



richardheinberg.com

MuseLetter #326 / April 2020 by Richard Heinberg

Spring greetings:

This past month, under the extraordinary circumstances of global pandemic, lockdown, and economic crisis, I've written more essays and articles than can be sent in one MuseLetter. So I've selected three of the most-read to include here ("Pandemic Response Requires Post-Growth Economic Thinking," "Fraying Food System May Be Our Next Crisis", and "How much is a barrel of oil worth?"), and posted another ("Earth Day 50: Under Lockdown") on the front page of my website, RichardHeinberg.com. Remember: you can find just about everything I write--and far more--on a daily-updated basis at Resilience.org. Please stay safe, healthy, and active!

Pandemic Response Requires Post-Growth Economic Thinking

Amid a horrific human tragedy of sickness and death, much of it taking place in hospitals staffed by brave but overworked and under-equipped doctors and nurses, we are all learning once again what it feels like when economic growth comes to a shuddering stop and the economy goes into reverse—shrinking and consuming itself. Millions have been thrown out of work, untold numbers of businesses shuttered. The St. Louis Federal Reserve estimates that Q2 unemployment could clock in as high as [32.1 percent](#) (for comparison, unemployment at the depths of the Great Depression was 25 percent, and during the Great Recession of 2008-2010 it peaked at 10 percent). Though radical measures must now be adopted to slow the spread of the coronavirus, those measures are having toxic side effects on the economy.

Yet, economic growth was bound to end at some point, with or without the virus. A few moments of critical thought confirm that the exponential expansion of the economy—whose physical processes inevitably entail extracting natural resources and dumping polluting wastes—is destined to reach limits, given the obvious and verifiable fact that we live on a finite planet.

However, we also happen to live in a human social world in which a decades-long spurt of economic and population growth, based on the snowballing exploitation of a finite supply of fossil fuels, has become normalized, so that world leaders have come to agree that growth can and must continue forever. In response to this situation, clear-eyed systems and environmental scientists have, during the past few decades, proposed policies either to transition the

global economy away from its near-suicidal requirement for infinite growth, or to cushion the impact when growth limits are finally reached.

At first, this post-growth train of thought was so marginalized by mainstream economists that few educated people were even aware of its existence. In other words, it lay entirely outside the [Overton window](#) of acceptable public discourse.

Then, in 2008, the wheels of the financial bus that we were all riding fell off, and there was an opening for discussion about different ways of organizing the economy. During the early recovery period after the global financial crisis, I presented a natural-limits-based view of economics in my book [The End of Growth](#), in which I summarized heterodox policy proposals for getting society on a sustainable track without destroying livelihoods. However, central banks and national governments managed temporarily to bail out the wizards and quants who had precipitated the crisis, restarted the growth machine, and thereby narrowed the Overton window once again.

Still, during the decade that followed, a seed of post-growth economic thinking was planted and began to sprout. In Europe, ecological economists and environmental activists organized “[degrowth](#)” conferences. The tiny nation of Bhutan, which had been experimenting since the 1970s with Gross National Happiness (GNH) as an alternative to Gross Domestic Product (GDP), tallied up its findings and [argued at the United Nations](#) that other countries should likewise aim for widespread social satisfaction rather than growth in monetary exchange. Groups promoting [public banking](#) mushroomed across the U.S., and articles about [Modern Monetary Theory](#) (MMT) and [Universal Basic Income](#) (UBI) appeared in major news outlets; the latter was even promoted by [an early contender](#) for the Democratic Party presidential nomination.

Still, the economic priesthood held tight to its dogma. Although it was patently illogical, the demand for endless growth continued to be defended using [tortured reasoning and cherry-picked statistics](#). We can grow in green ways, the orthodox economists insisted—ways that don’t impact the environment. Well, it’s true that we can use resources more efficiently, we can recycle more, and we can find ways to reduce the toxicity of the wastes we produce. But the fact remains: over time, a growing economy will eventually and inevitably [take up more ecological space](#) than one that does not grow. Even the richest man in the world, who made his hundreds of billions of dollars from consumers, [came to the conclusion](#) that there are limits to energy and gains in efficiency, and that we face a future on this planet of limits. (He, less surprisingly, came to a different solution than I and other “limits to growthers” would offer, his being that we should harvest the moon and colonize space.)

Now, the coronavirus pandemic has seismically shifted the discussion once again. The Overton window is broken and the wall that held it has caved in. Suddenly the first priority of world leaders is no longer economic growth; instead, it is public safety. Lives must be saved and health care systems salvaged regardless of the short-term hit to profits, employment, and investment returns. This sea change in priorities requires entirely different thinking and policies—ones much more closely aligned with heterodox post-growth thinking than with pro-growth economic orthodoxy.

Here is a quick survey of the post-growth economic policies recently introduced by sustainability theorists, and a brief discussion of how and whether each is relevant to our new pandemic-obsessed moment.

Universal Basic Income

UBI is a government plan for providing all citizens with a given sum of money, regardless of their income or employment status. The purpose is to prevent or reduce poverty and inequality. However, UBI would also be useful in a post-growth scenario. Suppose, for example, that a nation decided to lower its greenhouse gas emissions by restructuring its economy so as to substantially reduce energy usage and material throughput. Eventually, many people could transition from jobs in airlines and other energy-intensive industries to become food producers and small-scale manufacturers within more localized economies (see below). But, over the short run, substantial numbers would be thrown out of work; how to avoid widespread economic hardship and social instability in the interim? Answer: UBI.

The U.S. federal government's just-passed stimulus plan includes the equivalent of a nascent UBI: It mandates one-time cash payments of \$1,200 for each adult and \$500 per child. It also sets aside \$367 billion to help small businesses and \$500 billion for loans to larger industries. (The Fed is meanwhile [buying corporate bonds](#) and securities from hedge funds, to the tune of trillions, [putting the Treasury on the hook](#) for them.) There is ongoing discussion among policy wonks about [longer-term cash payments](#) to individuals; if this indeed happens, the U.S. will be officially experimenting with UBI.

But where's the money to come from? For the time being, it's being conjured through a [cozy arrangement](#) between Congress and the Federal Reserve: Congress issues debt, which the Fed buys—without requirement for interest payments. This brings us to:

Modern Monetary Theory (MMT)

MMT says that monetarily sovereign countries like the U.S., U.K., Japan, and Canada are not limited by tax revenues or borrowing when it comes to federal government spending. They can create as much digital or paper money as they need, and are (or should be) the legal monopoly issuers of their currency. Therefore, they should be able to create and spend as much energy as needed to create full employment.

I must confess some skepticism with regard to MMT. It's obvious how it would be useful in a crisis; but, over the longer term, if the money supply is growing faster than energy and materials, the result must be inflation. In fairness, Modern Monetary Theorists have given considerable thought to the problem of inflation, and have come up with ways of limiting it—such as by levying deficit-reducing taxes, during times of full employment, to reduce aggregate demand. Yet, in my experience, most Modern Monetary Theorists follow conventional economists in mistakenly assuming that energy and natural resources are effectively infinite, rather than finite and depleting. By focusing just on employment, they miss the essential basis of all economic productivity.

In any case, a crisis is what we have: Governments and central banks are being forced to resort to a form of MMT because of a sudden, dramatic spike in unemployment. And, over the short term, money printing is an essential economic tonic. However, over the longer term, the best outcome would be achieved if the current crisis forces economists to think anew about the nature of money itself—what it is, how it is created, and what are its social effects. Most economists still think of money as simply a medium of exchange, but it is better understood as storable, quantifiable, and transferrable social power. Renegade economist Steve Keen [points out](#) that conventional economic theory does a surprisingly poor job of explaining money and debt. Alternative currency theorists like [Thomas Greco](#) do a much better job of it.

[Ecological](#) and [biophysical](#) economists—the vanguard of post-growth economists—go even further. They start with realistic assessments of finite energy sources and natural resources, then explore how economic systems could fairly harvest and distribute resources without depleting nature’s stores over time. For starters, they propose [taxing all financial transactions](#) and requiring banks to hold [100 percent reserves](#). They also tend to hold to the principle, first propounded by American economist [Henry George](#) (1839-1897), that each person should own what he or she creates, but that everything found in nature, most importantly land, should belong equally to all humanity.

Public Banks

Today most money is created by [private banks](#) through the process of issuing loans. Digital money is called into existence when a loan is granted; when the loan is repaid, that money vanishes. The problem is, interest must be paid on the loan, and the money needed to pay that interest isn’t created when the loan is issued. The borrower must earn or borrow money for interest payments from elsewhere. As long as the overall economy is growing, that’s usually possible. But if the economy isn’t growing, defaults ensue. Lending slows to a dribble, with more money disappearing than is being created. That’s called a deflationary depression, and it’s something to be avoided if possible—though it’s an inevitable feature of debt-based economies in a finite world.

As a solution, why not create government-run public banks that loan money at no interest, at least in the cases of businesses that are operating for the public good? For example, if a state decided that it was in the public interest to promote renewable energy, its state bank could make zero-interest loans to solar installers.

Public banks [have a long history](#), and operate in many nations. In the U.S., the prime example is the Bank of North Dakota, which partners with private banks to loan money to farmers, schools, and small businesses.

The idea of public banks is closely tied to MMT; think of public banks as MMT at the retail level. So far, the pandemic has not provoked wide interest in public banking; but, as the incipient recession deepens and lengthens, expect this to be a subject of increasing discussion.

Gross National Happiness (GNH)

In 1972, Bhutan’s 16-year-old King Jigme Singye Wangchuck used the

phrase “Gross National Happiness” to describe the economy that would serve his country’s Buddhist-influenced culture. The label stuck, and soon the Centre for Bhutan Studies set out to develop a survey instrument to measure the Bhutanese people’s general sense of well-being. That [survey instrument](#) measures nine domains:

- Time use
- Living standards
- Good governance
- Psychological well-being
- Community vitality
- Culture
- Health
- Education
- Ecology

Bhutan’s efforts to boost GNH have led to the banning of plastic bags and re-introduction of meditation into schools, as well as a “go-slow” approach toward the standard economic development pathway paved by costly infrastructure projects paid for with huge loans from international banks.

There’s nothing in the recent stimulus package that resembles GNH, but policy makers increasingly could be forced into considering something like it, out of necessity. As people are stuck at home for long periods, some are descending into loneliness and depression brought on by isolation; others are filling their time with art, music, home schooling, and gardening. Leaders will eventually realize they must do something to discourage the former and encourage the latter. They may eventually conclude that gauging their success using GDP is pointless, and that directly measuring safety, health, and life satisfaction makes a lot more sense.

The Sharing Economy

The last time the U.S. suffered through an economic depression, in the 1930s, government economists and leaders of industry responded by creating a new economic paradigm—[consumerism](#). Henceforth American citizens would be termed consumers, whose duty is to buy and discard products at an ever-accelerating rate so as to steadily increase overall employment levels, the size of the economy, returns on investments, and government tax revenues. Two key strategies of consumerism were [planned obsolescence](#), in which products were designed to have limited useful lifetimes, or to soon become aesthetically undesirable in comparison with new versions of the same product; and redundant consumption, in which individuals were encouraged through advertising to prefer owning their own products (such as cars and lawn mowers) rather than sharing them with family members, neighbors, or friends.

Unfortunately, while consumerism succeeded in overcoming the problem of overproduction (which was one of the causes of the Great Depression), it resulted in the steady ramping up of resource consumption. At the same time, it had a negative impact on many people’s [psychological health](#), as they spent more time viewing advertising messages and shopping, and less time engaging with family, friends, and nature.

The idea of the sharing economy took hold around the time of the Great Recession of 2008; it proposed a [peer-to-peer](#) (P2P) way of organizing the economy in which the sharing of goods and services is facilitated by community-based online platforms. Many pioneers of the sharing economy were motivated by the ecological ideal of reducing overall consumption levels.

Unfortunately, however, the sharing economy quickly became equated with the gig economy, and with ride-sharing apps like Uber and Lyft—which promised to eliminate the perceived need for everyone to own a car, and thereby reduce carbon emissions from transportation. Unfortunately, it turned out that [Uber and Lyft generate more carbon emissions](#) than the trips they displace, and [aren't always model employers](#).

Nevertheless, the original ideals of the sharing economy persist among advocates of the [maker movement](#), [collaborative consumption](#), [the solidarity economy](#), [open source software](#), [transition towns](#), [open government](#), and [social enterprise](#)—as well as bridging organizations like [Shareable](#), whose founder, Neal Gorenflo, has [some ideas](#) on why sharing is even more important during the pandemic, and how we could seize the current moment as an opportunity to come together in cooperation and mutual aid even though we remain separated physically.

Green New Deal (GND)

[GND proposals](#) circulating in the U.S. prior to the pandemic aimed to provide 100 percent renewable energy in 10 to 20 years while supporting job retraining and aiding communities impacted by climate change. Some proposals also included a carbon tax (often with a fee-and-dividend structure that would rebate funds to low-income people so they could afford more costly energy services), incentives for green investment, public banks, measures to re-regulate the financial system, and the first steps toward a global Marshall Plan.

While GND advocates seldom publicly acknowledge that economic growth is both ephemeral and antithetical to a livable environment, their proposals are nevertheless largely consistent with policy advice post-growth thinkers.

The coronavirus pandemic cuts both ways with regard to climate change. Emissions are down, because businesses are closed and people are staying home. But the transition to renewable energy has slowed to a crawl. If we're to move to a post-carbon economy, we'll need massive investment in post-carbon transportation, building heating, manufacturing, and agriculture. President Trump has [signaled](#) he wants Congress to appropriate a couple of trillion dollars for infrastructure spending, but what he has in mind are subsidies for existing fossil fuel-dependent industries. MMT notwithstanding, the nation's money pot is not bottomless. If we are to have a Green New Deal, it must come soon.

Resilience

We have made the world more economically efficient by lengthening supply chains to take advantage of the cheapest labor and raw materials anywhere they exist, and by minimizing inventories with just-in-time supply strategies; but the result has been a withering of [resilience](#)—the ability to recover and

adapt to a crisis or disruption. Post-growth thinkers tend to agree that the structural unsustainability of modern industrial economies has created a series of crises that are lined up to bite—from climate change to the threat of global pandemics. Therefore, preparing for the post-growth era requires building resilience—particularly at the community level.

Suddenly, in this moment of broken supply chains, and shortages of toilet paper, masks, and ventilators, the argument for resilience is easier to make: there are perfectly obvious reasons to shorten supply chains, and establish strategic stockpiles that are distributed locally. Trump’s ham-fisted attempt to renegotiate globalization via tariffs hardly counts as a step in that direction. Unfortunately, because world leaders previously didn’t listen to [resilience advocates](#) sooner, we will all be paying a price for some time to come.

Localism

The lengthening of supply chains is the essence of globalization; if this has made us more vulnerable to crisis, then it stands to reason that we should re-localize some of our economic activity.

Post-growth thinkers have been advocating [localism](#) for decades. Naturally there are objections and questions: What about xenophobia? What about sharing knowledge and best practices across cultures? What about global cooperation to meet global challenges like climate change? In answer, localists say we needn’t view the recovery of local knowledge, local culture, and local economic vitality as all-or-nothing. Think of it as the rebalancing of a system that has become lopsided and dangerously unstable.

Meanwhile, in nations like the United States, where national leadership during the pandemic is absent or inept, citizens are being forced into thinking and acting more locally. Localism can have either a welcoming or an exclusionary face; it’s up to us to choose. Fortunately, many people so far seem to be [choosing to be neighborly](#).

* * *

The end of growth is painful. We had a foretaste of it in 2008, but the current crisis promises to be much worse. Our leaders are flying blind, just as they were during the Global Financial Crisis over a decade ago. We were unprepared for it, just as we were for the pandemic and the economic carnage that is accompanying it.

However, there are people who have been anticipating a moment like this for decades. If we are willing now to listen and learn from post-growth thinkers, the crisis and its aftermath can be a process of adaptation that leaves us more locally resilient, happier, and more connected.

That’s not to downplay the immensity of the task. Redesigning national economies in the midst of crisis is a challenge perhaps comparable to redesigning an airplane in mid-air, while attempting to make a safe landing. Navigating the end of growth will require courage, new thinking, flexibility, and a willingness to make mistakes. It’s understandable why, during “normal” times, people want to stick with what’s familiar. But we’re no longer in normal times. We are in a moment that requires us to undertake bold changes that have been put off for far too long.

Fraying Food System May Be Our Next Crisis

If you're already overwhelmed with news of the pandemic and are coping with depression, read no further. However, if you're a crisis responder by inclination or profession, you might start thinking food.

Experts who study what makes societies sustainable (or unsustainable) have been warning for decades that our modern food system is packed with ticking bombs. The ways we grow, process, package, and distribute food [depend](#) overwhelmingly on finite, depleting, and polluting fossil fuels. Industrial agriculture contributes to climate change, and results in soil erosion and salinization. Ammonia-based fertilizers create "[dead zones](#)" near river deltas while petrochemical pesticides and herbicides [pollute](#) air and water. Modern agriculture also contributes to deforestation and biodiversity loss. Monocrops—huge fields of genetically uniform corn and soybeans—are especially [vulnerable](#) to pests and diseases. Long supply chains make localities increasingly [dependent](#) on distant suppliers. The system tends to [exploit](#) low-wage workers. And food is often unequally distributed and even [unhealthy](#), contributing to poor nutrition as well as diabetes and other diseases.

Whatever is unsustainable must, by definition, end at some point, and critics of our present food system say that a crisis is increasingly likely (just as public health professionals had long [warned](#) of the growing likelihood of a global pandemic).

And yet, year after year, decade after decade, crop yields have increased. The famine that ecologist Paul Ehrlich cautioned about in his 1968 book *The Population Bomb* never materialized. Indeed, our ability to feed an exponentially growing human population is frequently touted as a primary benefit of modern industrial agriculture and globalization.

But the coronavirus pandemic poses a new and immediate threat to our food system on top of those already looming. Supply chains are broken, farms and restaurants are going bankrupt, and store shelves are sitting empty while, elsewhere, crops are being plowed under because there is no immediate market for them. Millions who've been thrown out of work are wondering how they will afford their next meal, even though produce is rotting in fields and warehouses. Unless something is done soon to take charge of this broken system and reorganize it, we could see entirely unnecessary casualties.

It's essential to explore this emerging crisis from a few different angles in order to appreciate its wicked complexity.

Vulnerable Food Workers

The Trump administration has designated food and agricultural workers as an "[essential](#)" [group of workers](#) who are advised to continue working, even if their states have announced shelter-in-place orders. But this implies a cruel irony: many of these "essential" workers are "illegal" and could be rounded up and deported at any moment. Also, the border between the U.S. and Mexico is now closed, making it impossible for documented seasonal migrant farmworkers to cross.

Farmworkers are also vulnerable to the virus. Most are [shielded only by bandannas](#) to protect their faces. A [2010 study](#) found that soap often isn't available in hand-washing facilities in the fields. And social distancing is an unrealistic requirement for farmworkers: according to the [2018 National Agricultural Workers Survey](#) (NAWS), about a fifth of U.S. farmworkers are migrants, who travel packed in vans or buses to get from job to job. And nearly half of migrant workers live in crowded housing. Farmworkers are currently [ineligible](#) for paid sick leave or unemployment insurance in most states, which means that, if they fall ill, they are likely to continue working as long as they can to support their families.

At a Smithfield pork processing plant in Sioux Falls, South Dakota, 240 of the facility's 3,700 employees recently fell sick. The plant, which accounts for 4 to 5 percent of the country's pork production, [is now closed](#). Two lamb slaughterhouses and a [beef facility](#) have also shut down. If similar closures happen more broadly, significant amounts of food could be removed from supply streams.

Fragile Distribution Networks

Even if plenty of food exists, problems with distribution can result in people going hungry. And the pandemic is disrupting distribution systems worldwide.

Grocery store and warehouse inventories have been upended by customer [panic buying](#). Meanwhile, grocery workers' health is at risk, and [some have begun dying](#). Like farmworkers, grocery and warehouse workers make low wages and receive few benefits, and are therefore motivated to work even when they don't feel well. Sickness and stay-at-home orders are also disrupting [food transport systems](#), even though these are likewise deemed essential.

Perhaps the hardest-hit segment of the food system is restaurants. The *New York Times* reports that [up to 70 percent](#) of local restaurants may be unable to re-open after the crisis.

Restaurant closures have knock-on effects: roughly 70 percent of commercial fish are consumed in restaurants; therefore, as a result of declining restaurant demand, [fishermen](#) are seeing plunging revenues and looming bankruptcies.

Further, due to closed restaurants, hotels, and schools, farmers are finding that longstanding demand from bulk buyers who supply these outlets is evaporating. As a result, farmers are [having to destroy large quantities](#) of milk, eggs, and vegetables. Meanwhile, food processors and packagers are having to decide if they should retool to increase how much they can send to grocery stores instead of restaurants, which is expensive and takes time. Nobody is sure how long this crisis will last, making it difficult to invest millions of dollars in new equipment.

Broken Global Supply Chains

Global trade has plummeted due to the coronavirus pandemic. In an April 8 report, maritime data provider Alphaliner noted that shipping lines have [idled vessels](#) with capacity totaling about 3 million containers. The World Trade Organization [says](#) the coronavirus pandemic could cause the deepest decline

of international trade flows in the postwar era. Much of that trade—both by value and quantity—is comprised of food. Shipping to and from China is down 23 percent, and the nation is heavily dependent on imports for crops like soybeans.

Port backups have paralyzed food shipments around the world. In the Philippines, a port that's a key entry point for rice is [at risk of shutting](#) because lockdown measures are making it hard to clear thousands of piled-up shipping containers. Ports in Guatemala and Honduras, which export specialty coffees, are limiting operating hours due to curfews. And ports in import-dependent Africa are being idled because not enough workers are showing up to unload cargoes.

Hinting at a new trend toward food nationalism, some countries have begun [banning food exports](#). Kazakhstan, one of the world's top shippers of wheat flour, has suspended contracts, and Vietnam has temporarily stopped accepting new rice export tenders. Serbia has stopped shipping sunflower oil, while Romania has banned grain exports. At the same time, some nations, such as China, are adding to their strategic food stockpiles, thereby removing food from market channels.

Processed food often entails a complicated web of interactions. For example, wheat grown in Europe may be shipped to India to be processed into naan bread for export to the United States. Complex supply relationships like this can be disrupted at many different choke points.

While the U.S. is a major food exporter, it depends on imports for many specialty foods and out-of-season produce, such as seafood from China, avocados from Mexico, and bananas from Central America. Food supply problems for now mostly result simply from problems in moving food to where it's needed. But if supply chain problems aren't solved, farmers may increasingly see difficulties obtaining seeds, chemicals, fertilizers, and spare parts for machinery. Actual food production shortfalls could result.

Even without those further logistical difficulties factored in, the U.N. Food and Agricultural Organization (FAO) [says](#) there could be global food shortages in April and May as a result of supply problems caused by the coronavirus.

Bankrupt Farmers

Before the pandemic, American farmers were already facing the greatest adversity in decades. [Waves of bankruptcies](#) were engulfing not just family farmers, but even a few big agribusiness firms like [Dean Foods](#). [Severe weather](#) related to climate change, and [falling commodity prices](#) resulting from globalization, had both hit at once. Meanwhile, farm debt had reached an all-time high of [over \\$400 billion](#). More than half of all farmers were losing money every year. And perhaps the saddest and most telling statistic of all is that farming communities have seen increased suicides.

President Trump's trade war made a bad situation worse. Tariffs on Chinese goods like steel and aluminum were answered with 25 percent tariffs on U.S. agricultural exports. China was turning increasingly to countries like Brazil for its soybean and corn imports.

Now the pandemic adds new challenges for farmers, including sickness, the need for social distancing among farmers and farmworkers, broken supply chains, and upended market relationships.

Bad Weather

Flooding, fieldwork delays, and plant disease plagued growers across the Corn Belt in 2019. Now, the latest [2020 spring flood outlook](#) shows that farmers in the Midwest could be facing yet another wet year. Although planting is under way in some parts of the country, farmers in many regions are [still coping](#) with the aftermath of last year's floods. As of just a couple of weeks ago, many farmers still couldn't access all their property due to high water. That's just North America. In East Africa, the worst [locust swarm](#) in 70 years is hitting Ethiopia, Kenya, and Somalia. [Gro Intelligence](#) reports that about 18 million hectares, or 84 percent of cropland in Ethiopia, is now affected by locusts, while a third of crops in Kenya and 85 percent of crops in Somalia are similarly at risk.

Vanishing Affordability

Even if food supplies remain ample and distribution problems are solved, hundreds of millions of currently unemployed people face difficulties gaining access to food.

The charity Oxfam International said on April 9th that half a billion people could be thrown into poverty around the world as a result of social distancing and lockdown orders that have brought global economies to a halt, unless world leaders immediately implement a rescue plan to support poor and less-industrialized countries.

Due to hoarding and the consequent disruption in inventory pacing, U.S. [food prices are already up](#). If supplies begin shrinking, food prices would be bid even higher. This might be good for farmers, but catastrophic for everyone else.

Still, if food prices stabilize or even fall, people who have no money won't be able to buy groceries. Prior to the pandemic, ten percent of Americans were already chronically food insecure. Now, with massively increased unemployment, lots more are suddenly in that predicament. Food banks are currently not in position to take up the slack, and some [food banks are already being overwhelmed](#).

* * *

Let me be clear: I am not forecasting that a famine will erupt later this year in the U.S. or globally. The [FAO assures us](#) that “. . . there is no need for the world to panic. Globally, there is enough food for everyone.” And I certainly don't advise panic buying, as that will only worsen existing supply-chain problems.

However, there is more food supply uncertainty now than at any recent time, including the dark days of 2008-2009. Perhaps the most likely scenario is one in which, for Americans with income or savings, many preferred foods will

become unavailable or significantly more expensive. This may especially be the case for foods that people like to prepare at home (such as pasta, rice, and canned soups), or foods most closely tied to international supply chains.

However, for Americans out of work and with no savings, this could be a time of literal belt-tightening, with the likelihood of widespread hunger depending almost entirely on what state and federal governments do in response to the situation. In poor regions of the world, food stress is particularly likely this year. In any scenario, the worst affected will be the most vulnerable segments of the global population—including migrants and refugees.

If crisis does ensue, food shortages could lead to social and political disruptions. It may be instructive to recall that the Arab Spring and the Syrian civil war were partly caused by [rising food prices](#). If world leaders value their jobs and reputations, they would do well to start planning ways to keep pantries full.

Solutions

During wars and economic downturns, many people respond intuitively by [growing more of their own food](#). And that is exactly the behavior emerging during this pandemic: local plant nurseries are seeing runs on topsoil, seed potatoes, plant starts, and veggie seeds. [Baker Creek](#) seed company, one of America's top suppliers of heirloom organic seeds, ran out of stock in mid-March. And Oregon State University's spring Master Gardener class, which usually sees 150-250 applicants, was inundated with roughly 25,000 requests.

Crisis managers and resilience thinkers have foreseen the circumstances now unfolding; indeed, a pdf website titled "[Food Security in a Pandemic](#)" by the Pan American Health Organization (PAHO, a division of the World Health Organization, or WHO) discusses what municipalities can do to make sure everyone in their region is fed. The advice to local leaders is:

- In the early stages of a pandemic, don't wait until food supply problems appear to begin strategizing and taking action.
- Prioritize who will get food rations.
- Monitor all aspects of the regional food system.
- Encourage sharing and bartering among households.
- Set up food trade and barter locations.
- Mandate a price freeze on staples.
- Encourage transaction by phone and internet.

At the national level, food price controls have an [uneven history](#) of success. However, as Stan Cox details in his indispensable book [Any Way You Slice It: The Past, Present, and Future of Rationing](#), rationing has often worked wonders to stabilize food supply systems. Just one example: the British people were better nourished under food rationing during and immediately after World War II than they were prior to the war or in subsequent decades. The United States rationed during both World Wars, and continues to do so: the [Supplementary Nutrition Assistance Program](#) (SNAP, also known as food stamps) is essentially a national rationing program for low-income people. Food stamp enrollment has erupted since early March; in just one week, California saw nearly 100,000 new applicants for its SNAP outlet, CalFresh.

In many respects the pandemic highlights long-standing food problems. If we are to avert not just this food crisis but the next one as well, deeper changes to the current system are needed. We must redesign the relationships between food producers, processors, retailers, and consumers so as to shorten supply chains and create more slack in the system. Large, centralized systems are touted as efficient, but often they are instead fragile. We need a food system that is antifragile, to use a term coined by Nassim Taleb. That requires decentralization and more localization, which would entail the buildout of many more small-to-mid-sized farms and the facilities to process, store, and sell the food grown on these farms. This is the opposite of what has happened in the decades since WWII. We used to have many small and mid-sized farms, but they went bankrupt or were bought out. Somehow, we need to make sure they can survive and thrive. And we must prioritize food production methods that use a minimum of fossil fuels, that [capture atmospheric carbon and sequester it in soil](#), that [build healthy and biologically rich topsoil](#), that deliver [nutritious and affordable food](#), and that are [fair to farmers and farmworkers](#).

Many farmers and other food system workers are already doing what they can to create a more resilient, just, and sustainable network. Jason Bradford, a biologist and organic farmer in Corvallis, Oregon (author of a [report](#) released last year on vulnerabilities and paths to reform the food system, and Board President of the organization I work for, Post Carbon Institute), has already joined with fellow local farmers to create a new Community Supported Agriculture ([CSA](#)) program to respond to the coronavirus pandemic and a potential associated food crisis. Bradford told me, “We’re growing vegetables, fruits, dry beans, and cereal grains to provide a plant-based diet for everyone who joins the CSA. In addition, we are locally sourcing meats (beef, pork, and chicken), eggs, cheese, baked bread, and honey that can be ordered weekly for an additional charge per item.” Obviously, Bradford’s CSA can’t feed everyone who might like to join, but a national [CSA movement](#) already exists and could be expanded.

For better or worse, this is likely to be a historic moment of change for our food system. Events may take us in one or another direction. If big existing players in the food industry are first in line for bailouts and use the crisis as an opportunity to gobble up their smaller competitors, we could soon find ourselves dependent on a food system that is [even more consolidated and deregulated](#), and even less resilient in the face of future disruptions. On the other hand, governments, producers, and consumers could use the crisis as an opportunity to address festering food supply issues, and to refashion the system in a way that better meets everyone’s needs over the long run. We all have a stake in the outcome.

How much is a barrel of oil worth?

If you were an oil futures trader wanting to unload a May 1 contract on Monday, April 20, a barrel of oil was worth \$-37. That’s right, traders were, in effect, willing to pay someone—anyone—to take ownership of a commodity that powers modern industrial society, and has suddenly become too abundant.

The reasons for this bizarre state of affairs have been discussed at length in

articles in the financial press. To summarize: the coronavirus pandemic has resulted in the grounding of fleets of airliners, while hundreds of millions of automobile owners, now under lockdown, have had to let their cars sit gathering dust rather than motoring to and fro. The result has been the quickest and deepest oil demand crash in history. In 2019, the world was using 80 million barrels of petroleum per day (mb/d); the pandemic has probably erased at least 20 mb/d of demand (we won't know exact figures until the dust settles). OPEC and Russia have been negotiating the terms of a voluntary production cutback in order to keep prices from falling too far too fast, but an agreement remains elusive and the size of the cuts under discussion is dwarfed by the enormity of the demand blowout.

Oil storage facilities are nearly full. So, if you're a futures trader and have to settle your May contracts in hours or minutes, what are your options?

Without storage capacity, you can't take physical delivery of the stuff, so you will have to sell your contracts at a discount. And if lots of other futures traders are in the same boat, the size of that discount can grow to absurd levels—as it did on Monday.

It's all simply a matter of supply and demand. Market fundamentalists say that oil trades will eventually rebalance and all will be right with the world as soon as the pandemic is under control and the global economy gets the greenlight to consume. Perhaps. But they may be missing a couple of details:

First, the oil price crash could be signaling a deflationary contraction of the economy that won't easily be fixed. The coronavirus pandemic is an exogenous disruptor. Therefore, the usual economic recovery tactics may not work this time around (as they more-or-less did in 2008, when disruption was caused by factors endogenous to the financial system). It all depends on the nature of the virus and its interaction with human immune systems, which we are still learning about. Will infection confer immunity? Will a vaccine quickly appear? Until we know the answers to these questions, the duration of our economic time-out, and the depth of demand destruction for lots of things, including oil, will remain matters for speculation.

The oil industry may not be fixed easily. During the past decade, nearly all new sources of supply were high-cost. That's because oil is a nonrenewable resource that we harvest using the low-hanging fruit principle, and the low-hanging fruit had already been picked throughout decades of prospecting, drilling, pumping, and burning. After the Federal Reserve patched up the financial system in 2008-2010 by showering investors with trillions of dollars of new money,

America's frackers were able to commandeer boatloads of that cash by portraying their industry as the next "big thing." Producing tight oil with horizontal drilling and fracking was so expensive that very few companies actually made a profit, but that pesky irrelevancy was easily swatted away. As industry reps repeated at investor presentations, "The proof is in the production!" The money poured in, and America's oil production levels soared.

But now dozens of tight oil companies are about to be wiped out. Indeed, the entire petroleum industry is teetering. In the short term, the big fish will

simply eat smaller ones, buying up assets for pennies on the dollar. But the big fish are finding themselves swimming in water that's getting uncomfortably shallow.

Further, there's the prospect that shutting-in wells could reduce their cumulative production by 5 to 10 percent, leading to a permanent loss of productive capacity. For all the best financial reasons, oil companies have created a fragile system, exemplified in the fact that pipelines require a certain volume of oil in order to prevent infrastructure damage.

That second detail: the importance of petroleum to industrial societies is hard to overstate.

Virtually all sectors of society depend on fossil fuels, including our food system. If U.S. oil companies fail, that means total global production will be capped at a significantly lower level, putting a limit on economic recovery. This would also make the U.S. more dependent, once again, on foreign sources of conventional oil. Renewable energy boosters might say good riddance to the frackers, but the renewable energy transition depends on fossil fuel inputs to the production of solar panels, wind turbines, and batteries. Further, the electrification of transportation will be hit hard by competition with low-priced oil.

Conceivably, the shock of seeing oil trading at \$-37 could forcibly awaken us all to a broader and deeper view of the human condition in the early 21st century. Oil is what made our modern way of life possible. It's also what makes it unsustainable. Oil is amazing stuff, the product of tens of millions of years of sunlight captured by photosynthesis and slowly transformed by natural processes into a substance that is energy-dense, easily storable, and transportable. But burning millions of years' worth of carbon-based fuel in a mere century is changing the chemistry of Earth's atmosphere and oceans to such a degree that civilization may not survive.

What could future generations do with oil, other than simply burn it? What might future generations tell us about climate change?

Unfortunately, future generations don't have a say with regard to prices. And that may be the single biggest flaw in the way we've organized our modern world.