

## **Regionalized Food Systems: Improving Resilience in the Face of Uncertainty**

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### **Summary**

Regionalized food systems provide an opportunity for improving resilience in the global food supply in a period of increasing uncertainty due to climate change, population growth, fresh water stress, and energy cost, among other threats. In affluent countries, this is primarily about rebuilding parts of the food system that were systematically lost in the 20<sup>th</sup> century. Within less-affluent countries, many local food systems are already regional in nature so it is important to seed development to enhance, not diminish, these regional food systems through appropriate modernization and intensification. In both cases, science and technology, coupled to community-based development techniques, have critical roles to play in improving productivity and efficiency at small and mid-size scales, reducing in-field and post-harvest losses of food, improving diet choice among consumers, and enhancing chances for livelihood expansion across a large percentage of the population.

### **Current Realities**

The sustainability and resilience of our food system is, in part, dependent on the development, maintenance, and/or enhancement of regional food systems around the world. This does not imply a deconstruction of current global trade. Rather, we need to develop regional food systems that optimize the production, consumption, and supply chain infrastructure of food within a defined region, while integrating with larger regions as well as the national and global supply of food in a manner that provides a healthy, sustainably produced diet to a region's inhabitants.

During the last century, a number of factors have combined to both increase the availability of a wide range of foods and increase the vulnerability of those foods to disruption. In the United States, we increasingly rely on concentrated production centers for a wide variety of foods — especially fruits and vegetables but also an array of animal products. For example, the Central Valley of California supplies a large percentage of the U.S. domestic fruits and vegetables and is experiencing severe drought conditions. It is estimated that 40% of the region will not be planted and/or harvested this year. The concentration of production in this relatively small area could leave us vulnerable to disruption. Often the expertise for production of these crops is unavailable elsewhere. Hence, the capacity of our food system to absorb disturbance and reorganize so as to retain essentially the same function and structure (i.e., resiliency) is in doubt. Regionalized food systems would improve resiliency by distributing the various food system functions, starting with production, more broadly.

There are several reasons why food system resiliency is important. The literature on climate change is clear: humans have significantly impacted global climate and will continue to do so with deleterious consequences on the environment and resource ability for the foreseeable future. Simultaneously, the global population will increase by some 2 billion people between now and 2050, requiring an estimated additional 2.4 trillion pounds of food annually. The U.S. population will increase by more than 100 million during the same period, and U.S. agriculture is threatened by changes in climate. In the latest U.S. Census of Agriculture, the number of farms in all size categories decreased as well as a continuing decrease in the amount of total farmland.

Our dietary patterns also impact land use and greenhouse gas emissions. All studies to date investigating the impact of dietary patterns on environmental sustainability indicate significant variation on atmospheric carbon and/or land needs depending on dietary choices — typically the greater the amount of plant products in the diet the lower the greenhouse gas emissions.

## **Scientific opportunities and challenges**

The need to improve global capacity for regional food production diversity, while also insuring a reduction in both energy use and land-intensive consumer demand patterns, is clearly indicated. Since the spatial urban “eating footprint” typically exceeds the boundaries of the city by many times, urban food practices and behaviors affect food systems and natural resources. In affluent countries, dietary patterns tend to exacerbate dietary impact on climate change and land use primarily because of high levels of meat consumption. The challenge in the developing world is to improve the food security for a wide swath of the population in a manner that reduces the potential of climate change impacts. Research indicates as countries develop, dietary patterns tend to move toward more resource-intensive practices that promote climate change. There is very little public or private policy focused on creating a playing field that prioritizes development (in affluent countries) or maintaining/enhancing (in less-affluent countries) of regional systems. Such priorities include new farmer development and support, supply-chain infrastructure creation, and consumer-preference targeting. Increasing urban/rural population ratio (especially in less-affluent countries) also will mean fewer farmers per capita, generating even more challenges

How people access food has a number of implications for strategies to enhance food security as we move through the 21<sup>st</sup> century. It is estimated that in East Africa, the bulk of the population (and certainly the lower half of the economic strata) will continue to rely on traditional market systems as people urbanize with less self-provided food for the bulk of their daily sustenance. This implies three things: (i) the need for much greater productivity by farmers in these parts of the world, (ii) the need for much greater attention to post-harvest losses of food and (iii) the need for a better understanding and community-based development of the supply chain infrastructure in traditional markets throughout less-affluent countries.

Recent research highlights the impending growth of the “modern market sector” and the continued majority importance of the traditional sector in supplying and distributing food to urban residents during the next 25 years. Those in the lower half of the economic spectrum will continue to experience the traditional sector as the main source for urban food provisioning. This food system depends on regional/local production and a dynamic supply chain. In these areas, promoting improved food security and equitable economic growth in the traditional sector requires a community-driven approach. However, there is very little support to this sector in terms of policy promoting community-driven infrastructure development, or “appropriate technology” development — arenas where science and the private sector could play a role. It is clear that a focus on “appropriate community-based modernization” of the traditional sector will provide a dynamic action and outcome regarding market development for rural farmers, livelihood generation along the supply chain, and enhanced capacity for food security. Since cities in Sub-Saharan Africa generally will rely on local and regional food production, it is imperative that urban demand and rural supply are better linked, conceptually and in practice, to regional and local food systems and also to overall capacity of local, regional, and global agrifood systems.

Affluent countries have been moving along a path of regional food system redevelopment, while in less-affluent countries, the challenge is to not squander the existing regional food systems under the aegis of “modernization.” Globalization has proceeded at a rapid pace with increases in food imports, food exports, and the worldwide distribution of foods. World trade agreements have consistently expanded the reach and regulation of global food suppliers, while often inhibiting efforts at local food system preferencing. Simultaneously, in affluent countries there has been growth in interest and activity around regional food systems in which relationships among people and with natural resources are important. In the U.S., this interest in local/regional purchasing, either directly from farmers or indirectly from a number of outlets, has expanded beyond fresh produce to include locally processed and value-added products. In the last 10 years this development has expanded well beyond farmers’ markets to all facets of the wholesale, retail, and institutional markets.

## Policy Issues

We have an opportunity to develop, redevelop, and maintain regionalized food systems across the globe in a manner that supports trade but simultaneously prioritizes a diversity of regionalized production, processing, and distribution. The outcome is a more resilient, food-secure, and sustainable food system for ourselves and future generations. There are a range of groups and institutions that can provide funding and leadership for the policy issues enumerated, including national governments with coordination through international bodies, the philanthropic sector, various private sectors and academic sectors for research and development, and academic sectors for training of engineers and other scientists in community-based technology development.

- Identify and implement scale- and community-appropriate technology to improve the efficiency of production and post-harvest management of food products (e.g., the smaller-scale farming sector). Technology that is accessible, affordable, and appropriate for conditions around the globe needs to be developed in this context. This must be made readily available along traditional supply chains in less-affluent countries and developing regional supply chains in affluent countries. Large and small companies in cooperation with engineering schools could develop scale-appropriate equipment.
- Foster land, soil, fresh water, and nutrient preservation/restoration practices in affluent and less affluent countries. This recognizes that preservation and restoration of our natural resources is a prerequisite for a sustainable food supply that enhances food security for future generations. Food and Agriculture Organization (FAO) and International Federation of Organic Agriculture Movements (IFOAM) internationally; U.S. Department of Agriculture (USDA) and National Oceanic and Atmospheric Administration (NOAA) nationally; NGOs such as World Wildlife Fund and American Farmland Trust and foundations such as C.S. Mott and Surdna are examples for engagement in this arena.
- Promote incentives for young people to consider farming as a career worldwide. This necessitates investment in training, infrastructure development, land access, capital access, and fair-market access within both the academic (e.g., land grant universities in U.S.) and private sectors. USDA, U.S. Treasury, and the Environmental Protection Agency (EPA) as well as their state counterparts and foundations such as W.K. Kellogg and Jesse Smith Noyes are examples for engagement in this arena.
- Develop public policy incentive programs for residents of all countries focused on healthier eating and the reduction of the obesity epidemic. USDA's Supplemental Nutrition Assistance Program (SNAP); Wholesome Wave Foundation, and Fair Food Network; Community Support Agriculture purchases via insurance companies are examples for engagement.
- Give priority to a national security agenda that emphasizes food security and a food system designed for sustainability in a manner similar to that done relating climate change to national security and challenges for the national defense apparatus. Center for Regional Food Systems at Michigan State University exemplifies a location for this type of analysis.

## References:

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*\*\* A policy position paper prepared for presentation at the conference on Food Safety, Security and Defense: Focus on Food and the Environment, convened by the Institute on Science for Global Policy (ISGP), on October 5-8, 2014 at Cornell University, Ithaca, New York, U.S.*