# COVID-19 exposes paradox of simultaneous food shortages and food waste

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Approaching Earth Day 2020 on April 22nd, the world looks very different than just one year ago, and hardly any country has escaped being hit by the COVID-19 pandemic. With most businesses shut and few people commuting to work, there has been a significant drop in emissions for the first time since the Great Recession started back in 2007. On the bright side, the air quality level in China, India, and the U.S. is better than it has been for decades. Nevertheless, although COVID-19 has caused an immediate positive environmental impact, some substantial issues have emerged throughout the agricultural supply chain that should be a major concern. In this article, I will discuss the importance of mitigating the environmental and economic impact of food waste, as well as the development of a strategy for feeding a rapidly growing global population.

During the past year, I published articles on alternative protein and indoor farming (https://ecotechcap.com/news-%26-articles). These two sectors have generated significant attention from consumers and investors due to their tremendous growth potential, and marketing focused on environmental sustainability. A third area where I am seeing an increasing level of interest from consumers and investors is food waste mitigation. Even prior to the spread of COVID-19, this was a tremendous problem, with over 40 percent of U.S. food produced ending up as food waste.[1] COVID-19 has caused food waste to increase significantly, as our food distribution systems are unable to respond quickly to this overnight shift, with people forced to stay at home. At the same time as demand from the food service sector (hotels, restaurants, schools, and stadiums) has dried up, it has risen sharply in the retail sector and also, sadly, at food banks. Many farmers have been forced to let crops rot in fields, and pour milk down the drain, due in part to lack of demand or, more concerningly, distribution limitations. In San Francisco, one of the largest supermarket chains has run short of produce due to an outbreak of COVID-19 at a key distribution center. Although there isn't a shortage of produce, at other supermarkets in San Francisco and elsewhere in the U.S., the supply chain in this and many other instances is failing to deliver food to consumers.

Everyone is aware that COVID-19 is greatly straining supply chains in many sectors—think about store shelves without any cleaning supplies, hand sanitizer, paper towels, or toilet paper, or the lack of personal protective equipment (PPE) for medical professionals—but the food and agriculture sector has a much bigger challenge, which is that many of its products, especially the higher margin produce and proteins, are highly perishable. Any food wasted during normal times is unfortunate, but right now, with so many people faced with the prospect of being unable to afford to feed their family since

[1] Natural Resources Defense Council report of Food Waste, August 16, 2017

unemployment has skyrocketed, it is more essential than ever to focus on establishing a more effective food production and distribution network.

Making the U.S. supply chain more efficient is a major challenge, but it's not the only hurdle to be overcome. The reality is that food production and distribution is more global than ever. Food companies have embraced globalization, enabling more food to be grown and/or processed in different regions of the world, taking advantage of lower labor costs or different growing seasons to supply produce when it is typically not available in one hemisphere. As a result of the supply chain becoming more global, companies must start implementing the latest technology in order to make it more dynamic, and better able to respond to the next major event, whether it be a global pandemic, or a weather-related incident (drought, flood, hurricane, tornado, tsunami), that leaves parts of the world unable to feed themselves. Another benefit of a more dynamic global supply chain would be that growers and consumer packaged goods (CPG) companies could respond more rapidly to changing consumer trends, such as the latest fad diet or the current trend to eat more plant-based proteins.

**Reducing food waste is good for the environment and one's wallet**

Food waste mitigation is getting more press these days, not just because of the negative environmental impact caused by food rotting in fields, warehouses, and landfills, but also because people are beginning to understand the amount of energy and water that is needlessly wasted in growing uneaten food. Today, 30 percent[2] of the world's energy and 70 percent[3] of the world's fresh water is used throughout the whole food & Ag value chain, from farm to fork. According to the World Bank, by 2050, feeding a planet expected to have over 9 billion people will require an estimated 50 percent increase in agricultural production and a 15 percent increase in water withdrawals. This will be a significant challenge for the ag sector, especially as many of the regions with the poorest, fastest growing populations (Africa and South Asia) are already using over 80 percent of their fresh water for agriculture.[4] Water scarcity is becoming a major issue in many parts of the world, due to climate change and overuse of aquifers. Governments and consumers are endeavoring to decrease their carbon footprint, but they aren't finding it easy, as the use of fossil fuels is a leading cause of carbon emissions and remains the main energy source for the food & ag sector in most countries. Thus, tackling food waste offers a rare opportunity to provide solutions for reducing emissions at the same time as decreasing energy and water usage.

While most people focus on the impact of emissions, energy, and water, food waste leads to other meaningful environmental consequences. According to ReFED, a nonprofit committed to reducing U.S. food waste, 19 percent of all fertilizer and 18 percent of cropland is wasted growing food that is not consumed. Knowing the tremendous environmental damage that fertilizer and other nutrient runoff causes, including harmful algae blooms and red tides in the Chesapeake Bay, Great Lakes, and Gulf Coast, reducing food waste becomes even more important. Furthermore, the impact that using the 18 percent of cropland currently cultivated for food that is ultimately wasted either for crop rotation or carbon capture, could be highly beneficial for the environment.

While most of the focus on food waste has been on the environmental impact, it is important to remember there also is a significant economic cost. ReFED estimates that U.S. consumers, businesses,

[2] Choose Energy, Energy & Food Blog, November 26th, 2019

[3] World Bank, Fresh Water Use, March 22, 2017

[4] World Bank, Fresh Water Use, March 22, 2017

and farms spend $218 billion annually, or 1.3 percent of GDP, growing, processing, transporting, and disposing of food that is never eaten. That works out to 52 million tons of food sent to landfills annually, and accounts for over 20 percent of landfill volume. Additionally, another 10 million tons of food waste is discarded or left unharvested on farms. Of the 52 million tons sent to landfills, roughly 25 million tons is generated by the retail sector, and 27 million tons by homes and restaurants. Furthermore, the National Resources Defense Council (NRDC) estimates that a U.S. family of four wastes an average $1,800 worth of food each year, accounting for a majority of the spending on food that is wasted. This food waste equates to 400 pounds annually per American, or 1,250 calories per day per person. At the same time as hundreds of billions of dollars of food is thrown away, the NRDC estimates that one in eight Americans struggles to put enough food on the table and faces food insecurity. It is sobering to think that the U.S. would be able to feed all its citizens facing food insecurity using less than one-third of the food wasted each year. Moreover, the U.S. population dealing with food insecurity will undoubtedly grow, if shelter-in-place ordinances last much longer into 2020, and the unemployment rate continues to climb. Although food waste and food insecurity are two separate problems, I am seeing the emergence of companies developing interesting technology and business models that if successful, could help to mitigate both issues.

**The Goal of a More Environmentally Sustainable Lifestyle**

Given that food waste is a tremendous problem, increasingly consumers, producers, and politicians are focusing on reducing food waste in order to live a more environmentally sustainable lifestyle. Furthermore, with the population expected to grow to over 9 billion by 2050, food waste mitigation will be necessary to eliminate food shortages, especially in the developed world, which typically has the highest levels of food waste. Just as energy conservation is easier than, and preferable to, producing more energy, even renewable energy, food waste mitigation is preferable to producing more food, even if we had an overabundance of land, water, and other farm crop inputs, which is not the case today.

One reason I have hope that we will be able to feed future generations is that there are several highly innovative companies emerging that are tackling food waste using a variety of technologies and unique business models. Investors understand the significant opportunity of building a business to tackle food waste mitigation and have been investing an increasing amount of capital to support innovative companies in this area. There are a number of companies whose main focus is on reducing food waste, but I am also seeing a broad variety of solutions focused on other parts of the food & ag value chain that are positioned to have a significant impact on reducing foods waste, spanning sectors such as advanced materials, ag biotech, automation & robotics, digital ag, indoor farming, and supply chain technologies. In my follow-up food waste article, I will go into more detail about these new technologies that have the most potential.

Like many of the largest problems facing society today, such as COVID-19 and climate change, food waste mitigation only can be solved by the global community coming together to tackle what look like insurmountable problems. The COVID-19 pandemic has brought into sharp focus the areas of food & ag that are desperately in need of an overhaul. This will involve leveraging new technology already being implemented in other sectors of the economy, including advanced materials, blockchain, CRISPR, information technology, and robotics & automation. As we start to rebuild our post-COVID-19 world, this is the best chance we have to reimagine how we deal with the problems of food waste and food scarcity.