef side of the business. Others that wanted to focus on goats. Then they wanted to bring in pigs. Then they didn't know how to handle poultry with an inspection. They never got anywhere because they couldn't focus on anything. They just had so many different interests and ideas that that inhibited them.
- 2.** There have been some examples where people would get operations lined up and they had these cooperatives of all these folks who said that they would get involved with the business, they would help put up capital, and then they do all this background work to get everything lined up, but then all of a sudden nobody has any money. So, going with those promises to build something that never materialized.
- 3.** Some of them have just tried to do too much too fast. They wanted to make every product under the sun, every type of service available; they wanted to do ritual slaughter, they wanted to do ready-to-eat products, all of this by buying an existing facility that obviously couldn't handle any of that. And then they didn't have the resources to retro-fit that plant. That was a challenge for them.
- 4.** Some of these folks have the mindset that the government is out to get them, they're anti-USDA from the beginning. That's never going to work for them. They just didn't want to deal with it, they didn't want to accept that there were rules that they had to follow. That did not work well for that plant.

⁶⁴ Tolstoy, L. Anna Karenina, p.1. Or, stated a bit less tersely by Aristotle: "Again, it is possible to fail in many ways (for evil belongs to the class of the unlimited, as the Pythagoreans conjectured, and good to that of the limited), while to succeed is possible only in one way (for which reason also one is easy and the other difficult -- to miss the mark easy, to hit it difficult); for these reasons also, then, excess and defect are characteristic of vice, and the mean of virtue; For men are good in but one way, but bad in many." Aristotle. Nicomachean Ethics, Translated by W. D. Ross, Oxford University Press, Oxford; Revised edition, 2009.

⁶⁵ Also stated a bit less tersely by in Catastrophe Theory: "... for systems belonging to the singular part of the stability boundary a small change of the parameters is more likely to the send the system into the unstable region than into the stable region. This is a manifestation of a general principle stating that all good things (e.g. stability) are more fragile than bad things. It seems that in good situations a number of requirements must hold simultaneously, while to call a situation bad even one failure suffices." V.I. Arnold. 1992. Catastrophe Theory, Springer-Verlag, pp. 31-32

⁶⁶ Raines, C. 2011. "Whatever Works." Presentation on Niche Meat Processor Assistance, Network webinar, "To Build or Not to Build," 9-28-11. Available at: <http://www.extension.org/pages/59962/to-build-or-not-to-build:-lessons-learned-from-new-processingventures>

5. Some tried to already enter a saturated market. They just had this thought that, "Here was a plant for sale." or "We're 10 producers wanting to market something." But they didn't take into account that they're going to have to get other livestock in too. They didn't have the option of getting those things taken care of. If the market is saturated and there is a plant operating, there may simply not be enough market share, whether it be the customers you have coming in to sell products or getting enough livestock in yourself.

6. Farmers didn't have enough livestock to supply them. Another plant was built and they had very seasonal swings, and they weren't going to do game harvesting. Everywhere you go in Pennsylvania, almost every small plant will close down and process deer for a couple months. Well these folks didn't want to do that. It turns out in winter they couldn't find all the livestock they needed anyway so they had no operating capital. Simply they didn't do any market research. It was a very "I will build it, they will come" mentality.

7. In some cases, the plant had been built, at least the facility, and they totally underestimated the expenses for equipment. One plant budgeted \$5000 for a new smokehouse, which for them was not nearly enough for the type of smokehouse that they wanted to do. They should have been up in the \$50,000-60,000 range. And then, they weren't able to produce those products which totally messed up their business plan.

8. We've had some that have had problems with zoning. They underestimated all of their water/sewer costs. They had all of this stuff planned but then realized that tapping into all that was going to be cost prohibitive to them. They didn't get that business going at least in the location that they wanted to. That delayed progress on their plant.

9. They underestimated some transportation costs. One plant was dealing with slaughter only and taking it to an existing cut and wrap facility. They failed to take into account the need for buying a truck and running that truck back and forth. They didn't build that into their pricing system and that did not help them.

10. Non-cooperative producers. Sometimes we have issues with producers who do not come pick up their meat. Or we have producers that show up late and don't bring what they say they're going to bring and this is something you can't really plan for. But they've had to pay for extended inspection hours because they didn't have that communicated to their customers. And then they also just had to basically eat some product. Now they were operating the USDA plant, this happened to be something they produced on a custom-exempt day, but they were just stuck eating that whole processing cost. It was custom-exempt meat and then they couldn't do anything with it. So they lose money both dealing with the non-cooperative producers.

11. Cowboy mindset. They're going to go in there, they're going to take charge, they know exactly what's going on and they can do the job better than anybody else, which usually they can't. Being a little too gung-ho or over-zealous simply hasn't helped.

12. They did not understand (this is an example from multiple) the time commitment. Running a small plant with a small staff and making it a family business is simply huge. Whether it be

marketing or processing or anything like that, it's not going to be a 9-5 job. There's just a lot more and then they get totally wrung out. They didn't have any experience with it and they didn't understand how much time it was going to take them.

13. It's always a challenge to find qualified labor. Yes, we have students who know how to cut meat, but they're not going to work for a local slaughterhouse when they can make twice as much money doing something else. We have had, in order to find qualified labor, I know of some processors who are doing a sort of labor exchange with a penitentiary in the area and dealing with things like that. But they're unable to find qualified cutters, slaughter men, processors who know how to do the work. They're out there, but they can be a challenge to find. They couldn't really go anywhere with their business because they didn't have the right people involved.

Building resilient meat production/processing/marketing system. To meet growing demand for local meat and poultry, farmers need access to appropriate-scale processing facilities with the skills, inspection status, and other attributes to handle these products safely, legally, and to customer specifications. At the same time, existing small processors often lack the steady, consistent business they need to be profitable. From their perspective, capacity is often not lacking but in excess⁶⁷. Seasonal demand for their services creates an unstable “boom and bust” cycle that is difficult to maintain: fixed costs are paid all year, skilled workers need year-round paychecks.

*“You can’t just call your dentist and say hey, I’m coming in tomorrow.
There are higher cost industries in which you can’t afford to have underused capacity.”*
– Chelsea Bardot Lewis, Vermont Agency of Agriculture, Food, and Markets

Interrelationships between systems determine resilience. Establishing lasting local meat systems involves a shift in the relationship between farmers and their processors, away from a series of independent transactions, conducted at arm’s length, to interdependence. The shift from convenience to commitment includes not only enhanced coordination and communication but “hard” commitments: farmers commit, individually or in coordinated groups or brands, to providing the processor with sufficient, steady business, i.e., livestock to process. Processors commit to processing those livestock to farmer specifications, consistently and on time. Strengthening commitments between processors and farmers – as well as along the entire supply chain – is essential to maintaining and expanding the processing infrastructure necessary for growth in local meats.

Trust and cooperation between farmers of various sizes. Many collaborative efforts fail because one of the bigger farms begins to dominate the effort. Since having at least one “anchor” customers provides steady volume and consistent business, smaller producers benefit from partnerships with larger producers. Some processors are their own anchor customer, providing the majority of the throughput. When farmers aggregate into a single niche brand, that brand can be a valuable partner for processors because it can deliver steady throughput and coordinated communication that can often be difficult for farmers to deliver individually. None of this can occur unless farmers trust each other. Facilitators must

⁶⁷ A study of Vermont in 2010 showed only 38% of the state’s capacity was being used. High demand in the fall and low usage in spring and summer wreaks havoc on ability to meet payroll in slack times while still being able to meet demand in the fall (Lewis, C., 2011. Renewable Food and Agriculture Systems, 27:192-199.)

work hard to establish trust in the early stages—including eliminating some potential participants who are just too selfish and independent to get along with smaller producers.

Transparency and trust between managers of cooperating systems. Processors can use tools like active scheduling systems and variable pricing to assure that throughput is steady, week by week and over the year. This is part of their commitment to farmers, who know they will have processing dates for their livestock. Processors who help their farmers-customers with business advice, marketing, and distribution, for free or for a fee, can build good working relationships and long-term loyalty as well as build demand for their own processing services. Deeper commitment comes when farmers invest in their processors financially, for mutually beneficial development.

Even when farmers are not formally organized, they can help their processors by working with each other to spread their collective demand for processing over more of the year.

Farmers who supply niche meat brands that use small, local or regional processors should also recognize the long term benefits of maintaining established coordinated marketing arrangements and relationships, even in times of high commodity livestock prices. When commodity prices are high, fewer farmers try to sell animals through niche markets, and this reduces business for the small processors who handle niche brands. Farmers strive to make the best decisions for their own operations, yet if they lack commitment to their brands, those brands may not be able to commit to processors, and processors may not survive.

Ongoing communication underpins the entire relationship. Whether about scheduling or services, costs or prices, meat quality or market conditions, processors and farmers need to communicate effectively with each other to develop and maintain strong business relationships.

State and Federal policy are systems which can stifle or facilitate, but can seldom be ignored. Several states have shown how technical assistance and capacity building for processors can be very effective in enhancing local meats processing. Examples include business and management skills training, assistance with grant writing, help in transitioning to USDA inspection or third party certification, even help setting up, implementing, and maintaining scheduling systems. Training and capacity building can also target farmers, for example, to improve communication with their processors, as the Northeast Livestock Processing Service Company has done⁶⁸, and to understand their processors' business and regulatory environment⁶⁹.

Other states are held back by Federal and State gatekeepers who stand in the way of small producers. Arkansas officials seem determined to put roadblocks in the way of small processing enterprises with the result that many Arkansas producers must go out of state due to closure of old processors and no new ones opening up. Just across the border in Missouri, the gatekeepers are extremely helpful with

⁶⁸ Harris, K. 2011. Working Effectively with Your Processor. Presentation on Niche Meat Processor Assistance Network webinar. August 24. Available at: <http://www.extension.org/pages/59961/working-effectively-with-your-processor>.

⁶⁹ Wenther, J., 2009. Understanding the Processor's Language. Presentation on Niche Meat Processor Assistance Network webinar. Sept. 15. Available at: <http://www.extension.org/pages/23228/understanding-the-processors-language>

the result of many more top quality processors available. Many enjoy the patronage of Arkansas producers.

Public officials who see their positions as part of a regulatory and policy system to stimulate local food systems also support local meat processing by: clarifying Food Code variance requirements, implemented at the state level, for retail dry cured meat products; clarifying federal poultry processing exemptions, e.g., regarding multiple users of the same equipment; working with state and local agencies to allow innovative wastewater management systems and on-farm offal composting; and including local meats in state and local procurement orders/purchasing specifications.

Producers need to provide strong input to the policy system. With producer input, state and local governments – for example, in Wisconsin, Vermont, Minnesota, and North Carolina – have played a role with public investment (for example, appropriations, tax credits, tax incentives, or loan guarantees) for processing plant and equipment upgrades.

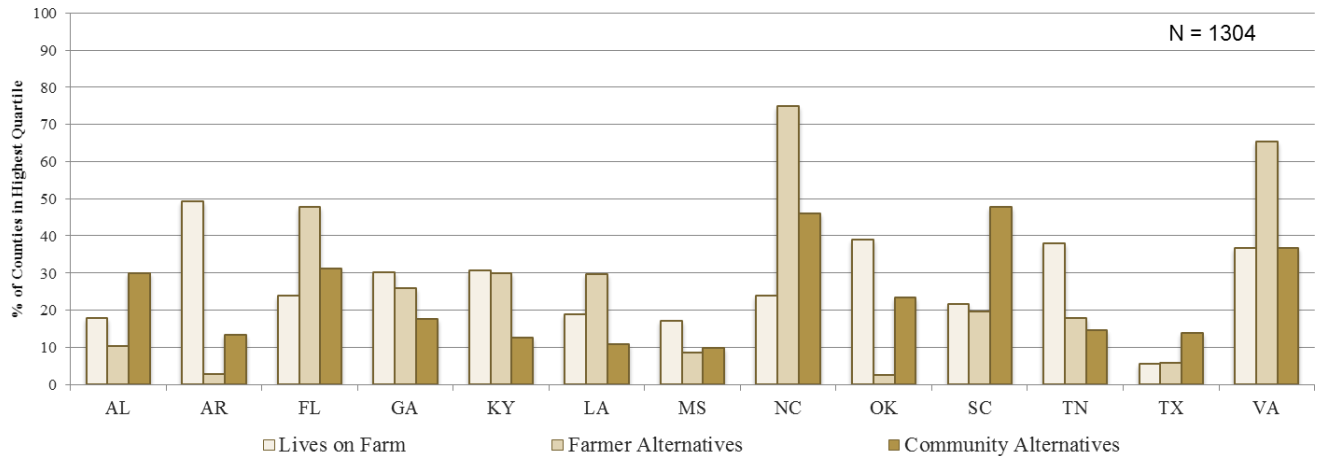
Other options include tax incentives and loan guarantees to back processors during start-up and/or expansion, and outright grants. State legislatures can also direct and support relevant state agencies to allocate staff time to work on these issues, providing not only technical support to individual plants but statewide leadership on industry-scale challenges and solutions.

Self-assessment of the locally self-organized factor of resilience. If you've read this chapter, we're sure you can generate numerous questions to assess the strength of this factor on your farm. They should be similar to the following:

1. Do you buy supplies locally?
2. Do you direct market?
3. Do you market locally?
4. Are you a member of any local sustainable Ag groups?
5. Do you live on your farm?

Secondary database analysis of locally self-organized factor. Based on variables available at a county-level in the 2012 and 2007 USDA Agricultural Census, we made the estimates of strength of this factor in all Southern states. See Appendix for details on method

Locally Organized/Local Control in Agrifood System by State % of Counties in State Ranked in Highest Category



Sources: 2012 Census of Agriculture, 2013 Food Atlas, and 2014 review of state policies and regulations; extra calculations by the University of Mississippi Center for Population Studies. Scores based on standardized score rankings on: Lives on farm = % principal farm operators live on farm; Farmer Alternatives = % operations with on-farm processing; % operations marketing directly to retailers; % operations with CSAs; Community Alternatives = presence of meat processors, farmers markets, and farm to school programs. Analysis based on 1304 counties.

Conclusions

Understanding the local food system as being part of numerous interacting adaptive systems is the lesson from ecological systems research and the lesson from the specific local meat system cases presented. If a local food system hopes to last, it must understand resilience. Of the eight factors underlying resilience of systems, the need for disturbance and reassembly periods is the hardest to accept in managed agroecosystems. No one wants to disturb and reassemble his system. Instead, we try to make everything run smoothly and insure that everything comes out OK. We like to continue to do what we are used to doing. Civilized humans like stability. But, we know that a farm or any system which does not adapt and change is a system which is stagnant and dying. Similarly, the larger system our farms are a part of needs regular disturbance and reassembly or it will die. American automobile manufacturers almost all died because they had not been forced to undergo the disturbance and reassembly which led to strengthened German, Japanese and even Italian companies. Many formerly local or, at least, American production/processing/marketing systems have been totally eliminated and reassembled by systems mostly based overseas⁷⁰.

Our food system is in a state of disturbance and reorganization. Smaller farms, if adaptive, flexible and agile, diverse and redundant and highly networked, can prosper and even help construct the new

⁷⁰ Grennes, 2003, in *Creative Destruction and Globalization*, Washington, D.C.: Cato Institute, chronicles the disturbance and reassembly of the automobile and textile industries. Schumpeter (in his 1934 book *The Theory of Economic Development*. Cambridge, MA: Harvard University Press) first explored creative destruction—prefiguring one aspect of ecosystem resilience—disturbance and reassembly.

system. As in all ecosystems, other keys will be diversity of production, collaborating with other farms to insure redundancy, and symbiotic connections with non-farm systems.

The American industrial food system, as it falls, will likely thrash around like the last dinosaur to go extinct. Its death throes will be painful, but it will die. What will replace it and who will be in the driver's seat depends on who is able to master the factors underlying resilience in any agroecosystem, especially local self-organization.