

Modern Agriculture Drives Hunger, Obesity and Disease While Simultaneously Threatening Food Chain

Analysis by [Dr. Joseph Mercola](#)

March 13, 2024

STORY AT-A-GLANCE

- › Growing environmental, climate and health problems can be traced back to modern food production, including food insecurity and malnutrition amid mounting food waste, and rising obesity and disease despite growing health care outlays
- › Conventional, chemical and energy-intensive farming is also depleting fresh water supplies, while toxic agricultural chemicals pollute air, soil and waterways, thereby threatening the entire food chain from top to bottom
- › Answers to pressing global problems hinge on the widespread implementation of regenerative farming and decentralized food distribution

Editor's Note: This article is a reprint. It was originally published April 25, 2017.

“Regenerative food, farming and land use can provide a solution to the health crisis, the water crisis, environmental degradation, climate change, rural poverty, hunger and war.” ~ Ronnie Cummins, Founding Meeting of Regeneration International, June 9, 2015, Finca Luna Nueva, Costa Rica

If you'd walked up to a farmer 100 years ago and told him farming would one day threaten life on Earth, he probably would have laughed in your face, saying such a thing simply isn't possible. Agriculture is necessary for food production, and therefore for life, the farmer would have said with firm conviction – and farming the land or raising cattle is not going to unduly harm anything or anyone.

Today, however, such an impossible scenario is precisely what we're facing. Virtually every growing environmental and health problem can be traced back to modern food production. This includes but is not limited to:

- Food insecurity and malnutrition amid mounting food waste
- Rising obesity and chronic disease rates despite growing health care outlays
- Diminishing fresh water supplies
- Toxic agricultural chemicals polluting air, soil and waterways, thereby threatening the entire food chain from top to bottom
- Disruption of normal climate and rainfall patterns

The good news is there are viable answers to all of these problems that do not merely scratch at the surface, and the answers hinge on the widespread implementation of regenerative agriculture and decentralized food distribution.

It's easy to forget that at one point, not so long ago, all food was organically grown in a way that supported the ecosystem and environment as a whole. This all changed in the 1940s when the Green Revolution took hold and industrial, chemical-dependent farming techniques quickly spread to become the norm.

Industrial Farming Has Proven Itself a Failed Experiment

Farming has sustained mankind for millennia. Industrial farming, on the other hand, has managed to create a series of unsustainable situations in less than 70 years, and evidence suggests we will not make it until the end of the century if we continue along the path of degenerative food and farming.

Topsoil destruction, erosion and desertification are exacerbated by tilling, monocropping and not using cover crops. Maria-Helena Semedo of the Food and Agriculture Organization of the United Nations has warned that at the current rate of topsoil degradation, all the world's topsoil will be gone in less than 60 years.¹

At that point, it'll be "game over" because without topsoil you cannot grow food no matter how many chemicals you add to it. Closely related problems are the loss of soil fertility and biodiversity, which is directly related to the loss of natural carbon in the soil.

An estimated 80% of soil carbon in heavily farmed areas has already been lost,² due to destructive plowing, overgrazing and the use of soil-destructive, carbon-depleting chemical fertilizers and pesticides.

Industrial monocropping has also led to the loss of diversity. Seventy-five percent of the world's crop varieties have gone the way of the dinosaurs in the last 100 years, and another 20% of all plants worldwide are threatened with extinction.³

Toxic contamination adds to the problem. According to studies by the Chinese government, 20% of arable land in China is now unusable due to pesticide contamination,⁴ and important crop pollinators such as butterfly and bee populations have collapsed, thanks to widespread pesticide application.⁵

Modern agriculture also promotes water waste through use of flood irrigation, destruction of soil quality and poor crop choices.

According to the U.S. Department of Agriculture, about 80% of U.S. consumptive water (and more than 90% in many Western states) is used for agricultural purposes⁶ and, worldwide, groundwater is being used up at a faster rate than it can be replenished.

According to James Famiglietti, a senior water scientist at NASA's Jet Propulsion Laboratory, the majority of our global groundwaters "are past sustainability tipping points,"⁷ which means it's only a matter of time until we run out of fresh water.

Without food or drinkable water, the end of civilization as we know it is pretty well-assured. The question is will enough people have the foresight to change course?

Industrial Food System Promotes Both Obesity and Malnourishment

The industrialization and centralization of food production was done to increase farmers' capacity to grow more food at a lower cost. Unfortunately, a core principle was lost in this efficiency equation – that of food quality and nutrient density.

Today, we have ample amounts of "good-looking" foods, thanks to genetic engineering and agricultural chemicals. What you don't see is the loss of nutrients. Tests reveal that the nutrient content of foods has dramatically declined since the introduction of mechanized farming in 1925.

As just one example, to receive the same amount of iron you used to get from one apple in 1950, by 1998 you had to eat 26 apples; today you have to eat 36, and this is a direct consequence of industrial farming techniques and use of chemicals that destroy soil quality by killing essential microbes.

We now know that, just as the human gut microbiome plays integral roles in human health, so the soil microbiome influences nutrient uptake and plant health. Soil microbes even help regulate the invasion of pests.

It's not surprising then that as nutrient density declined and toxic exposures via food increased, obesity and chronic disease rates have dramatically risen – so much so that obesity now threatens to overtake hunger as the No. 1 global health concern.

Obesity Is Becoming Greater Health Concern Than Hunger

In 1950, an estimated 700 million people were starving; obesity affected approximately 100 million, primarily in wealthy nations. These statistics have changed dramatically over the past six decades as the industrialization of agriculture has become the norm.

By 2010, the world's hungry had grown to 800 million while the number of obese citizens ballooned to 500 million. Four years later, 641 million people were obese,^{8,9,10,11} and

estimates suggest that by 2030, more than 1 billion people worldwide will fall into this category.

This would not be happening were it not for the adoption and spread of processed foods as dietary staples. Along with excess body weight come a wide range of other health problems and associated health care costs. In the U.S., just eight obesity-related diseases account for 75% of health care costs.

These diseases include Type 2 diabetes – which now affects nearly 1 in 11 adults worldwide¹² – nonalcoholic fatty liver disease, heart disease, cancer and Alzheimer's.¹³ In fact, 1 in 5 American deaths is now associated with obesity.¹⁴

The ramifications of poor diet and toxic exposures from food are perhaps most notable in the U.S., where for the first time in two decades, life expectancy has actually declined.^{15,16,17}

Remarkably, half of all Americans now struggle with some kind of chronic illness,¹⁸ and the cost of health care in the U.S. accounts for 17% of the gross domestic product.¹⁹ The direct and indirect annual cost of diseases attributed to obesity alone tops \$1.4 trillion.²⁰

All of these statistics tie back to our food supply, starting with how food is grown. On the whole, there's really no way to reverse these disease rates without addressing agriculture and food production. Our very lives depend on it.

Hunger Is the Result of Inadequate Food Distribution and Waste, Not Lack of Production

While the chemical technology industry claims we cannot feed a growing population without industrialization, chemicals and genetically engineered seeds, few facts support this ideology. On the contrary, studies have repeatedly shown organic farming is more likely to succeed in feeding a population of 9 billion strong, especially during drought conditions.

A report by two U.N. experts — Hilal Elver, the UN's special rapporteur on the right to food and Baskut Tuncak, the special rapporteur on toxics — also firmly refutes the notion that pesticides are essential to ensure sufficient amounts of food for a growing world population.²¹

In fact, the report calls for a global treaty to phase out toxic chemicals and transition toward sustainable farming practices worldwide, to preserve and promote human and environmental health. According to Elver and Tuncak:²²

"The assertion promoted by the agrochemical industry that pesticides are necessary to achieve food security is not only inaccurate, but dangerously misleading. In principle, there is adequate food to feed the world; inequitable production and distribution systems present major blockages that prevent those in need from accessing it ..."

Food waste is another facet of this inequitable system. It's been estimated that one-third²³ to one-half²⁴ of all the edible food in the world — as much as 2 billion tons' worth²⁵ — is simply thrown away each year. In 2010, 133 billion pounds of food were wasted at the retail and consumer levels in the U.S. alone, with two-thirds of it attributed to household food waste.

So, while 13% of American households struggle to obtain enough food,²⁶ 40% of food in the U.S. goes uneaten. This is a problem that simply cannot be solved through increased use of pesticides, GMOs, animal drugs and intensive confinement factory farms.

The fact that industrial farming and cheap food is not the answer becomes even more obvious when you consider that the poorest Americans actually have the highest rates of obesity and chronic disease.²⁷ They're not suffering the effects of lack of food or starvation. They're suffering from obesity-related disorders resulting from cheap processed foods, devoid of much-needed nutrition — the only foods many of these people have access to and can afford.

Solving Obesity and Hunger by Sharing Fresh Surplus

While there are many solutions for reducing individual household waste, we really need to think bigger. We need to radically improve the supply channels between producers and consumers to ensure food gets equitably distributed, rather than thrown away somewhere along the way. We're not wanting for ideas here. It's just a matter of implementing them more widely.

For example, Ample Harvest has created a novel and effective food bank distribution system for fresh produce. Billions of pounds of fresh foods are in fact available, but the conventional food bank distribution system does not allow those foods to enter the system. Instead, all that fresh nutritious food is tossed into urban landfills.

Meanwhile, the poor end up eating mostly processed fare that promotes obesity and chronic disease. Ample Harvest connects farmers and home growers who have too much food with those who really need it by donating the produce directly to a local food pantry or soup kitchen. [AmpleHarvest.org](https://www.ampleharvest.org) now has a database of nearly 8,000 participating food pantries across the U.S.

The system is very efficient, and associated costs are a mere fraction of other national food programs. It's also universal in that it can work in any community, large or small. And it works with both home growers and larger farms. This is just one example showing that food insecurity can be inexpensively and relatively easily solved. But to do so, we need to step outside of the conventional distribution channels and create new ones.

Regenerative Agriculture Is a Must for Food and Water Sustainability

In addition to destroying soil and denaturing our food, industrial agriculture is also draining aquifers and polluting waterways across the globe, thereby threatening human survival in more ways than one. The frightening reality is we're running out of drinkable water and poisoning what little is left.

One-third of the largest groundwater aquifers are already nearing depletion, with three of the most stressed aquifers being located in areas where political tensions run high as it is.²⁸ To give you an idea of how quickly groundwater is being depleted, consider what's happening in the High Plains Aquifer (also known as the Ogallala) in the American Midwest.

Here, the water level has been dropping by an average of 6 feet per year, while the natural recharge rate is 1 inch or less.²⁹ Once this aquifer is depleted – and many wells have already run dry in the area – 20% of the U.S. corn, wheat and cattle output will be lost due to lack of irrigation and water for the animals.

The average American will feel the effects of aquifer depletion directly as well, because with scarcity comes price hikes. According to a report³⁰ from Michigan State University, published earlier this year, if water prices continue to rise at the current rate, five years from now nearly 36% of Americans may be unable to afford their monthly water bill.

Corporate Agribusiness Has Become the No. 1 Water Polluter

Precious water sources are also threatened by pollution from large-scale monocrop farms and concentrated animal feeding operations (CAFOs).³¹ According to a report³² by Environment America, corporate agribusiness is "one of the biggest threats to America's waterways." Tyson Foods Inc. was deemed among the worst, releasing 104.4 million pounds of toxic pollutants into waterways between 2010 and 2014.

Researchers have warned that many lakes around the world are now at grave risk from fertilizer runoff that feeds harmful blue-green algae (cyanobacteria),^{33,34} and once established, it's far more difficult to get rid of than previously thought. The answer, according to the authors of this study, is better land-use management that addresses fertilizer runoff. Dramatic reductions in fertilizer use are also recommended.

Indeed, the long-term solution to many of our water quality and water scarcity issues is to phase out the use of toxic pesticides, chemical fertilizers and soil additives, and to grow crops and raise food animals in such a way that the farm contributes to the overall

health and balance of the environment rather than polluting it and creating a dysfunctional ecosystem.

Addressing Three Key Food Production Areas Can Help Solve Multiple Environmental Crises

Three key areas of food production that can help solve many of the environmental crises currently facing us are:

1. Regenerative agriculture (food crops)
2. Regenerative grazing (livestock)
3. Restorative fishing (seafood)

As noted in my interviews with a number of sustainable farming pioneers and ecological experts over the past few years, the separation of livestock from crop farming is a significant part of the problem. This was supposedly done to increase efficiency and reduce costs, but the hidden costs of this segregation are quite enormous.

Our modern agricultural system, which focuses on monocropping and CAFOs as two separate food streams, puts more carbon dioxide into the atmosphere than the actual burning of fossil fuels, contributes more greenhouse gas emissions than all vehicles in the U.S. combined, turns farmland into desert and reduces organic matter in soil, thereby reducing rainfall and worsening droughts. We'll take a closer look at all of these issues in subsequent sections.

Industrial Agriculture Prevents Critical Carbon Sequestration

Carbon management — pulling carbon out of the air and sequestering it into the soil — is a critical aspect of environmental health and the growing of food. Scientists have also noted the importance of carbon sequestration for the reversal of climate change.³⁵ Through their leaves, plants use sunlight (photosynthesis) to remove carbon dioxide

from the air, converting it into a carbon fuel used to stimulate and promote their own growth.

Up to 40% of that carbon fuel also goes to the roots of the plant, where it's leaked out into the soil. There, it becomes food for soil microorganisms. So, the plant nourishes the soil as much as the soil nourishes the plant. As mentioned earlier, we've already lost up to 80% of the soil carbon in heavily farmed areas — a fact that really highlights the urgent need to improve carbon sequestration.³⁶

A key strategy to sequester carbon in soil is to use cover crops. In other words, soil should never be left exposed, as without root systems holding the soil in place, soil erosion speeds up. Mixed grasses also nourish the soil microbiome, which need the plant interaction.

Nature abhors monoculture. In 1 square foot of pristine prairie land, you'll find about 140 different plants, and this is the type of natural biodiversity regenerative farmers aim to mimic. As noted by Regeneration International:³⁷

"Storing carbon in the soil and maintaining perennial living soil cover (trees, pasture, grazing animals ...) brings a host of benefits, including: increased soil fertility and biological activity, improved wildlife and pollinator habitat, less vulnerability to disease, increased crop yield, increased drought and flood resilience and increased water-holding and filtration capacity."

Fertilizers Contribute to Greenhouse Gas Emissions in More Ways Than One

Scientists have also declared farming and fertilizers as the No. 1 cause of particulate matter air pollution in much of the U.S., China, Russia and Europe today, specifically the nitrogen component of fertilizers.^{38,39} Industrial food and farming also release dangerous amounts of greenhouse gases, carbon dioxide, methane and nitrous oxide.

Interestingly, while fertilizer mining operations produce their share of greenhouse gases⁴⁰ – yet another environmental hazard I've not touched on here, but have written about in previous articles – most of these emissions actually occur upon application.

According to the International Panel on Climate Change, 1 out of every 100 kilos (220 pounds) of nitrogen fertilizer applied to farm land ends up in the atmosphere as nitrous oxide (N₂O), an ozone-depleting greenhouse gas 300 times more potent than CO₂.⁴¹

In 2014, the amount of N₂O created by nitrogen fertilizer spread on American farmland was equal to one-third of the N₂O released by all cars and trucks in the U.S. More research suggests the real number may be three to five times higher than that.

Grazing Animals Are an Important Part of Regenerative Agriculture

By preventing carbon sequestration, industrial farming contributes to desertification – turning land into desert – which cannot support plant life and photosynthesis, thereby worsening atmospheric CO₂ levels. According to Allan Savory, an African ecologist, dramatically increasing the number of grazing livestock is really the only thing that can successfully reverse both desertification and rising CO₂.⁴²

An article⁴³ by Pure Advantage notes how "there is no current or envisioned technology that can simultaneously sequester carbon, restore biodiversity and feed people. But livestock can ..."

As explained in Peter Byck's short film, "One Hundred Thousand Beating Hearts," farm animals form symbiotic relationships where one species helps keep parasites from overwhelming another. It is the separation of crops and animals into two distinctly different farming processes that has led to animal waste becoming a massive source of toxic pollution rather than a valuable part of the ecological cycle.

The success of Will Harris' grass fed ranching operation in Georgia (detailed in my July 2016 interview with him), and thousands of other ranches across the U.S. and the world,

also testify to the regenerative power of grazing animals. The percentage of organic matter in soil is a good indicator of quality, and Harris has been able to increase organic matter in his soil from less than 0.5% to as much as 5% in a 20-year period.

Not only does increasing organic matter in soil and pastures produce higher-quality produce, meat and dairy, it also saves water in two ways: First, by retaining more rain water and reducing irrigation needs; and second, by encouraging rainfall and preventing extended droughts. In fact, satellite data reveals plant-soil evapotranspiration may exert a far greater influence on weather and rainfall patterns than previously thought.⁴⁴

The more organic matter there is in the soil, the more moisture is captured and released back into the atmosphere through plant transpiration. Remarkably, for each 1% increase in organic matter, each acre of soil can retain another 20,000 gallons of water.

Raising organic soil matter by 1% in Oklahoma alone would allow the soil there to retain an additional 894 billion gallons more water after each rainfall of 1 inch or more! As noted by Beef Producer, which reported the satellite findings:⁴⁵

"This is exciting because it strongly suggests grazing and farming that builds soil is not only directly beneficial to those practicing it for higher yields, lower inputs, more profit and more drought resiliency, it also appears it helps make more rain for everybody."

Land Rehabilitation Projects Confirm Even Large-Scale Environmental Devastation Can Be Reversed

Based on the current state of affairs, it's easy to see the situation as hopeless. However, there is good news. Land rehabilitation projects – both by private farmers and larger government-sponsored endeavors such as the Chinese Loess Plateau regeneration project – unequivocally confirms that we can reverse even severe and large-scale environmental destruction.

The Loess Plateau was until recently one of the poorest regions of China, where centuries of agriculture had eroded once-fertile soils into a desert-like landscape, unable to support plant growth. Similar situations exist all over the world. The documentary above features soil scientist John D. Liu of the Environmental Education Media Project, who has followed the Loess Plateau regeneration project for over 15 years.

Today, the once barren landscape is again filled with thriving forests, and farmers are again producing abundant amounts of food. This just goes to show that, given a fair chance, the entire ecosystem can regenerate itself, and with the appropriate interventions, it can do so faster than would occur naturally. This, truly, is the beauty of regenerative agriculture. As so eloquently summarized by Tim LaSalle, CEO of the Rodale Institute:⁴⁶

"Regenerative agriculture is an approach to food and farming systems that works with nature's rhythms in ways to feed our growing population, to regenerate topsoil, to enhance biodiversity and to ensure life now and long into the future. Specifically, regenerative agriculture regenerates or builds fertile topsoil, primarily through the practices that increase soil organic matter and soil carbon.

This essential soil nutrient not only aids in increasing soil biota diversity and health, but increases biodiversity both above and below the soil surface, while increasing water holding capacity, sequestering carbon thus drawing down climate damaging levels of CO₂, and improves soil structure to reverse civilization threatening human caused soil loss."

Restoring grasslands is of particular significance, as evidenced by researchers comparing the effect of naturally restored forest versus grassland on carbon sequestration in the Loess Plateau.⁴⁷ According to the authors, "[N]aturally restored grassland would be a more effective vegetation type for [soil organic carbon] sequestration due to higher carbon input from roots ..."

Regenerative Agriculture Builds Sustainable Economies Too

The good news doesn't end there. While profitability is commonly cited as a determining factor for why farmers "cannot" farm organically anymore, research refutes such scaremongering. One such study^{48,49} found organic farmers earn anywhere from 22% to 35% more than their industrial counterparts.

What's more, regenerative agriculture can also help create regenerative economies based on values and principles that go far beyond merely making money,⁵⁰ thereby benefiting society in practical ways beside a cleaner, healthier environment and more nutritious, less toxic food.

In a 2015 article, John Fullerton, founder and president of Capital Institute, presented the organization's views on regenerative capitalism, which is built on universal principles of health and wholeness. "We have identified eight key, interconnected principles that underlie systemic health," he writes. These eight principles, which he proposes be part of a regenerative economic system, include:

Right relationship — Economy based on the understanding that damage to any single part ripples outward to damage every other part of the system

Holistic wealth — The understanding that true wealth is more than just money. It can also be measured in wellbeing of the whole and broadly shared prosperity

Innovation, adaptation, responsiveness

Empowered participation

Seeking balance — "A regenerative economy seeks to balance: efficiency and resilience; collaboration and competition; diversity and coherence; and small, medium and large organizations and needs. It runs directly against the (short term) 'optimize' ideology that is at the root of modern financial logic"

"Edge effect" abundance — "Creativity and abundance flourish synergistically at the 'edges' of systems ... For example, there is an abundance of interdependent life in salt

marshes where a river meets the ocean ... At those edges the opportunities for innovation and cross-fertilization are the greatest"

Robust circulatory flow of money, information, resources, goods and services

Honoring community and place – "A regenerative economy nurtures healthy and resilient communities and regions, each one uniquely informed by the essence of its individual history and place"

How to Affect Change, Seven Days a Week

A growing number of home owners are now responding to the call for cleaner, healthier foods by converting their front and backyards into edible landscaping using organic and regenerative methods.

But even if you're not growing your own foods, you can still help steer the agricultural industry toward safer, more regenerative systems by supporting your local farmers and choosing fresh, local produce over "cheap" conventional varieties commonly sold in larger grocery chains. Remember to choose organic, grass fed beef, poultry and dairy, in addition to organic produce. If you live in the U.S., the following organizations can help you locate farm-fresh foods:

[American Grassfed Association](#) – The goal of the American Grassfed Association is to promote the grass fed industry through government relations, research, concept marketing and public education.

Their website also allows you to search for AGA approved producers certified according to strict standards that include being raised on a diet of 100% forage; raised on pasture and never confined to a feedlot; never treated with antibiotics or hormones; and born and raised on American family farms.

[EatWild.com](#) – EatWild.com provides lists of farmers known to produce raw dairy products as well as grass fed beef and other farm-fresh produce (although not all are

certified organic). Here you can also find information about local farmers markets, as well as local stores and restaurants that sell grass fed products.

Weston A. Price Foundation – Weston A. Price has local chapters in most states, and many of them are connected with buying clubs in which you can easily purchase organic foods, including grass fed raw dairy products like milk and butter.

Grassfed Exchange – The Grassfed Exchange has a listing of producers selling organic and grass fed meats across the U.S.

Local Harvest – This website will help you find farmers markets, family farms and other sources of sustainably grown food in your area where you can buy produce, grass fed meats and many other goodies.

National Farmers Markets Directory – A national listing of farmers markets.

Eat Well Guide: Wholesome Food From Healthy Animals – The Eat Well Guide is a free online directory of sustainably raised meat, poultry, dairy and eggs from farms, stores, restaurants, inns, hotels and online outlets in the United States and Canada.

Community Involved in Sustaining Agriculture (CISA) – CISA is dedicated to sustaining agriculture and promoting the products of small farms.

The Cornucopia Institute – The Cornucopia Institute maintains web-based tools rating all certified organic brands of eggs, dairy products and other commodities, based on their ethical sourcing and authentic farming practices separating CAFO "organic" production from authentic organic practices.

RealMilk.com – If you're still unsure of where to find raw milk, check out Raw-Milk-Facts.com and **RealMilk.com**. They can tell you what the status is for legality in your state, and provide a listing of raw dairy farms in your area. The Farm to Consumer Legal Defense Fund⁵¹ also provides a **state-by-state review of raw milk laws**.⁵² In California, **Raw Farm**, formerly Organic Pastures, is licensed to sell raw dairy products.

For more information on Regenerative food, farming and land use, visit the website of [Regeneration International](#).

Sources and References

- ¹ Scientific American December 5, 2014
- ^{2, 36} Boulder Weekly January 12, 2017
- ³ Newsweek May 10, 2016
- ⁴ The Guardian March 7, 2017
- ⁵ New York Times February 26, 2016
- ⁶ USDA, Economic Research Service, Irrigation & Water Use, Overview
- ^{7, 28} Mashable June 16, 2015 (Archived)
- ⁸ The Lancet April 2, 2016: 387(10026); 1377-1396
- ⁹ Time March 31, 2016
- ¹⁰ Newsweek April 4, 2016
- ¹¹ Reuters March 31, 2016
- ¹² BBC News April 6, 2016
- ¹³ Journal of Neuroscience January 27, 2016, 36(4): 1324-1335
- ¹⁴ American Journal of Public Health April 5, 2013
- ¹⁵ New York Times December 8, 2016
- ¹⁶ STAT News December 8, 2016
- ¹⁷ Washington Post December 8, 2016
- ¹⁸ WebMD, November 2, 2016 (Archived)
- ¹⁹ The Fiscal Times, December 2015
- ²⁰ Milken Institute Lynda and Stewart Resnick Center for Public Health, November 2016, Weighing Down America (Archived)
- ^{21, 22} The Independent March 7, 2017
- ²³ PLOS One July 21, 2016
- ^{24, 25} IME January 2013 (Archived)
- ²⁶ USDA Economic Research Report September 2016
- ²⁷ Diabetes 2011 Nov; 60(11): 2667–2668
- ²⁹ The Desert Sun February 2, 2017
- ³⁰ Michigan State University January 11, 2017
- ³¹ CDC.gov, Understanding CAFOs and Their Impact on Communities (PDF)
- ³² Environment America February 4, 2016 (Archived)
- ³³ Ecosphere January 2015:6(1) (Archived)
- ³⁴ The Blade January 11, 2015
- ³⁵ The Carbon Underground, White Papers
- ³⁷ Regeneration International February 7, 2017

- ³⁸ Harvey, F. (2016). Farming is 'single biggest cause' of worst air pollution in Europe. The Guardian. Retrieved 22 May 2016
- ³⁹ Bauer, S., Tsigaridis, K., & Miller, R. (2016). Significant atmospheric aerosol pollution caused by world food cultivation. Geophys. Res. Lett
- ⁴⁰ Fertilizers Europe, Energy Efficiency and Greenhouse Gas Emissions in European Nitrogen Fertilizer Production and Use (PDF) (Archived)
- ⁴¹ In These Times April 28, 2016
- ⁴² YouTube.com, TED Talks, Allan Savory, How to green the world's deserts and reverse climate change
- ⁴³ Pure Advantage October 6, 2016
- ^{44, 45} Beef Producer January 18, 2017 (Archived)
- ⁴⁶ LinkedIn, Tim LaSalle, August 16, 2016
- ⁴⁷ PLOS One 2012; 7(7): e40123
- ⁴⁸ Nature Plants February 3, 2016 DOI: 10.1038/nplants.2015.221
- ⁴⁹ Time Magazine February 4, 2016
- ⁵⁰ Neweconomyweek.org
- ⁵¹ The Farm to Consumer Legal Defense Fund
- ⁵² Farm-to-Consumer Legal Defense Fund, State by State Review of Raw Milk Laws (Archived)