



OUR FOOD SYSTEM AT ITS LIMITS

Building a Resilient Food Supply Chain In The Face Of The Pandemic

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Tyson Foods warns that “the food supply chain is breaking”

Food Firms source domestically as coronavirus creates supply chain concerns

Transportation bottlenecks snarl inputs to food supply chain

Recent Headlines

When asked his thoughts on the difference between regional food production and distribution systems, versus the current model, an Executive Chef we interviewed initially responded with a single word. Resilience. He feels that the current model of producing, packaging, and transporting food - occurring far from the point of consumption, lacks the resiliency that is inherent and needed in a more regional approach to food production. Executive Chef Noah Balow, Nicolett, Island Inn, Minneapolis, MN

COVID-19 has sheared away our notion that our global supply chain – once one of the wonders of the modern world – is resilient. The pandemic has highlighted the reality that after two and a half months we still struggle to find a national strategy that will bring us a sense of security.

Consider some of what we have witnessed in just three months:

- Long lines of cars in every part of the country depending on the distribution of free groceries to avoid a food access crisis
- Widespread outages in supermarkets, rolling from one category to another
- Crops being plowed under because of dedicated supply chains and end markets closing down – and no effective way to redirect the food to the most needy
- Millions of farm animals being “culled” and destroyed for lack of processing space due to closures
- Food processing plants closing because of workplace infections, leading to significant shortages in the food supply
- Global food shipments shutting down as countries isolate themselves from their neighbors

The recent coronavirus pandemic is challenging our assumptions about the invincibility of our food system, demonstrating how easy it is to wreak havoc and disruption. However, the current pandemic is only the latest problem in a host of problems with the current food production and distribution system.

It is high time for us to re-evaluate our food system.

The United States is just over 40 percent farmland, used for both livestock and crops¹. Of that, Crops represent 349 million acres of the 915 million we use to feed ourselves. But, despite such a large commitment of land to food production, we still find that food insecurity continues to grow. The Food Bank industry continues to expand at a compound growth rate of 7.6% pre-pandemic. According to the USDA's 2019 report, *Household Food Insecurity in the United States*, more than 37 million people in the country struggle with hunger.

Our system becomes more fragile every year, becoming less resilient and more vulnerable to man-made or natural disruption. We continue to further segregate ourselves from our food production sources. In today's marketplace, food production typically takes place in areas that are geographically distant from the places where food is consumed.

This separation of production from consumer is a relatively recent phenomenon, driven largely by the urbanization of our society and our desire to consume a full array of fresh fruits and vegetable on a year-round basis and at favorable prices. This was not the case a few generations ago, when our more rural society consumed food that was locally grown and had seasonal variability. The current means of remotely mass-producing food has destroyed this relationship we once had.

Our covenant with food is primary. We must now review how we want to see its role in our local lives. If we assume the choice is only a nutritional one, we miss the importance that food has economically.

The entire food system is the economic value of the food, the many ingredients that food contains, how food is produced, who handles it, and its nutrition value. These questions are better answered when the companies that provide the products, share an ethos and proximity to the region in which we live.

Our nation's food economy is estimated to be over \$1.7 trillion dollars. Although sounding impressive, that only includes the amount of direct dollars recorded by food codes in our gross domestic product. When the non-direct and value-added figures are calculated and included, food and agriculture represent 45,582,086 jobs. More than one-fifth of the nation's economy is linked, either directly or indirectly, to the food and agriculture sectors, with a total economic impact of \$7.06 trillion, according to a new nationwide economic impact study. Further, the study found that more than one-fourth of all American jobs are similarly connected. The food sector contributes \$154.4 billion in exports and 14.1% of total national output².

But the long-distance relationship we have with food is problematic on several fronts. The problems inherent in the current system, and recent innovations in growing technologies,

¹ USDA, 2018

² Feeding the Economy, April 28.2020 Report

provide a compelling argument for the return to more localized sourcing. Recent development in technology, local seasonal growing, Farmers Markets, and Controlled Environment Agriculture (CEA) ³are all rushing to provide greater options; but is it fast enough?

America has a history of kicking the can down the road in the face of pending disasters. We are even challenged when dangers are slow in developing and advance in methodical increments. Some examples are antibiotic use, climate change, water shortages, pandemic planning, overfishing and topsoil loss. We have known about Food Deserts for 20 years, yet they still exist, and we have failed to eradicate them. We feign surprise when 1,500 cars show up at the local food bank. While the country is surely not a terminal patient, we find ourselves playing catchup and trying to assess just how serious we need to be before changing how we handle matters.

While not over-emphasizing the panic of the COVID-19 crisis (but also mindful of it), it is illustrative of the magnitude necessary to wrestle us from slumber. Some of the best examples are the large meat processing plants that have shut down due to worker infections, resulting in shortages of meat staples. Government-mandated closure of large portions of the hospitality industry has resulted in widespread disruption in the production and distribution of fresh produce. It is surely frustrating to witness producers destroying crops in some areas while unemployed people line up by the tens of thousands at food banks on the other side of the country. This speaks volumes about the inefficiency and inflexibility inherent in the current system.

However, the current pandemic is only the latest in a host of problems with the current food production and distribution system. Food products recalled by the U.S. Food and Drug Administration (FDA) have skyrocketed 92.7 percent since 2012. Bacterial contamination occurs, with Salmonella, E. coli and Listeria Monocytogenes being the most consistent culprits. About 28 percent of FDA food recalls were for bacterial contamination in 2012. By the end of 2017 that number had grown to 31.3 percent.

Much of the western half of the United States suffered prolonged, deep droughts during the Warm Period from 1100-1300AD, for intervals of a hundred years or more. Recent studies from NASA have posited that we may be entering another such period soon. Due to seasonably cold weather in portions of the country, a large percentage of the leafy greens and vegetables consumed in the United States come from Arizona and California. Water availability in the southwestern United States is already problematic, and likely to get worse during a cyclical drought. Were a mega-drought to occur, the fields in the Western United States would quickly run out of water. Shortages of produce would easily become endemic.

³ Controlled Environment Agriculture is a broad term that applies to various systems that are used to grow crops in contained conditions. This approach for ensuring reliable production is growing in the United States at the rate of over 25% annually. This approach is being applied globally and is documented in the Food21 report published in 2018.

Transportation and distribution are others issue that argue in favor of local and regional food production. A city such as Pittsburgh is over two thousand miles from the growing valleys in California and Arizona. Foods coming out of Mexico and South America must use multi-modal transportation chains to reach end users, principally ships, trains and trucks, all of which use massive quantities of carbon-producing fossil fuels to bring produce to consumers. By having all of our sources so far from so many of our largest urban areas we are seeing how the logistics of moving and distributing food invites problems during disruptions like the pandemic.

What we have now is fragile, not resilient. Returning to a system where the majority of the food can be regionally produced and consumed is much more resilient than the current production and distribution model.⁴

There are useful analogies and standards from military, business and computer applications that illustrate the shortcomings of the current system. Businesses are reluctant to rely on a single supplier for critical inputs. The military recognizes that long supply lines are inherently fragile, risk critical disruptions and are expensive to maintain. Our current food system relies heavily on long and complex supply lines, making it vulnerable to disruption.

From growers to retailers, we have become fixed on a large scale, energy dependent and rigid model. Consider the perspective of a large retailer or large restaurant chain. They need certainty that the items required will be available when they need it, at a level of sufficient quality and at prices that are as stable as possible. Enterprises of sufficient scale can satisfy these needs whereas smaller producers may not.

Moving to a Regionally Centered Food System

In April of 2020 the USDA, facing the daily stream of news about food going to waste in the fields or milk being poured down the drain, launched a bold initiative to direct billions of dollars in purchasing power into the hands of regional food banks. At the same time, the agency eased restrictions on purchasing locally grown and produced food from area farms. It was a tacit admission that the disconnect between our communities and our producers was real and jarring in its inefficiency.⁵

This sudden shift in federal policy around procurement is a sign that the time to commit to a regionally centered food system is now. Supporting and interacting with growers, food

⁴ Financial author and philosopher Nassim Taleb, in his book *Anti-Fragile*, suggests that there is a spectrum from fragility to resilience to anti-fragility in most systems. Fragile systems break down under conditions of chaos and uncertainty.

⁵ Designated the CFAP-USDA Purchase and Distribution Program, USDA is planning to provide a billion dollars a week through a national network of food distribution hubs, primarily regional food banks, to make direct on-farm purchases and in turn provide communities in need with grocery boxes of produce, dairy and meat. It is hoped this will stem the tide of farmers literally abandoning their harvests due to low market prices or cancelled orders.

producers, makers and distributors at the community level is critical in correcting the shortcomings of the global supply chain.

One can argue that well-functioning regional food production systems can improve every one of the deficiencies we face. So, what would such a network of systems look like? Is there a way to satisfy food enterprises across the size spectrum while ameliorating the problems with large scale, concentrated production at a geographically remote location? Regional and local food production, done correctly, can provide a far better alternative. Regional food production is not a new idea. However, past efforts have been hampered by an inability to satisfy the demands of large-scale enterprises and the difficulties encountered by some cooperative models.

Smaller food enterprises, on the other hand, are freer to value things like local purchasing in support of local businesses, farmers and producers. They often value organic production. They can easily build these values into their brands. Consumers today embrace these values. More people are placing a higher value on local, sustainably produced foods. The recent proliferation of the "locavore" movement supports this thesis. Organic foods have gained a substantial hold in our food chain, despite being priced at a premium, indicating that consumers are willing to pay for foods that they feel are healthier for them and for their families.

Resilience will grow with new regional systems, because we could produce crops that are grown for best taste and not the ability to travel three to five days. We would feel better by not excluding distressed and lower income communities. We can improve a healthcare system whose income statements are at risk because of diet-related diseases because people can eat better.

The system needs to improve. It needs to become better and more inclusive. We have not solved the food problem when the structure of the industry excludes communities that must depend on food banks, or when the methods we use are unsustainable, leading to the contamination of our soils and waterways and further exacerbating our waste challenges.

In order to achieve scale at the regional level, we will need to tap into the rapidly growing applications of Controlled Environment Agriculture (CEA).⁶ We believe that, done properly, it can work in conjunction with local field growers. A healthy, vibrant network of CEA production facilities could turn food production and distribution into a regional engine, creating prosperity across a greater cross-section of society while increasing food security for the nation as a whole. It would move the national food production system away from fragility toward resilience.

We can build local food systems in distressed communities around CEA facilities. Technological progress has made the construction of facilities feasible in comparison to distant outdoor growers. Where energy and lighting requirements historically made such systems cost-prohibitive, advances in LED lighting have levelled the field. Planting vertically maximizes the square footage that is available for production. Control over growing conditions means the time

⁶ InCity Farms is working to become a leader in developing locally-based, state of the art CEA facilities in communities throughout the regional foodshed. This effort is highlighted at www.food21.org.

it takes to turn a crop can be reduced, resulting in many harvest cycles per year and better nutritional and flavor profiles.

A CEA facility could solve several of the problems with large-scale, long-distance farming. The first problem it solves is that of seasonality. Growing continues year-round. Because water is filtered and recirculated throughout the system, water loss is minimal, mitigating pollution problems from traditional agricultural runoff. CEA does not pollute downstream watersheds because the system does not rely on pesticides or chemical fertilizers. The lack of artificial chemical inputs also eliminates adverse health effects.

Having a network of such facilities in and around U.S. population centers would provide numerous benefits. Shipping distances and fossil fuel use would be minimized. When food is grown near where it is consumed, people have greater knowledge of its character and that of those who are growing it.

Regional food production ensures that jobs are created wherever such facilities operate. Employees' earnings are spent in the local economies, making them more vibrant and self-sustaining. CEA facilities provide a clean, healthy work environment and can pay a good living wage. Employees have greater income at their disposal, allowing them to purchase more of the healthier foods they have a hand in producing. The increased availability of fresh produce, and greater knowledge of healthy food choices, can help to reduce consumption of unhealthy processed foods, and reduce dietary-related health problems.

The plight of food is about more than a food selection choice. How we define and address the solutions have a big impact on economic conditions and our health outcomes. We need to start the work of designing a next-generation system. We have witnessed government's limitations in providing a comprehensive plan that works best for all. We must all believe that we are active authors of the future plan.

Glenn Ford is a senior advisor to Food21 on controlled environment agriculture and the founder of Praxis Foods Holding Company, and InCity Farms, an aquaponics venture. Glenn believes that existing business norms and economic models have failed inner city and rural communities and that new approaches rooted in business creation are the most aggressive means to improve conditions.