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Can Regional Food Networks and Entrepreneurial Strategies Enhance Food System Resilience?

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Viewed in retrospect, one of the more important contributions of the local food movement will arguably be its stimulating effect on new policy dialogue around questions of scale, entrepreneurialism, and resilience—the capacity to withstand and adapt to shocks to the food system such as climate change, geopolitical and economic disruptions, energy and water shortages, and natural disasters (Smith et al., 2016; Puma et al., 2015; Magis, 2010; Wilson, 2010; Ericksen, 2008). The emergence of local food as a player—quirky, questionable, but quite clearly consequential—has driven inquiries and arguments from town squares and university halls to state departments of agriculture and Congress. The scientific and policy dialogue is timely. Food system policy must be examined with an eye to scale and resilience.

We argue that no scale is inherently good or bad. Instead, we hypothesize that with targeted policy support, regional food networks (RFNs) can play a critical role in strengthening food system resilience. We see regions as a useful unit of analysis because agricultural issues tend to be regional issues; "topography, water availability, land and other inputs, farm scale, crop options, and market proximity are operable at the regional level" (Clancy and Ruhf, 2010). RFNs arise through marketing relationships between consumers and producers that are still considered "local" but take on new forms as demand for local food has grown: While direct-to-consumer sales are plateauing, "intermediated" sales to retail, restaurants, institutions, processors, or distributors that are rooted in a region have grown (Low et al., 2015). An "RFN ecology" framework reminds us that food systems are integrated, nested, and networked scales with interactions and responses between and among different levels of food production and their social, economic, institutional, and natural environments. The more scales and interconnections in play, the stronger the underlying system (Meadows, 2008).

We conceive RFNs linking local and national or global scales; from this central role, they can enhance long-term opportunities in ag-related entrepreneurship at diverse production, consumption, and community scales, stimulating new strategies, practices, products, and markets. Diversity is another key attribute of a resilient system (Ericksen, 2008; Meadows, 2008). But rather than focusing only on individual farm entrepreneurship, the New Natural Resource Economy (NNRE) is an economic development framework that recognizes the collective importance of very small, community-focused, multifunctional businesses that create new products and markets with an emphasis on environmental stewardship (Lurie and Brekken, 2017; Hibbard and Lurie, 2013). The NNRE framework integrates economic, social, and environmental impacts with a focus on the small- and midsized-farm sector, which could enhance community development in rural areas.

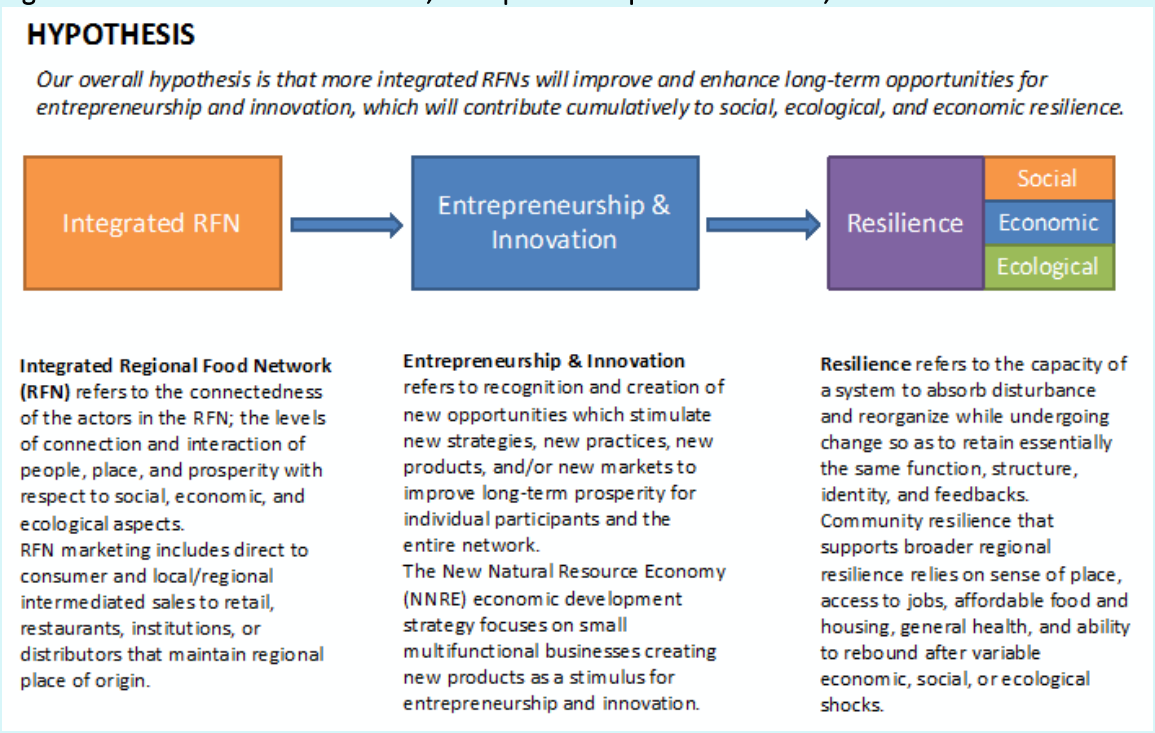
To date, there has been a lack of systematic research on RFNs, their characteristics, and their scalar linkages and interactions. To fill the gap, we conducted two surveys using convenience sampling, one of Oregon RFN producers (N = 193) and another of RFN consumers (N = 614), then analyzed results from the rural parts of the state to assess whether RFNs in rural Oregon reflect an NNRE development model (Lurie and Brekken, 2017). Based on our

findings and the literature, we now consider how RFNs contribute to entrepreneurship and innovation, in turn contributing to resilience in the food system across economic, social, and ecological dimensions. We then turn to public policy options for supporting the RFN ecology to enhance food system resilience.

RFN Ecology: Adaptability, Diversity, and Integrated Nested Scales Foster Entrepreneurship and Food System Resilience

Our overall hypothesis is that more-integrated RFNs will enhance entrepreneurship and innovation through opportunities for adaptation and increased diversity at multiple scales, which will contribute cumulatively to social, ecological, and economic resilience in the food system (Figure 1). RFNs enhance diversity by expanding the range of food marketing options. They present adaptive strategies for small and midsize farm and food businesses as they struggle to compete in the global food system. Small and midsize farms may also be more willing and able than larger operations to adapt their operations to new regional markets (Hibbard and Lurie, 2013; Diamond and Barham, 2011; Lev and Stevenson, 2011; Walker et al., 2004; Lichtenstein and Lyons, 2001).

Figure 1. Connections between RFNs, Entrepreneurship and Innovation, and Resilience



From the results of our 2016 Oregon RFN consumer survey, we found that consumers define local food at a more regional level: One-third of respondents considered food from within the state to be local, with a majority looking beyond immediate city or county lines (Lurie and Brekken, 2017). RFNs stimulate farm entrepreneurship as farms respond to consumer interest in supporting local farmers and reducing the environmental impact of their food purchases. Oregon RFN consumers indicated a willingness to pay more for Oregon-grown food with environmentally sustainable practices (although environmental attributes were valued more strongly in urban areas), which aligns with the motivations of producers operating in Oregon's RFN who reported personal motivations for using environmentally sustainable production practices while contributing to their local economies and food security. Connecting consumers and producers in RFN markets can create a virtuous cycle that contributes to the economic, social, and environmental resilience of the region (Brekken, Parks, and Lundgren, 2017; Lurie and Brekken, 2017; Liang, 2015).

Looking in particular at rural areas of the state, we found that the RFN has the distinct characteristics of an NNRE strategy for economic development, with highly multifunctional agriculture among farms of multiple scales that seek to strengthen ties with their community and reduce environmental impacts from production. Here, we explore the literature to determine whether this regional NNRE strategy in the food system has the potential to contribute to economic, social, and environmental resilience (Lurie and Brekken, 2017).

Economic Resilience in RFNs

At the farm level, multifunctionality in agriculture generates additional revenue and inherent crop insurance through growing multiple products or offering services for a range of markets, along with expanded market knowledge and improved networking (Liang and Dunn, 2013; Iles and Marsh, 2012; Meter and Rosales, 2001). In our Oregon RFN survey, we found that farmers engaged in economically multifunctional agriculture through RFN participation: Respondents from the rural areas of Oregon on average sold into two RFN marketing channels, but some were highly diversified, selling into four. Furthermore, 40% of RFN survey respondents received over half of their household income from the farm, while the farm was an important source of supplemental income for the other 60%. The RFN also provided opportunities at a variety of scales: Nearly all respondents were very small businesses, but those that employed more than 10 people were also full RFN participants, showing that RFN marketing is not reserved for very small farms (Lurie and Brekken, 2017).

Some economic analysis has found that local food endeavors are economic development drivers, but impacts depend on the structure of local agriculture and the role agriculture currently plays in the economy. Factors such as farm size, farm distribution, commodities produced, types of agriculture, and level of urbanization are key variables (Low et al., 2015; Brown et al., 2013; Martinez et al., 2010). Over time, regionalizing may result in distributed and appropriately scaled infrastructure. The gap between supply and demand for new markets provides an opportunity for entrepreneurs and innovation, bringing new money and skills into the community (Kutzhanova, Lyons, and Lichtenstein, 2009). Diversity generates opportunities for new product development and associated entrepreneurial opportunities in related businesses.

On the downside, change is hard and potentially expensive, especially in the absence of capital backing for innovation (Lichtenstein and Lyons, 2001). Our rural RFN survey respondents ranked costs and time constraints higher than other barriers to RFN marketing (Lurie and Brekken, 2017). Furthermore, larger entities may incorporate "local" purely to increase market share, without regard for community development (Cleveland et al., 2014). Competing with these developments while dealing with the complexity of entering new markets can challenge smaller producers beyond their capacity (Born and Purcell, 2006). Additionally, economic development departments (city, county, etc.) tend to focus on larger scales to provide assistance and resources (Lurie and Brekken, 2017; Hibbard and Lurie, 2013; Walker et al., 2004). Enhancing RFN resilience requires significant leadership coupled with technical and other types of support. Starting at smaller scales and scaling up may be a key to developing appropriate, workable regional governance policies (Candel, 2014).

Social Resilience in RFNs

One outcome of local food is the "gentrification" of the food system, which fails to address the social justice issues of food insecurity. However, recent literature and our 2016 Oregon RFN producer survey found RFN farmers in Oregon's rural areas were highly motived to sell into RFN channels to "support local health/food security." Rural Oregon RFN producers seem to understand that lack of fresh food and food security are problems in rural Oregon. Producer participation in the RFN creates strong social and community connections, enhancing social aspects of community resilience. From the consumers' perspective, 72% of RFN consumer survey respondents from rural Oregon were motivated to participate in RFNs to "support local farmers," recognizing the value of farmers in their rural communities (Lurie and Brekken, 2017).

Our survey also found that farmers look to one another for support and advice, although farmers tend to look to others who share their production and marketing views, which can strengthen an RFN if more producers are involved (Brekken, Parks, and Lundgren, 2017; Parks and Brekken, 2018). For producers seeking new entrepreneurial opportunities, regional networks of peer advice and modeling can be important social support mechanisms.

Environmental Resilience in RFNs

Food systems studies commonly collect social and economic data to measure resilience, but only rarely do they measure environmental impacts or ecosystem services. All agricultural systems can use environmental services in unsustainable ways through pesticide and fertilizer pollution, excessive irrigation, soil erosion and loss of organic matter, loss of genetic diversity of crops, loss of habitat, and others. Damage to natural resources is rarely integrated into agricultural product pricing structures (Tillman et al., 2011; Pretty et al., 2006).

RFN marketing, as expressed through an NNRE development strategy, appears to allow producers to mitigate the environmental impacts of agriculture through production practice choices. In our survey of Oregon RFN producers in rural areas, we found strong adoption of environmentally conscious farming practices, with over 53% using organic practices but foregoing certification, 13% organically certified, and conventional growers reporting adoption of other conservation practices (conservation tillage, cover crops, etc.). Nearly 78% were motivated by their environmental values when choosing production practices. RFN marketing, which commands higher prices based on place of origin, can provide operators with the opportunity to cover the costs of environmental practices even when consumers may not be willing to pay more for environmental benefits of alternative production practices or when those benefits are difficult to communicate through marketing.

There is a lack of understanding of environmental impacts for agriculture at all but the coarsest scales and a lack of consensus on the use of integrated metrics. While this understanding is limited, multiple experimental models and frameworks are in construction or testing phases, with the promise that RFNs can support producers who use production practices attuned to restoring land, air, and soils while reducing input costs (Meter and Rosales, 2001; Boody et al., 2005; Sandhu et al., 2008; Iles and Marsh, 2012). The reduction of overall scale is typically helpful to the process of modeling outcomes across the landscape and can help generate policies and associated metrics for assessing local or regional environmental impacts and progress.

Enhancing Resilience through Policies Supporting RFNs

The concept of scale is an obvious foundation for policy dialogue, but it is freighted with many unchallenged assumptions: selected social and economic values, conflation of scale with desired outcomes, efficiency regardless of ecological impacts, political boundaries or distances as the definition of scale. To avert disappearing into the weeds, scale can more usefully be framed as socially produced, both fluid and fixed, and fundamentally relational (see Hinrichs, 2016). Attention to scale is useful in achieving many different goals (Born and Purcell, 2006; Puma et al., 2015). Significantly, recent research has concluded that policy makers need to be sensitive to variation in rural context, as a region's proximity to a variety of other resources has direct and indirect effects on its development potential (Van Berkel and Verburg, 2011). Such findings point to the importance of nested scales across production, consumption, *and* policy making.

Federal Food System Policy

Agricultural policy in the United States supports a narrow range of commodity crops. Coupled with market and technological changes, this policy stance contributes to the decreasing number of agricultural producers, particularly midsize diversified operations, associated regional infrastructure, and rural economies. These trends undermine resilience over time and across space (Boody et al., 2005). Furthermore, agriculture in its current state is a major contributor to environmental damage. Although the federal conservation programs and organic certification are available, they remain voluntary programs and do not systematically address the negative externalities that result from large-scale monoculture-production systems. One effect of such commodity-focused subsidies is policy path dependency, whereby institutions and policies accrue increasing returns for continuing down a certain path and, in so doing, make alternative choices costly, thereby becoming self-reinforcing (Iles and Marsh, 2012).

The value of "smaller and closer" has effectively been brought to the fore by the local food movement and is raising important questions for policy makers. Recent small adjustments in the Farm Bill promise some support for smaller-scale farm operations. Some of the 2014 provisions directed toward farmers markets and marketing support have greatly expanded their previous budgets, but their share of the overall bill remains in the very low single digits (Low et al., 2015). A provision to establish the data infrastructure to evaluate the effects of the

changes on local food systems would be more promising if mandatory funding had been assigned. Farmers markets and direct farm marketers are now eligible to accept Supplemental Nutrition Assistance Program (SNAP) benefits as a form of payment, directly benefiting consumers and local food producers (USDA-FNS, 2017). These sorts of adjustments may chiefly indicate the slow pace and limited scope at which federal policy change can be expected, although advocates continue to work toward systemic long-term changes.

Regional, State and Local Food System Policy

At the state level, policy supports that target cottage food laws, agritourism, small-scale meat processing, the expansion of farmers' markets and farm-to-school programs, and some attention to urban agriculture are emerging across the country (Brekken et al., 2016; Low et al., 2015; Iles and Marsh, 2012). These laws take the form of funding support or deregulating some small and local food system activities.

Recognizing that the food system has significant impacts—such as on the local economy, jobs, transportation, the environment, health, and waste disposal—food system planning saw dramatic growth in the early twenty-first century. Currently, many local food system planning efforts lack balanced coordination to include stakeholders across sectors, organizations, and residents. There is a growing trend for states, cities, and counties to incorporate food systems into comprehensive and environmental planning, using land use and other regulatory tools such as permitting, licensing, and monitoring from production through processing to consumption and disposal (Brekken et al., 2016; Low et al., 2015; Neuner, Kelly, and Raja, 2011). The movement has included the development of a variety of food system assessment tools, which range from assessing the productive capacity of surrounding lands to multidimensional, qualitative, and quantitative evaluation of food systems across social, economic, and ecological dimensions (Thilmany et al., March 2016; Freedgood, Pierce-Quiñonez, and Meter, 2011). The latter approach is expensive and complex; its power as a tool for dialogue about resilience, however, is significant.

Economic Development Policy

Community resilience that supports broader regional resilience relies on sense of place, access to jobs, affordable food and housing, general health, and ability to rebound after economic, climatic, or ecological shocks. The global scale of production has overwhelmed connections between food and regional resources, and it is clear that "ag of the middle" (Lyson, Stevenson and Welsh, 2008)—small and midsize farms that are the classic supporters of RFNs—is in critical decline. Recent multifunctional farm studies (Liang, 2011; Liang and Su, 2013; Liang, 2012) suggest that entrepreneurial farmers are able and willing to create new opportunities by introducing innovative products and markets and adapting new technologies. Further study on the importance of matching production and consumption scales for regional economic development could help us better understand the structural and policy requirements to support such a shift.

The business development concept of "clusters," or geographic concentrations of interconnected companies, may offer value to food system and resilience planning (Beckie et al., 2012; Rodriguez-Clare, 2007; Born and Purcell, 2006). Farmers' inability to move their "factories" to more advantageous locations provides a strong motivator for cluster development, but historical trends away from regional infrastructure—from grain milling to slaughter facilities—are widespread (EcoTrust, 2015). Business development loans or other strategic support identified through planning and market analysis could promote strategic clustering to alleviate the infrastructure gap, particularly for "ag of the middle" producers with significant product volume or products that require further processing. Cluster development has been connected to upscaling of alternative food networks and stronger roles for regional networks in international business (McAdam et al., 2016; Gellynck, Vermeire, and Viaene, 2007).

Food hub development—and other forms of values-based supply chains—also appears to support the resilience potential of RFNs. A food hub is generally defined as "a business or organization that actively manages the aggregation, distribution, and marketing of source-identified food products primarily from local and regional producers to strengthen their ability to satisfy wholesale, retail, and institutional demand" (Barham et al., 2012). Well-organized, knowledgeable, and adaptable technical help; adequate financing; and a strong umbrella organization are important to but not always available in communities; supplying these needs is deserving of the attention of regional and community planners and economic development offices (Cleveland et al., 2014; Pirog et al., 2014).

Significant untapped market opportunities at the regional level provide potential to expand and diversify RFNs, particularly in wholesale markets that maintain the place-of-origin identity of the food. A classic example is the trend in institutional buying (among schools, hospitals, prisons, universities, etc.) toward sourcing locally or regionally. However, smaller enterprises, particularly in rural areas, face multiple barriers to market entry (Hibbard and Lurie, 2013), including the ability to supply adequate and consistent volume across seasons. However, this challenge suggests that both suppliers and buyers may need to update expectations, procurement, and marketing strategies to accommodate new and seasonal products (Cleveland et al., 2014). Our Oregon RFN survey results from rural areas showed that these market channels are already in use but are not as developed as direct marketing: A majority of respondents use local retail and restaurants as a marketing channel, but this accounts for only 23% of farm income on average; only 29% of respondents sold to local or regional distributors, and 11% sold to institutions (Lurie and Brekken, 2017). Regional planning and policy adaptations could provide support in these areas.

If resilience across many variables and geographies is to become a serious goal, policy discussions must address the strengths to be found in the links between scales, away from the half-century focus on economies of scale that have historically eliminated many productive choices in the "smaller and closer" arena. RFNs can provide strong support to such links between nested scales.

Summary

Thinking in terms of "RFN ecology" may be a helpful framework for creating food system resilience: integrating nested and networked scales with interactions between and among levels of food production and their social, economic, institutional, and natural environments. RFNs occupy the fertile middle ground between purely local production, distribution, and demand and prevailing national and international markets. Creating and sustaining robust, resilient RFNs and communities is complicated due to interconnecting scales and the immense variability across regions, including climate, soils, land use policies, sociopolitical culture, and organizational, leadership, and marketing proficiencies. State and local policies can be attuned to regional conditions, which is where we see more policy support at present.

Just as the elements in a healthy, diverse ecosystem support one another, RFNs need to exhibit mutually supportive structures and interactions to provide optimum diversity and concomitant resilience. The complexities of integrating networked scales across many community attributes suggests the importance of adaptability and begs for further public policy support. The path dependency phenomenon noted above has a proven history of helping larger producers; no data suggest it would fail to do so at the regional level. A policy commitment to RFNs at multiple scales can provide the institutional support necessary to increase returns to RFNs and creating self-reinforcing food security.

The local food concept continues to carry significant influence in the marketplace, defying its tiny share of the total food market. In this emerging discussion, "local" can still be defined as anything from next door to state boundaries, and "local" by any definition clearly cannot address food needs on a national basis. But far from dismissing the local food movement, these facts simply suggest that its ideas, practices, and consequences—intended and unintended—remain in the nascent stages of development. Vigorous debates will continue.

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