REVISITING
Crisis By Design

Three Decades of Failed Farm Policy

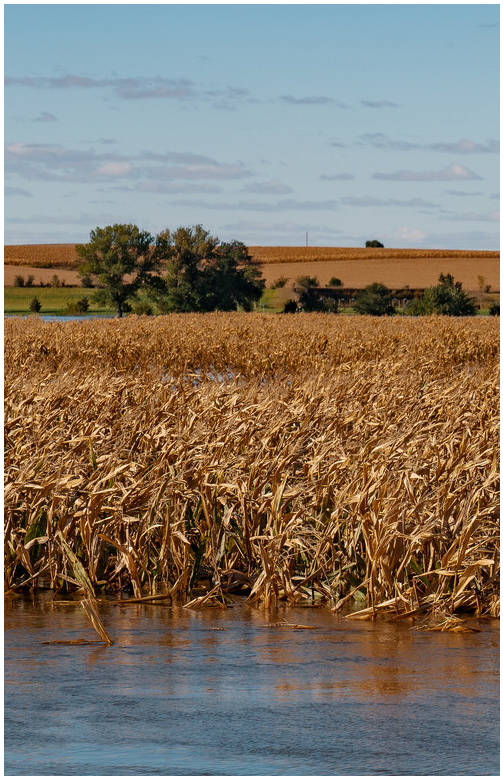

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TABLE OF CONTENTS

INTRODUCTION

As we enter a new decade, farmers are once again in crisis. Stories in the news point to rising bankruptcies in the dairy sector and the chaos in commodity markets created by Trump's trade skirmishes. Presidential candidates are getting an earful from farmers and rural communities, and new ideas are on the table. But the causes of the farm crisis run much deeper than the latest round of tariffs. The issue is not only that so many farmers have been hit hard by years of falling prices and rising bankruptcies, but that the interlocking system of trade and farm policies are designed for exactly that kind of outcome. It is not so much a crisis of prices as a *Crisis by Design*.

That is the title of an article written by IATP founder Mark Ritchie and Kevin Ristau in 1987, in the midst of another farm crisis. It was a watershed document that has been the cornerstone of IATP's work for many years and has catalyzed further analysis and action by family farmers and their allies. It traced the origins of farm policy, starting from the historic pattern of boom and bust cycles of prices through the eventual establishment of parity pricing and supply management that emerged in the 1930s.

> *But from the moment farm families took possession of the land, whether they were freed slaves or immigrant families, they found themselves caught in a classic cost/price squeeze. Skyrocketing prices for the items they needed —such as seeds, credit and transportation— could not be covered by the prices the grain monopolies were willing to pay for their crops.*
>
> *This squeeze between rising costs and falling prices caused a series of rural depressions and panics in the late 1800s and early 1900s. Seeing these economic crises as a threat to their survival, family farmers organized political movements to protect themselves and to lobby for changes in the government policies that were creating the crises.*

That organized political pressure led to the establishment of federal legislation that set minimum prices for farm goods that met farmers' costs of production—called parity pricing—and supply management to balance the volume of production with demand. The parity program also created a national grain reserve to stabilize prices in times of droughts or other national disasters.

Ritchie and Ristau described the steady assault on these programs by corporate-led think tanks such as the Committee for Economic Development (CED), which argued that those programs were contrary to the "free market" and that farmers could be more "productively used" in other sectors of the economy and should be removed from agriculture through a series of policy changes. The CED recommended transforming the sector to require greater mechanization and reliance on agrochemicals.

Those proposals were backed by the Chamber of Commerce and American Banking Association, among others, and resulted in a series of policy changes that eroded the parity programs. Ritchie and Ristau reported that "As prices fell, many farmers were forced out. Farm population dropped by nearly 30% between 1950 and 1960 and another 26% between 1960 and 1970." Congress passed a new farm

program in which taxpayers partially compensated farmers when prices dropped below certain targets, allowing grain traders to buy at prices below the cost of production.

In 1987, when *Crisis by Design* was written, farmers were again in crisis. Farm debts and bankruptcies skyrocketed, and land values and farm prices plummeted. Those calamities spread throughout rural communities. Ritchie and Ristau noted, "Like any worker whose wages are cut in half, farmers faced with falling prices must work twice as hard and sell twice as much just to cover their bills." This led to the abandonment of many soil and water conservation practices. Grain corporations took advantage of the situation to expand export sales of grain at below the cost of production, underpricing farmers in other countries, a practice known as dumping.

Ritchie and Ristau proposed a return to parity pricing and supply management, geared toward stabilizing prices and supplies and prioritizing local consumption over export markets. Unfortunately, in the decades that followed, the last vestiges of those programs were dismantled, definitively ending with the 1996 "Freedom to Farm" bill. Subsequent farm bills patched together various emergency fixes into the program of farm supports and crop insurance we have today.

And now more than 30 years later, we are in the middle of another farm crisis, with the added pressure of an impending climate catastrophe. We at IATP decided to take a fresh look at the analysis and predictions made in *Crisis by Design*, using U.S. Department of Agriculture (USDA) and other official data, especially from the Census of Agriculture, to understand how the farm situation has changed since then and what current policies imply for the future. We looked at nine factors in the farm economy, as well as how U.S. agriculture intersects with global markets, the environment and broader disparities:

CORPORATE CONCENTRATION:

The boom and bust cycles have continued, leading to sharp increases in corporate concentration and control over agriculture and rural economies. The horizontal concentration in nearly all aspects of agricultural production, processing and distribution that began in the 1980s has become entrenched. In beef slaughtering, for example, just four firms control 85% of production. Supply chains have become integrated vertically as well, both within the U.S. and globally, so that decisions and profits are concentrated in the hands of just a few corporations, while farmers and farmworkers take on the risks, with very few enforceable rights.

FINANCIALIZATION:

When *Crisis by Design* was published in 1987, traders and processes used agricultural futures and options contracts to manage raw materials price risks. Those complex but practical financial instruments have been dwarfed by more speculative financial markets. By 2012, agricultural contracts were an infinitesimal fraction of financial futures commodity contract transactions, both in number and value. When agricultural contracts are bundled with non-agricultural contracts into commodity index funds contracts, the fund formula, rather than supply and demand fundamentals, drives prices. The 2009 financial crisis led to certain reforms, but relentless industry opposition to rules designed to prevent and limit excessive speculation by financial entities continues to make even limited reforms difficult to enforce.

GLOBALIZATION:

Crisis by Design did not fully predict the expansion of global trade rules that came with the formation of the World Trade Organization (WTO) or the huge increase in bilateral and regional trade deals that go beyond WTO commitments. Those agreements were designed to facilitate exchanges of goods, services and investments across borders, not to promote fair or sustainable agricultural systems or economic development. IATP has been documenting the extent of dumping, i.e., exporting farm goods at below the cost of production, since the late 1990s. With some brief exceptions, there has been a clear and consistent pattern of cheap exports invading global markets to the detriment of farmers in the U.S. and abroad. While U.S. production doesn't dominate world markets as it once did, global traders easily shift purchases among suppliers and buyers, transferring risks to farmers.

TECHNOLOGY:

The vast expansion of agricultural production was enabled by the adoption of new technologies not envisioned in *Crisis by Design*. The use of new chemicals, seeds and farm machinery are major components of the cost of production, which has exceeded the farmgate prices for agricultural commodities in many states in most years since 2010. These choices were driven by USDA policies, often developed based on confidential studies provided by agribusinesses, more than economics. Globally, insect and weed resistance has increased on over two billion acres of first generation genetically engineered (GE) crops since 1996. Applications of gene editing techniques such as CRISPR have introduced new traits, including herbicide resistance. If the pest resistant management strategies fail in the second-generation GE crops, as they failed for the

first generation, the "technology treadmill" will turn more rapidly and at greater cost to farmers.

LAND:

These changes in financial markets and trade, especially as they reinforce low prices paid by agribusinesses for crops, also affect land prices and ownership. Increases in farm debt, bankruptcies and land values have far outstripped farm assets and income, making it increasingly difficult for farmers to hold on to their land. Corporate and investor-owned land has doubled since the 1980s and the number of farms owned by corporations and investors rose by nearly 10% between 2012 and 2017. As *Crisis by Design* noted in 1987, these absentee landowners often treat "irreplaceable soil and water resources with the same narrow, short-term profit orientation that has characterized corporate treatment of other capital resources such as steel mills and railroads." In addition, farmers and landowners are aging while young and beginning farmers are eager to start operations. Many aging farmers and landowners do not have a succession plan, and young and beginning farmers cite lack of access to land as their biggest challenge.

WATER:

Dramatic increases in agricultural use of chemicals and fertilizers and growing concentration of livestock production since the 1980s, linked to increasing farm size and the shift from family farms to larger corporate agribusiness, have also worsened water pollution. In 2016, the U.S. Environmental Protection Agency (EPA) reported that nationally, 71% of assessed lakes, ponds and reservoirs, 53% of assessed rivers and streams, and 80% of assessed bays and estuaries did not meet water quality standards. A majority of waterways are unsuitable for aquatic life and/or human uses, and drinking water wells, particularly in rural areas, are also contaminated. The laws intended to control pollution from agriculture are weak both as written and as implemented, with powerful farm and agribusiness interests effectively blocking protective standards and effective enforcement.

CLIMATE CHANGE:

While the scientific understanding of climate change has progressed since *Crisis by Design* was written, climate policy has stalled. This inertia can be traced to a three-decade-long disinformation campaign led by the oil and gas industry to dispute climate science and turn it into a partisan issue—feeding into larger political divides in the country. Climate related droughts and flooding are among the biggest stories in agriculture. Rural communities of color are often affected disproportionately by such events, exacerbated by preexisting environmental justice issues. The breach of manure lagoons following recent hurricanes affected the water in largely African American rural North Carolina communities. Agricultural workers are increasingly experiencing extreme heat events, an issue that is likely under-reported because many farmworkers are immigrants, with fewer legal rights. The growth of industrial agricultural operations and practices are also increasing greenhouse gas emissions from agriculture. Future climate policy must also address the economic drivers of the current farm crisis—primarily a glut of overproduction and highly concentrated markets controlled by a handful of global companies.

RACE AND GENDER:

These changes, while harmful for nearly all farmers, particularly affect farmers of color and women farmers. Racial, ethnic and gender-based disparities in the U.S. agricultural and food system are most visible when we consider farm ownership and income from farm operations. This is especially evident in the steady decline in the number of African American farmers, from 746,717 African American farmers in 1900 down to a mere 18,451 in 1997, a whopping 97.5% decline. The continued decline in their share of farmland ownership, the lack of adequate measures to address ongoing discrimination and unequal access to information and loans continues to affect African American, Latino and other groups of socially disadvantaged farmers.

ORGANIC AND AGROECOLOGY:

There are some glimmers of hope. Organic agriculture has grown substantially since its beginnings as an alternative movement, including a 50% rise in sales in the last 15 years. However, the maintenance and enforcement of high standards in the USDA National Organic Program requires ongoing vigilance. Organic agriculture has expanded in other countries, too, along with new movements for regenerative agriculture and agroecology. Agroecology incorporates human rights and participatory dimensions to decisions on food production, emphasizing a dialogue between farmers and scientists. Agroecological practices focus on production intended for very local markets and quality assurance is based on relationships of trust between farmers and consumers. It represents a new approach to agriculture that builds on the principles of organic agriculture and emphasizes local communities over global markets and fairness for farmers and consumers.

Current U.S. farm and trade policies are not just inadequate to address the dire situation confronting farmers, eaters and the planet. They are causing it. Proven ideas like supply management and parity pricing are taking on new life as alternative solutions. While U.S. farm policy has yet to

effectively respond to climate change, farmers are increasingly adopting practices, including building soil health, that can both reduce emissions and strengthen climate resilience. The elements—and the social movements needed to back them up—are there for a new approach to farm, climate and trade policies that take steps to resolve rather than reinforce the current crisis.

Unfortunately, nearly all of the themes and predictions outlined in the original *Crisis by Design* still resonate today, with new disruptions from the climate crisis, financialization and globalization. As we completed this new analysis, we contacted Mark Richie for his perspective. He answered,

> *For those who worked tirelessly to drive farmers off the land, they had great success for quite a few years. But there's a whole new generation of young farmers, rural and urban, that are reversing the policies that have intentionally pushed their parents and grandparents off the land. This includes millions of new arrivals who have come to our country, like the Germans and Scandinavians last century, to make a prosperous life in partnership with the land, the rain, the sun, and their neighbors. They are making the case for the necessity of public policies that promote both sustainable production systems and robust resilience. Consumers and producers are finding each other and together co-creating a brighter future for all.*

The challenges we face in our farm economy and rural communities will not fix themselves. As we enter a new decade, our policy framework needs a new design—a design focused on thriving rural communities, more farmers on the land and ecological resilience.

REVISITING CRISIS BY DESIGN

THE AGRICULTURAL TECHNOLOGY TREADMILL

- Agricultural technology has enabled overproduction of agricultural commodities, which has left farmers dependent on taxpayer funds in most years to compensate for low commodity prices.
- Technology adoption statistics do not measure the impacts of technologies on rural communities, particularly in developing countries.
- The monoculture application of "precision agriculture," which promises to increase yields while reducing environmental damage, may result in the accelerated pest and weed resistance characteristic of genetically engineered crops.

FROM INTEGRATED PEST MANAGEMENT TO GENOME AND GENE EDITED CROPS

The original *Crisis by Design* analysis does not address the topic of agricultural technology directly. However, the unmanaged agricultural production that contributed to low and erratic commodity prices and, together with the farm mortgage crisis, bankrupted farms in the 1980s, was enabled by agricultural technology. The "maximize production for trade" ideology was synthesized in the Nixon administration's Secretary of Agriculture Earl Butz's order to "plant fencerow to fencerow," a dramatic reversal of New Deal supply management and soil conservation practices.[1]

Crisis by Design outlines how agricultural economists contracted by the agribusiness-funded Council for Economic Development (CED) proposed policies that would strip from the farm bill supply management practices and policies to keep farmgate prices above the cost of production.[2] Under the CED proposals, adapted in more than a half century of farm bills, taxpayers would compensate farmers for below cost of production farmgate prices with "deficiency payments." Farmers would pass on most of those payments to agricultural seed, fertilizer, veterinary medicine and machinery companies to enable ever greater crop yields and herd sizes. Farmers tried to outrun the declining economic benefits of being early adopters of new technology, described by the Kennedy administration's Chief Agricultural Economist Willard Cochrane as the "technology treadmill."[3] Many farmers, even those who inherited land and expensive machinery, who got on the treadmill and "got big" are now filing for Chapter 12 bankruptcies.[4]

Statistics can help explain the extent of adoption of an agricultural technology but are unhelpful in understanding how or why a technology was adopted. Nor do statistics explain why governments decided not to support a competing technology, even if it was more cost effective and led to higher prices and more prosperous rural communities. For example, the International Service for the Acquisition of Agri-biotech Applications, an industry sponsored non-profit organization, keeps statistics about acreage planted with genetically engineered (GE) seeds and GE product "approvals" as part of its mission to promote technology adoption, particularly in developing countries.[5] Yet, you would not learn from such statistics that U.S.

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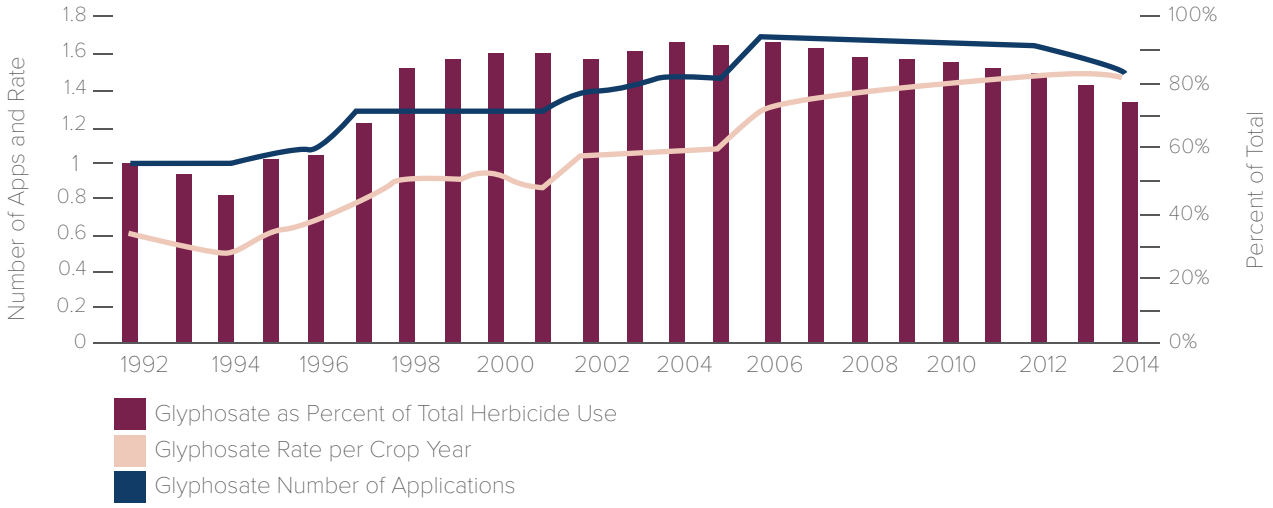
Reliance on Glyphosate in Soybean Production



agencies do not approve products following a risk assessment, but merely acknowledge that GE product developers believe that their products conform to U.S. regulations according to data and studies submitted by the GE product developer.[6] Many of those studies are classified as Confidential Business Information and are unavailable for peer review. Nor would you learn how publicly funded development banks require adoption of agricultural biotechnology "packages" and policies as conditions of receiving loans.[7] Indeed, forced adoption of an agricultural technology can be damaging to rural development in ways not captured by statistics focusing on productivity gains and planted acres.[8]

Agricultural technology, including chemicals, seeds and farm machinery, are major components of the cost of production, which has exceeded the farmgate prices for agricultural commodities in most years since 2010 in Midwestern states, according to a Federal Reserve Bank of Minneapolis article in 2019.[9] The USDA Agricultural Census reports "Farm Production Expenses" for 2017 and 2012, but neither gives a broader historical perspective nor compares those costs to farmgate prices.[10] The cost of agricultural technology, relative to prices, is only one factor in today's farming crisis, but it is an important one.

A crucial agricultural policy debate in the 1980s and early 1990s was the definition and practice of Integrated Pest Management (IPM), "first used in agriculture beginning in the 1970s in response to growing knowledge about the negative side-effects of pesticide overuse," famously documented by Rachel Carson in "Silent Spring" (1962).[11] The pesticide companies that viciously attacked Carson's personal life had to prevent the widespread adoption of IPM in U.S. good agricultural practices if they were to increase their pesticide sales.[12] Despite prescient testimony to the Environmental Protection Agency[13] that crops engineered to resist proprietary pesticides would result in increased weed resistance[14] and pesticide use,[15] the companies succeeded in preventing widespread adoption of IPM and increasing their pesticide sales, as indicated in the chart.[16]

Globally, insect and weed resistance has increased on over two billion acres of first generation genetically engineered (GE) crops since 1996.[17] Applications of gene editing and genome editing techniques, such as CRISPR, have introduced new traits to new crops, including herbicide resistance.[18] To "modernize" first generation GE product rules, USDA has proposed not to regulate, require risk assessment or even require field trial data for most crops derived from the new GE techniques. In most cases, GE product developers would self-determine if their product required any U.S. pre-market review, thus expediting commercialization.[19] U.S. trade policy will require import of a quantitatively undefined "low level presence" of GE plant and animal products unapproved in the importing country.[20] If the pest resistant management strategies fail in the second-generation GE crops, as they failed for the first generation, the "technology treadmill" will turn more rapidly and at greater cost to farmers.

BIG AG DATA AND THE PROMISE OF PRECISION FARMING

The promised salvation from the brutal economics of the technology treadmill lies in the data harvesting and analysis of farmers' work, input applications and machinery use, which is now marketed as part and parcel of "precision farming," first envisioned in a 1997 National Research Council report.[21] "Precision farming" continues the "get big

or get out" mantra for technology investment invoked by the USDA Secretary Sonny Perdue,[22] except that "precision farming" technologies aspire to cause less environmental damage than their predecessors. A 2015 article in *Foreign Affairs* summarizes the promise:[23]

> *One effect is on yields: precision agriculture allows farmers to extract as much value as possible from every seed. That should help feed a global population that the UN projects will reach 9.6 billion by 2050. Precision agriculture also holds the promise of minimizing the environmental impact of farming, since it reduces waste and uses less energy. And its effects extend well beyond the production of annual crops such as wheat and corn, with the potential to revolutionize the way humans monitor and manage vineyards, orchards, livestock, and forests. Someday, it could even allow farmers to depend on robots to evaluate, fertilize, and water each individual plant — thus eliminating the drudgery that has characterized agriculture since its invention.*

This vision of agriculture without farmer labor, leaving only agricultural robots and data managers, is closer to technological realization than it was in the original *Crisis by Design* analysis. In 1999, proponents of agricultural biotechnology had predicted that "in 5-10 years production agriculture will be gone."[24] Combining robotics and artificial intelligence to perform agricultural labor tasks has been presented as a cost-effective solution to a forecast agricultural labor shortage.[25] The cost of disruption to farm families and rural communities without farmers is "externalized" or not measured by the boosters of this purportedly efficient form of agricultural production.

CONCLUSION

Willard Cochrane, writing before the systemic impact of climate change on agriculture had become apparent, could not develop what his biographer Dick Levins called a "clean economic plan" to keep the technology treadmill from destroying U.S. farming and extracting agricultural wealth from rural communities.[26] "Get big or get" technology adoption and agricultural policy has resulted in increasing concentration among the few surviving agribusiness firms, each now promising different "climate smart" technologies, which, however, require further public subsidies of the treadmill's high costs and low farmgate prices.[27] Clearly, an economic plan, whether or not "clean," must be developed on the first principle that agriculture cannot become a sustainable public utility by continuing "get big or get out" agricultural policy and technology investment.

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REVISITING CRISIS BY DESIGN

CLIMATE CHANGE — CRISIS BY DENIAL?

- Climate change is increasingly disrupting farmers, the agriculture economy and rural communities.
- The growth of industrial agricultural operations and practices are increasing greenhouse gas emissions from agriculture.
- While U.S. farm policy has yet to effectively respond to climate change, farmers are increasingly adopting practices, including building soil health, that can both reduce emissions and strengthen climate resilience.

The threat climate change poses to farmers and rural communities was not fully understood when the original *Crisis by Design* was published in 1987. Since then, our scientific understanding about the climate crisis, and more specifically on agriculture, has evolved dramatically. The Intergovernmental Panel on Climate Change was established in 1988 and has published a series of five climate science research assessments, most recently a special report on Climate Change and Land.[1] The formation of the United Nations Framework on Climate Change in 1992 launched an international forum for coordinated global action, recently culminating in the 2015 Paris Climate Agreement. In the U.S., the Global Change Research Act of 1990 mandated a periodic National Climate Assessment be sent to Congress.[2] The fourth assessment was published in 2018, including a special chapter on agriculture and rural communities.

While the science has progressed, climate policy has stalled at the national level in the U.S. This policy inertia can be traced to a three-decade-long disinformation campaign led by the oil and gas industry[3] to dispute climate science and turn it into a partisan issue[4]—feeding into larger political divides in the country. President Trump's withdrawal from the Paris Climate Agreement,[5] while actualizing climate denial within federal agencies, including at the USDA,[6] is part of the living legacy of the fossil fuel industry's campaign. Fortunately, a growing movement for climate action (including many farm groups) is gaining momentum nationally, as states are leading the way on new climate policy.[7]

In recent years, disruptions associated with climate change continue to be among the biggest stories in agriculture. In 2019, Midwest farmers were hit by devastating spring and summer flooding.[8] In 2018, wildfires out West and early winter storms in the Great Plains states wreaked havoc for farmers and ranchers. In 2017, multiple hurricanes hit farmers in south and southeast states. According to the U.S. National Climate Assessment, climate-related weather disruptions have increased steadily over the last 40 years and are expected to rise further.[9] This past year continues a long-term trend of extreme weather events costing more than one billion dollars annually, according to National Oceanic and Atmospheric Administration (NOAA).[10]

As Figure 1 shows, historical crop insurance data analyzed by Inside Climate News provides some information about how natural disasters have affected farmers in recent decades.

These costs linked to climate change are expected to grow, according to a 2018 Congressional Budget Office report.[11] USDA's Economic Research Service projects a possible 20% spike in crop insurance costs connected to future climate events.[12]

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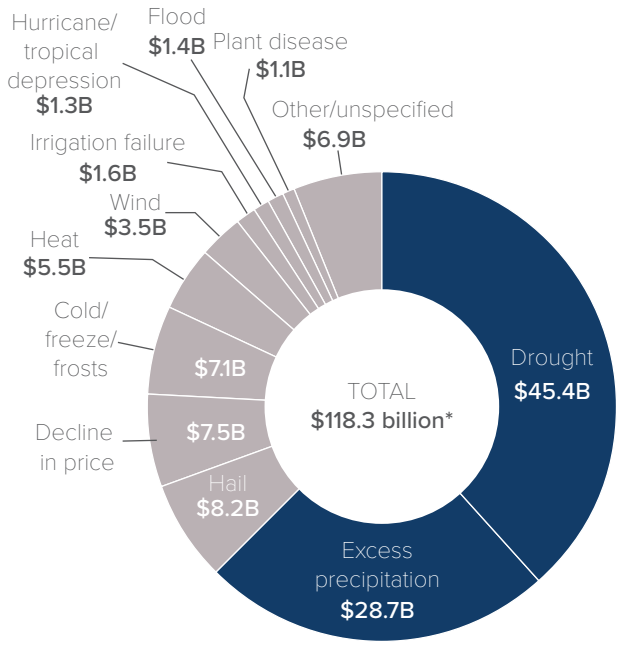
Figure 1: Claims Paid Under the Crop Insurance Program
By cause of loss, in billions of 2016 dollars, 2000 to 2016



*Sum does not equal total due to rounding

Source: Paul Horn, "What's Sparking Crop Insurance Payouts," Inside Climate News, December 31, 2018, https://insideclimatenews.org/sites/default/files/styles/colorbox_full/public/image_large/Crop-Insurance-Payouts-Climate-Change-Chart-529px.png?itok=Fju9yVQi

There are other indicators that climate-related events are wreaking havoc for farmers. The National Interagency Wildfire Center reports that the average wildfire is bigger, hotter and affecting many more acres.[13] The U.S. Geological Survey reports that some Midwest states like Iowa, Missouri and Illinois are seeing a more than 300-fold increase in annual rainfall compared to a century ago.[14] Rural communities of color are often affected disproportionately by climate-related events, exacerbated by already existing environmental justice issues. The breach of manure lagoons following recent hurricanes affected the water in largely African American rural North Carolina communities. Agricultural workers, often Latino, are increasingly experiencing extreme heat events, an issue that is likely under-reported because many farmworkers are immigrants with fewer legal rights.[15] While California, Minnesota and Washington have heat protections for workers, there is no federal standard guarding civilian laborers.[16]

Agriculture is also contributing to climate change. The EPA's Inventory of Greenhouse Gas Emissions and Sinks: 1990-2017 charts emissions by type and sector using methodologies established through the United Nations Framework Convention on Climate Change UNFCCC.[17] While emissions in most sectors are declining, agriculture emissions have increased more than 10% since 1990. Agriculture accounted for 8.4% of U.S. emissions in 2017, but that percentage does not include on-farm energy and fuel use, losses in cropland, the production of ammonia fertilizer, nor elements of the food system related to transport, processing and waste.

Within the agriculture sector, carbon dioxide emissions increased by 16.2%, methane emissions by 14.4% and nitrous oxide emissions by 7.3% since 1990, the EPA reported. The increase in methane emissions mirrors the rapid expansion of factory farms over the last two decades, where thousands of animals are raised in confined spaces with massive manure lagoons. Emissions related to manure management rose 66% since 1990. The EPA reported, "The majority of this increase is due to swine and dairy cow manure... "The shift toward larger dairy cattle and swine facilities since 1990 has translated into an increasing use of liquid manure management systems, which have higher potential CH4 (methane) emissions than dry systems."[18]

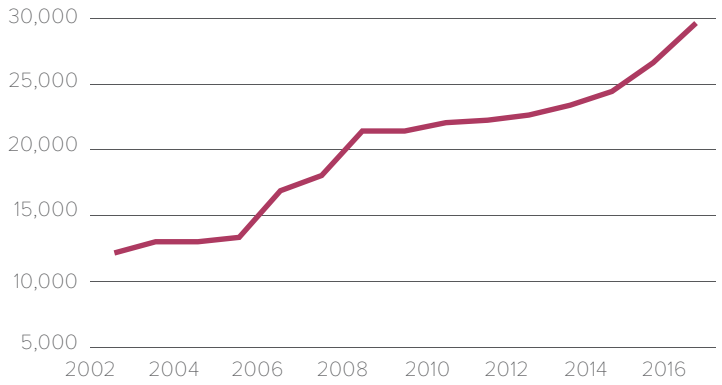
Manure management is also a source of nitrous oxide (N2O) emissions, both directly and through the application of manure on fields as fertilizer. N2O emissions related to manure increased 34% from 1990 to 2017—once again mostly associated with the rise of large-scale animal feeding operations.

Nitrous oxide emissions related to agricultural soil management, including synthetic fertilizer application and tillage practices, increased by 6% from 1990. The increase in the use of synthetic fertilizers explains part of the increase. The EPA also noted a 109% increase in carbon dioxide emissions related to the application of urea fertilizer, a form of synthetic nitrogen fertilizer. And the EPA's land use chapter documented the loss of more than 10 million hectares of cropland since 1990, resulting in a loss in the carbon storage rate of about 44%.[19]

Also worth noting by National Sustainable Agriculture Coalition (NSAC) in its analysis of the Ag Census is the expansion of cropland for animal feed over the last several decades coinciding with the shift toward factory farm systems. NSAC noted a dramatic drop from 66 million acres of pastureland in 1997 to 13.8 million acres in 2017.[20]

There is some evidence that climate-friendly practices are increasing. The 2017 Agriculture Census tracks acres that utilized a number of practices known to sequester carbon, build soil health and strengthen climate resilience. Since the 2012 Agriculture Census, there has been an 8 million acre growth in no till acres (less soil disturbance can

Figure 2: Growth in USDA Certified Organic Operations in the U.S., 2002-2016



Note: Foreign operations may also be certified to the USDA organic standards

Source: "2016 Count of Certified Organic Operations Shows Continue Growth in U.S. Market," United States Department of Agriculture, Accessed: May 8, 2018, https://www.ams.usda.gov/press-release/2016-count-certified-organic-operations-shows-continued-growth-us-market

sequester more carbon),[21] a 28% increase in acreage under reduced tillage[22] and nearly a five million acre jump in acreage planting cover crops.[23] Since 2012, there has been a 39% increase in the number of organic farms, which use fewer synthetic fertilizers and emit fewer greenhouse gases (GHG).[24]

Also worth noting, farmers are increasingly investing in renewable energy. The number of farms producing renewable energy has more than doubled since 2012 to over 133,000 farms, according to the Census of Agriculture.[25]

For farmers and rural communities, climate-related events, disruptions and disasters fall within an agriculture economy that is facing six years of low prices, creating enormous hardship particularly for small and mid-sized farmers. Future climate policy must also address the economic drivers of the current farm crisis—primarily a glut of over-production and highly concentrated markets controlled by a handful of global companies. Major reforms should include:

- A reformed farm bill must implement a supply management program to limit production and prepare for climate-related disruptions; greatly expand conservation programs that support climate resilience for crop and animal production; and stop subsidizing factory farms through loan and conservation programs.
- Food system infrastructure investment in agriculture systems like organic, grass-fed and perennials that provide climate benefits but need market development to be accessible to more farmers.
- Stronger environmental regulations must require reporting of GHG emissions from large-scale factory farms producing liquid manure, and those operations must be regulated appropriately to meet climate goals similar regulations need to be applied to the synthetic fertilizer industry.
- Antitrust enforcement is needed to create a more diverse market for new climate adaptive and resilient seeds and animal breeding—and to create a fair marketplace for farmers using regenerative practices benefiting the climate.
- Trade rules need to support climate policy (including renewable energy green jobs programs), stop creating special legal rights for multinational corporations, and support mandatory, accurate country of origin and other food labeling.
- Future climate policies need to be developed with farmers and rural communities dependent on natural resource-based economies at the table. They are on the front lines of the climate crisis.

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REVISITING CRISIS BY DESIGN

CORPORATE CONCENTRATION IN AGRICULTURE

- The horizontal concentration in nearly all aspects of agricultural production, processing and distribution that began in the 1980s has become entrenched.
- Vertical integration of supply chains, both within the U.S. and globally, means that decisions and profits become concentrated in the hands of just a few corporations, while farmers and farmworkers take on the risks with very few enforceable rights.
- Despite recent setbacks, tools are available to neutralize and push back on corporate concentration and control of agriculture, and with public attention focused on rural issues, the time is ripe for real reform.

Nearly every aspect of agricultural production has become much more concentrated over the last few decades. This concentration has coincided with a reduced focus on anti-trust enforcement, ever-increasing globalization locked in by international trade rules, and the explicit drive in farm policy to "get big or get out" under the notion that larger-scale agriculture could achieve economies of scale and better integrate with global markets. In reality, the policy of discarding smaller scale farmers and promoting industrial-scale agriculture has increased rural poverty, frayed the fabric of rural communities, and devastated local environments and waterways—while contributing to fewer choices for healthy foods for consumers. In "The Curse of Bigness, Antitrust in the New Gilded Age," Tim Wu explains, "As a business gets larger, it begins to enjoy a different kind of advantage having less to do with efficiencies of operation, and more to do with its ability to wield economic and political power, by itself or in conjunction with others. In other words, a firm may not actually become more efficient as it gets larger but may become better at raising prices or keeping out competitors."[1] This is as true in agriculture as in other sectors.

The four-firm concentration (C4) ratio measures the degree to which the top four firms control a given industry. In testimony to Congress in 2001, USDA Chief Economist Keith Collins reported, "The four-firm concentration ratio for steer and heifer slaughter rose from 50% in 1985 to 82% in 2000 but has remained stable since the mid-1990s. The four largest hog slaughter firms accounted for 56% of total commercial hog slaughter in 2000, up from 40% in 1990 and 34% in 1980."[2] The overall trend of increasing consolidation in the meat industry has continued since 2000, evolving into what today is a highly concentrated global meat complex controlling inputs, production and processing of mass quantities of food animals.[3] Reports of the USDA's Economic Research Service and Grain Inspection, Packers and Stockyards Administration (GIPSA), which was shuttered by the Trump administration, tracked C4 ratios for livestock slaughter for many years. Compiling reports from 2013 and 2016 (the last year it was produced), we see the consolidation of this corporate power in many sectors.

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Table 01: Four-firm concentration in Livestock Slaughter, 2002-2015

	Total value Purchases (%)	Steers and heifers	Cows and bulls	Sheep and lambs	Hogs
2002	64	79	39	65	55
2003	69	80	44	65	64
2004	67	79	43	65	64
2005	67	80	48	70	64
2006	66	81	54	68	61
2007	66	80	55	70	65
2008	68	79	55	70	65
2009	71	81	54	70	63
2010	67	85	53	65	65
2011	67	84	53	59	64
2012	68	85	56	62	64
2013	67	85	60	59	64
2014	67	83	57	58	62
2015	68	85	57	57	66

Compilation of 2013 and 2016 GIPSA reports

The story is similar for other aspects of crop and animal production, as well as inputs. For example, by 2018 just four firms (DowDupont, Chemchina, Bayer and BASF) controlled over 60% of global proprietary seed sales, consolidated through mergers and acquisitions from the six major agrochemical/seed firms that existed in 2013.[4] In 1975, the four largest corn seed firms controlled 59% of the market; by 2015, they controlled 85%.[5] By 2015, two of those corporations—DowDupont and Bayer—controlled fully 78% of the corn seed market.[6]

Table 02: Concentration in the U.S. Protein Sector

Commodity & CR4^	Firm Rankings
Broilers (51% CR4)*	1. Tyson Foods ** 2. Pilgrim's (owned by JBS) 3. Sanderson Farms Inc. 4. Perdue
*Note that JBS and Tyson each have more than double the market share of Sanderson Farms or Perdue.	
Turkeys (57% CR4)*	1. Butterball** 2. Jennie-O 3. Cargill 4. Farbest Foods
Steer & Heifer Slaughter (85% CR4)*	1. Tyson** 2. JBS 3. Cargill 4. National Beef
*Note that the top three firms have three-fourth of the market.	

Table 02: Concentration in the U.S. Protein Sector

Commodity & CR4^	Firm Rankings
Pork Slaughter (66% CR4)*	Smithfield/WH Group*** JBS Tyson Hormel

^CR4 refers to the percent of the market controlled by the top four firms.

*Source: USDA GIPSA 2016

**Sources: Watts poultry USA March 2017; Tyson Facebook

Chart Source: Hendrickson, Howard & Douglas.

American farming underwent a massive structural transformation in the '80s and '90s as the U.S. prepared for entry into the World Trade Organization (WTO) and the implementation of the Agreement on Agriculture that the U.S. helped craft.[7] Subsequent global trade rules both under WTO and country-specific trade and investment agreements, including the North American Free Trade Agreement (NAFTA), have promoted and entrenched this corporatization of farming and the rise of these agrochemical corporations as global actors without allegiance to a particular country and sourcing their supply chains from across the globe.

As a result of these changes, decisions and profits have become more concentrated in the hands of just a few corporations. Meanwhile farmers and farmworkers take on even more risks and debt, exacerbating the financial impacts of structural racism and entrenched discrimination against black and minority farmers within the USDA. In this industrialized model, much of the equipment, buildings and even feeder animals in factory-style operations don't come from the local community but are supplied under contract by giant meat processors such as JBS and Tyson. Significantly, nearly all U.S. pork and poultry production is now conducted under this system, where the companies own the animals while the farmers take on the risk and cost of production. Unfair contracts are exemplified by the tournament system under which farmers are paid based on a nontransparent ranking system that compares each farmer's performance against his neighbors'. The winners are rewarded while the losers are paid so little that many go out of business.[8]

Large-scale industrial feedlots that fatten beef cattle prior to slaughter now dominate the U.S. industry. Feedlots used to be smaller, family-owned operations but are now increasingly owned and operated by meatpacking companies such as Cargill and JBS and can hold more than 18,000 head of cattle at a time.[9] The same trends hold true for pork

Figure 01: Change in market share of the largest four U.S. corn seed firms

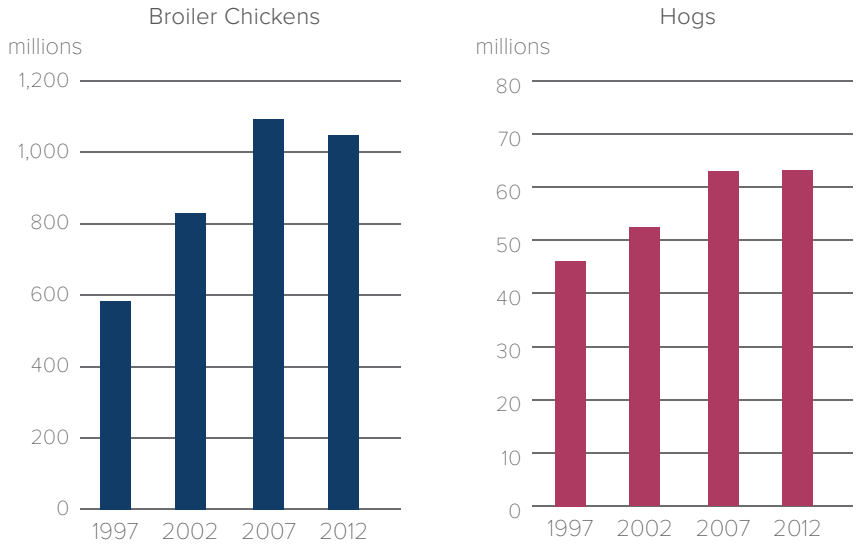
Source: Kelloway & Miller

and poultry production. For example, in 1992 the average number of laying hens per site was 399,467; by 2012 the number jumped to 695,743.[10]

Even the purchase, use and repair of farm equipment is affected by corporate concentration. Two companies manufacture nearly half of essential farm machinery including tractors, and these companies have used copyright laws to forbid farmers from editing tractor software. As the Open Markets Institute reports, "In many cases, farmers can't change engine settings, can't retrofit old equipment with new features, and can't modify their tractors to meet new environmental standards without going through the manufacturer."[11] Without public and regulatory pushback, this corporate capture is likely to accelerate as Big Data and agribusiness promote "smart agriculture" including drones, sensors, robots and other high-tech, proprietary systems as the new frontier in so-called "precision agriculture" techniques.[12] Corporate control over data and other technological innovations further weakens farmers' access to information on markets, production choices and the likely impacts of climate change, and has already contributed to a loss of biodiversity and decreased climate resilience.[13]

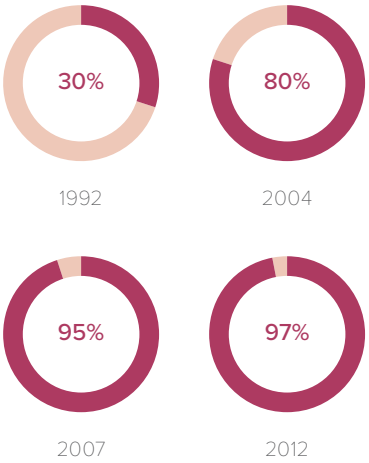
Despite these setbacks, tools are available to neutralize and push back on corporate concentration and control of agriculture. U.S. federal agencies have significant authority to address many of the destructive practices and anticompetitive conditions that have become normalized over the past decade. The Federal Trade Commission and the courts have previously tackled anticompetitive practices such as restrictions on consumers' right to repair.[14] Farmers pushing back against anti-competitive practices spurred the Department of Justice and USDA to conduct hearings in 2010, and USDA to propose rules under GIPSA mandating fairer contracts and other protections.[15] While these rules were subsequently watered down and then dumped by the Trump administration, for the first time in decades, presidential candidates are focusing on excessive corporate power and specifically its pernicious impacts

Figure 02: Number of Broiler Chickens and Hogs on Factory Farms in the U.S



Source: Food & Water Watch

Figure 03: Share of Hogs on Operations Larger than 2,000 Head



Source: Food & Water Watch

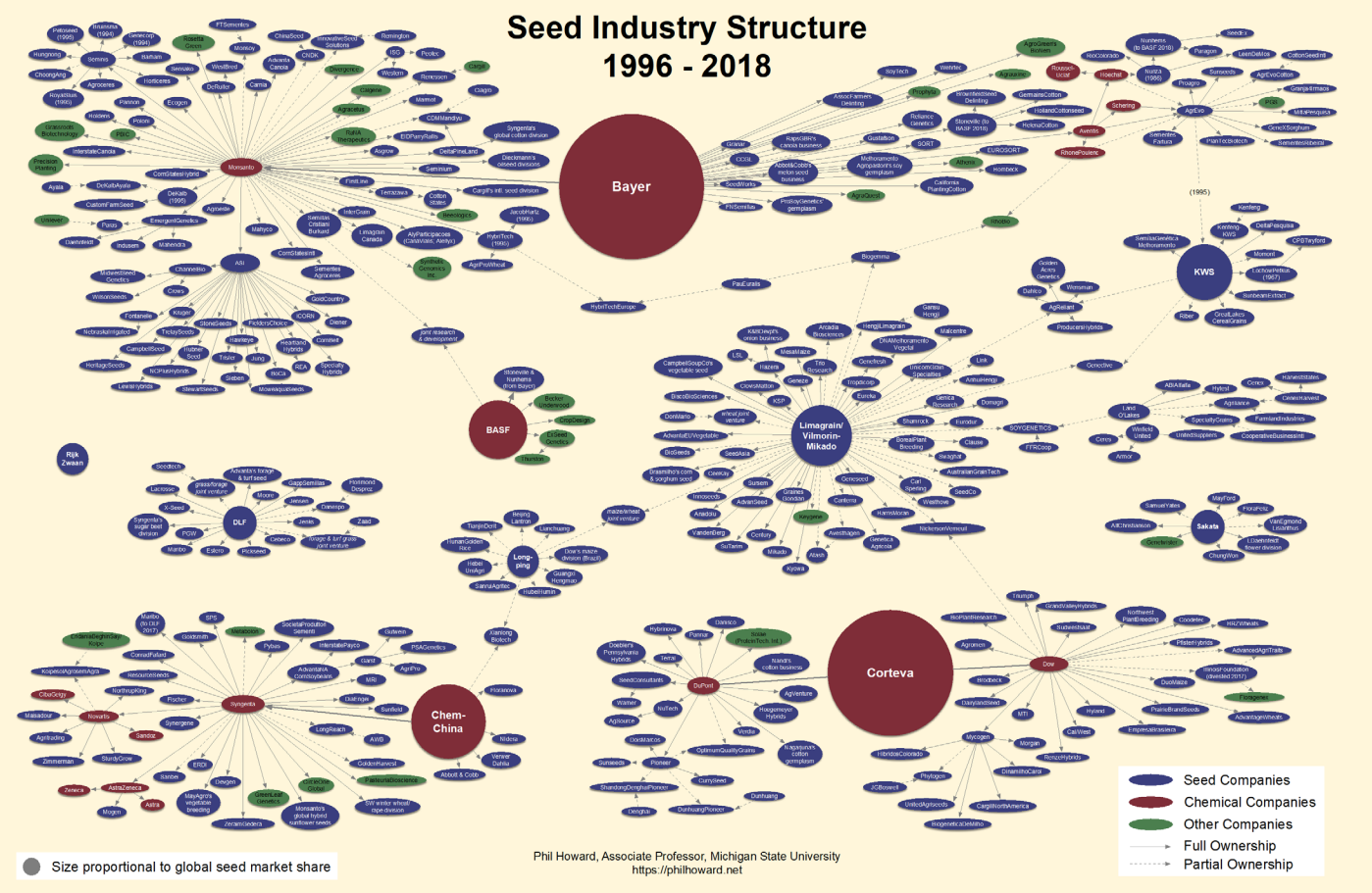


Chart source: Philip Howard

on farms, farmers and rural communities. Proposals to reform U.S. antitrust laws and address market concentration are being promoted by both mainstream conservative think-tanks and progressive policy organizations. The time is ripe for action and meaningful reform.

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REVISITING CRISIS BY DESIGN

AGRICULTURAL COMMODITY EXPOSURE TO FINANCIAL MARKET INSTRUMENTS AND RISKS

- The interconnectedness between farmers and the financial system, as well as between agricultural commodities and price risk management tools, has increased dramatically in recent years.
- Relentless industry opposition to rules designed to prevent and limit excessive speculation by financial entities continues to make even limited reforms difficult to enforce.
- U.S. commodity derivatives market contracts influence global commodity prices in part because they are traded in exchanges in dozens of countries, so U.S. market crises are likewise transmitted globally.

The extent of interconnectedness between farmers and the financial system and between agricultural commodity prices and financial risk management tools, such as futures and options contracts, has increased both in degree and kind over the last thirty years. By 1991, the author of "The Manipulation of Commodity Prices—The Unprosecutable Crime" had written that "The growth of commodity futures contracts in the last thirty years has been explosive."[1] However, it was not just that so many more contracts were being traded but that transactions of futures contracts based on interest rates and foreign currency exchange rates had greatly exceeded those of contracts based on the value of agricultural commodities.

The consequences of a larger but poorly regulated financial system exploded public awareness during the 2007-2009 financial industry insolvencies. The largest banks were bailed out by $29 trillion in Federal Reserve Bank emergency loans,[2] but the banks' reckless practices cost the remainder of the U.S. economy not bailed out $20 trillion "and counting" according to a Better Markets report.[3] Among those practices was excessive speculation in physical commodity contracts that created a "boom and bust" in prices, whose mechanisms are described in detail below.[4]

Standardized data on the interconnectedness between agricultural commodity contracts and financial commodity (e.g., interest rate, exchange rate) contracts is lacking. There is nothing in the Historical Highlights of the USDA agricultural census, 1987 to 2017, to describe changes in the relationship of agriculture to the financial system since the farm mortgage crisis of the 1980s.[5] The "financial innovations" of 1987, when *Crisis by Design* was published, were the stock market index futures derived from the value of stocks in the Standard & Poor's 500 index and other indices.[6] But unless you were a farmer with corporate stock shares or a member of a cooperative that played the futures markets, in 1987 your exposure to the financial system was largely confined to mortgage interest rates and farmland valuations that served as collateral for loans from your banker.

Today the interconnectedness of the financial and agricultural markets is pervasive. The United Nations Conference on Trade and Development uses an umbrella term to describe this interconnectedness for non-agricultural, as well as agricultural, commodities. "Financialization" refers to both the deregulation of the financial services sector beginning the late 1980s and the increasing dominance of "self-regulated" or unregulated financial actors

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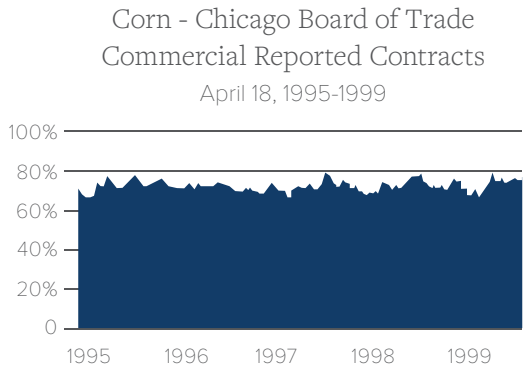

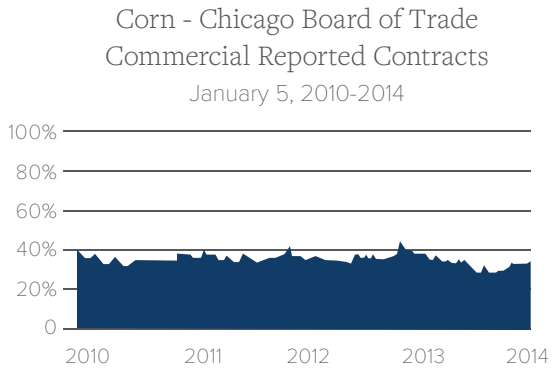

and instruments in the operations of formerly non-finance dominant firms.[7]

For example, in financialization, a company publicly known for producing meat, such as JBS, makes more money speculating on the value of foreign exchange contracts, ostensibly related to its commodity trading, than it does by producing and commercializing commodities.[8] In financialization, the actors, motives, contracts, trading technologies and even the trading venues change the role of financial services in relation to other economic sectors. For agricultural and other physical commodities, the historic financial services role of assisting the price risk management of commercial entities trading in commodity derivatives markets, such as the Chicago Board of Trade (CBOT), changes to dominating the trading of physical commodity contracts as part of financial portfolio diversification for institutional clients, such as pension funds. The shift from commercial hedger dominance to financial entity dominance is illustrated in the Better Markets tabulated charts above for 1995-2014 CBOT corn contracts.[9] The charts report the percentage of corn contracts traded by commercial users and traders of corn. The Better Markets analysis does not explain the reduction from nearly 80% in 1999 to about 40% of commercial user and trader reported trades in 2010.

However, a nearly certain factor in the financial entity dominance of the CBOT corn contract is the conversion in 2000 of the CBOT (and exchanges around the world) from being a nonprofit public utility to a for-profit corporation (termed "demutualization") seeking to maximize trade volume and trading fees in hyper-speed electronic transactions and trade data reporting.[10] Another symbiotic factor in the dominance of financial speculators over commercial hedgers in physical commodity contracts was the Commodity Futures Modernization Act of 2000, which enabled legally limitless transactions by financial actors on the for-profit maximization exchanges.[11]

When *Crisis by Design* was published in 1987, regulated derivatives instruments were agricultural futures and options contracts, largely used by traders and processors to manage raw materials price risks, e.g., the grain cost of breakfast cereals. Those complex but practical financial instruments have been dwarfed by speculative financial trading greatly exceeding the price hedging needs of traders and processors. By 2012, agricultural contracts were an infinitesimal fraction of financial futures commodity contract transactions, both in number and value.[12] When agricultural contracts are bundled with non-agricultural contracts into commodity index funds contracts, the fund formula, rather than supply and demand fundamentals, drive prices.

Another factor affecting agricultural prices are Automated Trading Systems (ATS), computer trading algorithms responding to other algorithms, that transact 99% plus of financial commodity contracts and almost 70% of agricultural contracts.[13] Orthodox theory understands "liquidity" to refer to the volume of capital that enables transactions. What IATP has called ATS "phantom liquidity",[14] i.e., contracts that appear and disappear on trading screens too quickly for commercial hedger use, creates a series of micro-shocks to price formation that can induce price volatility and favors those with trading venue access via hyper-speed computing power.

Relentless financial industry pressure has severely undermined the CFTC's ability to regulate these markets. The CFTC depends on Congress for the resources to monitor trading data for possible cases of market manipulation and excessive speculation. Nowhere near adequate levels of resources have been provided, even as the number and complexity of the contracts under CFTC authority has increased exponentially. Proposals to Congress to make the CFTC a self-financed agency, like all other financial regulatory agencies, have failed.[15] As a result, CFTC enforcement depends on market participant self-reporting of rule violations,[16] which elicits enforcement actions, but is directed mostly at relatively small-scale traders.

The CFTC delegates to the exchanges the authority to ensure that market participants do not hold contract positions in excess of their hedging requirements.[17] Effective exchange monitoring of excessive contract positions was weakened in 2000, when the three major nonprofit trading venues, the Chicago Mercantile Exchange, the CBOT and the New York Mercantile Exchange, converted into for-profit shareholder corporations.[18] They had a duty to shareholders to maximize transactions and trading fees, rather than monitor positions in the public interest.

The failure of exchange self-regulation to effectively monitor position limits and prevent excessive speculation was a major factor in what a Better Markets report called the 2005-2010 commodities "boom and bust."[19] Commodity index funds, such as those of Goldman Sachs/Standard and Poor's, packaged agricultural futures contracts together with those of energy and metals contracts to which position limits did not apply. Pension funds, endowments and mutual funds bought the index products, not to hedge commodity price risks, but to "bet long" to increase prices, regardless of market supply demand fundamentals analyzed by commercial hedgers and traditional non-index speculators.

The Dodd Frank Act of 2010 authorized the CFTC to set position limits, not just for more agricultural contracts than the eight authorized by the Commodity Exchange Act, but also for metals and energy contracts. However, a successful Wall Street lawsuit in 2012[20] forced the CFTC to both re-propose the rule, review thousands of industry comments and provide a new cost-benefit analysis. By November 2013, when the rule was re-proposed to take into account dozens of Wall Street proposed loopholes, the CFTC had received 23,000 regulatory comments.[21] Wall Street and the exchanges continued to oppose any significant limits on derivatives trading.[22]

When futures contract prices fail to provide reliable benchmark prices for grain elevators, the elevators may cease to allow farmers to forward contract their grain and oilseed production before harvest.[23] Without forward contracting, farmers may lack the capital required for their operations and even living expenses.

U.S. commodity market contracts are globally influential in no small part because they are traded in exchanges in dozens of countries. Many developing country governments use these global derivatives prices as reference prices for their agriculture policy.[24] If these derivatives prices are distorted by excessive speculation, policies based on the reference prices may be distorted too.

Price shocks and volatility are what financialization actors seek to manage to their own benefit and that of their clients. Most public focus on ATS and algorithmic trading has concerned price volatility and loss of risk management capacity in the stock markets.[25] The exchanges must report open contract positions (bidders have not found sellers) at the end of the trading day. Because most ATS commodity trading strategies are designed to close out trading positions before the end of the day, it is very difficult for the agency to assess if excessive speculation in one or more contracts is occurring. The study of intraday price volatility and price disruption in commodities recently undertaken by academics and by the CFTC[26] should become a basis for robust rulemaking.

IATP has urged the CFTC to study the impact of market events with uncertain price effects, e.g., the impact of African Swine Fever on lean hog futures prices, and ATS price risk management capacity of such events.[27] As extreme weather events exacerbated by climate change increase in severity and prevalence, the impact of those events on agriculture commodity prices and price risk management capacity will challenge the risk management capacity of all actors in the commodity supply chains, including the CFTC and other commodity derivatives regulators.[28] If regulators persist in allowing the purveyors of ATS to regulate themselves, they may soon find themselves in the position of regulators and legislators who allowed the Big Tech giants to self-regulate and now struggle to understand how these giants are disrupting economies and even democracies.

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GLOBALIZATION

- The consolidation of global and bilateral free trade agreements has empowered corporations to operate seamlessly across borders to the detriment of farmers and the environment.
- There has been a consistent pattern of dumping of agricultural commodities that has hurt family farmers in the global north and south and consolidated corporate power over supply chains.
- While U.S. production doesn't dominate world markets as it once did, global traders can shift among suppliers and buyers, transferring risks to farmers.

While the original *Crisis by Design* accurately described the farm policies that drove increases in corporate concentration and the decimation of farm economies, it did not predict the expansion of global trade rules that came with the formation of the World Trade Organization (WTO) or the huge increase in bilateral and regional trade deals that go beyond WTO commitments. Those agreements were designed to facilitate exchanges of goods, services and investments across borders, not to promote fair or sustainable agricultural systems or economic development. They led to the expansion of U.S. based agribusinesses into other aspects of supply chains and the rise of transnational companies based in the U.S. and emerging economies.

The emergence of global, bilateral and plurilateral trade deals set the stage for many of these changes. In 1996, Renato Ruggerio, the first director general of the newly formed WTO, proclaimed, "We are no longer writing the rules of interaction among separate national economies. We are writing the constitution of a single global economy."[1] He went on to insist that the new rules could rebalance the scales between rich and poor countries, but in fact, the WTO along with the North American Free Trade Agreement (NAFTA) and the countless bilateral and regional trade deals that followed have knitted economies together in ways that have lowered social and environmental protections. It was not developing countries who were empowered but instead vast corporations seamlessly operating across borders. This has been especially true in agriculture, where the traditional ABCD companies (Archer Daniels Midland/Bunge/Cargill/Dreyfuss) that had focused on grain trading expanded vertically and horizontally into other aspects of supply chains and, at the same time, were supplemented by foreign transnational corporations.[2] Currently, the biggest meat company in the U.S. is the Brazilian JBS, the biggest pork company is the Chinese-owned Smithfield, and the biggest seed and pesticide company is the German-owned Bayer. In each case, the nominal nationality is much less important than its market power.

The famous imperative to "get big or get out" drove U.S. farmers to expand their production for export. IATP has been documenting the extent of dumping, i.e., exporting farm goods at below the cost of production, since the late 1990s.[3] With some brief exceptions, there has been a clear and consistent pattern of cheap exports invading global markets, to the detriment of farmers. As of 2018, the rates of dumping stood at 29% percent for wheat and cotton, 9% nine percent for corn, 17% percent for soybeans and negative 4%four percent for rice.[4]

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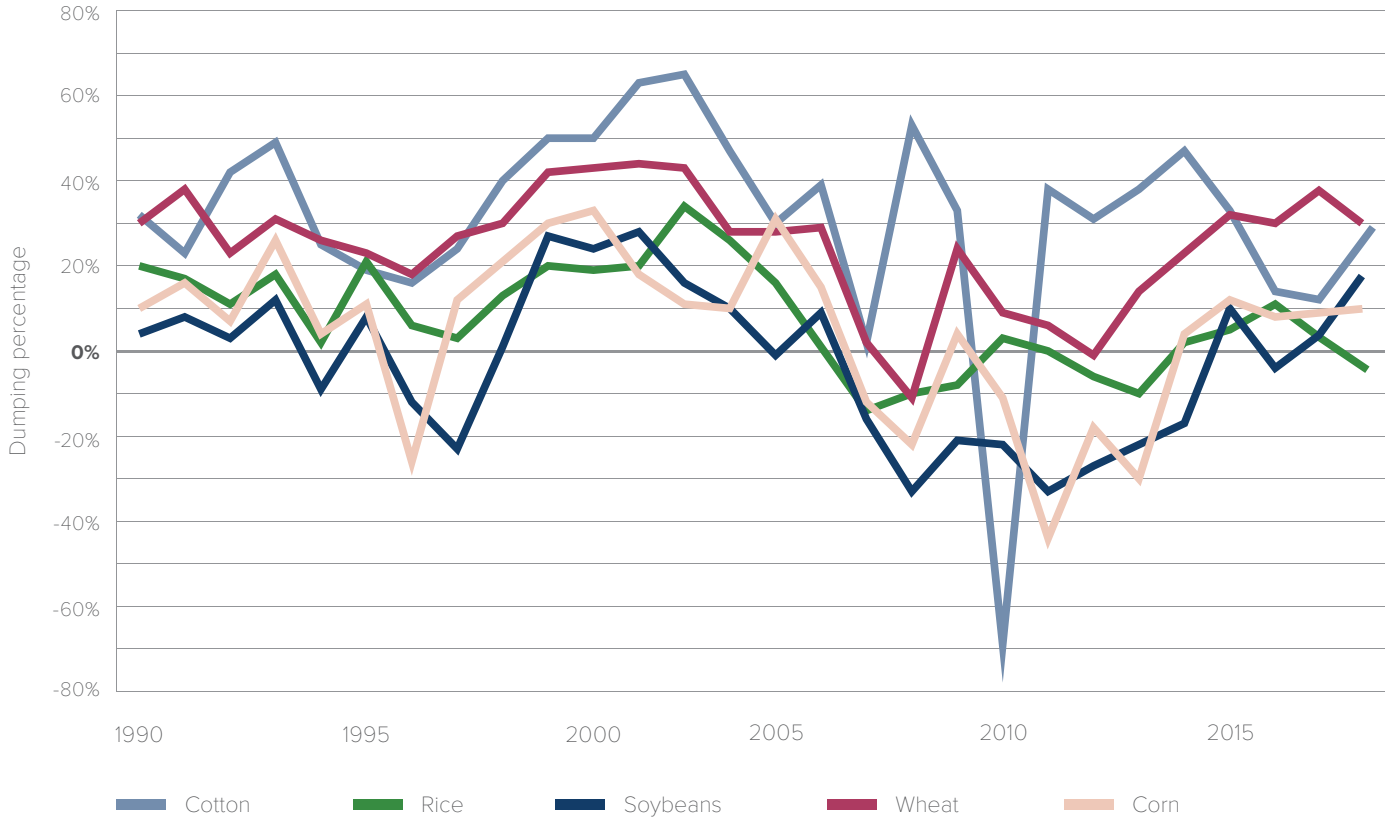
Graph 1: Dumping rates for major U.S. commodities, 1990-2018



Note: No data available for 2004.

These cheap exports had devastating impacts on farmers both in the U.S. and developing countries. Under NAFTA, for example, US exports of cheap corn to Mexico increased more than 400 percent. According to studies, some 4.9 million Mexican family farmers were displaced between 1991 and 2007, with about three million becoming seasonal workers in agro-export industries.[5]

The deregulation of U.S. financial and commodity markets, followed by renewable energy legislation that dramatically increased the demand for ethanol, and crop failures in Australia and Russia, led to a huge increase in commodity prices in 2007-2008. The Food Price Crisis led to riots in many developing countries. That initial price spike was repeated in 2011-2012 when a major drought in the U.S. caused grain prices to increase again. These periods of chaos in global markets created openings for corporations to consolidate power over supply chains to the detriment of farmers. When one family farm failed, it was often bought out by ever larger farms and corporations that sold goods into ever more concentrated supply chains. These firms are in the business of adding value to primary commodities, whether they are fattening animals or turning corn into ethanol. They are happy to keep farmgate prices low, since they can take profits at other points in the supply chain. In addition, their enormous size means they can sustain short-term prices swings or even profit from them, as long as they successfully predict the direction of those changes. Farmers, on the other hand, may defer losses temporarily but often cannot weather successive rounds of boom or bust.

U.S. production does not dominate world markets the way it once did. For example, in 1987, the U.S. exported 21 million tons of soybeans. It was by far the biggest exporter at that time, followed by Brazil with just 3 million tons. The U.S. export share held fairly steady until about 2007, when exports increased substantially as China became the leading importer. As of 2016, the U.S. exported nearly three times as much soybeans as it had in the 1980s (58 million tons), but now it is followed closely by Brazil at 52 million tons. In some years, Brazil exports more than the U.S. In 2015, Brazil exported 58 million tons of soy compared to 54 million from the U.S. China is by far the biggest soybean import market (84 million tons), followed by Mexico (4 million). While the U.S. is still the leading exporter of corn, with 56 million tons in 2016, the combined exports of Brazil and Argentina nearly match that amount. As of 2016,

Russia was the lead exporter of wheat, with 25 million tons, followed by the U.S., Canada and France.[6]

Increased dependence on export markets has increased vulnerability. Trump's imposition of tariffs led to retaliatory tariffs and decreases in purchases of U.S. goods by China. From October to July 2019, the U.S. exported 10.6 million metric tons of soybeans to China, compared to 25 million tons for the same period in 2018. Prices have dropped from around $10 a bushel in 2016 to near $8 a bushel as of September 2019. While they increased to about $9 a bushel after the announcement of "Phase One" of a trade arrangement between the U.S. and China, the damage caused by erratic markets and prices has not been resolved.

While Trump's bailout program provided some temporary relief from those losses, the situation highlights farmers' vulnerability to the whims of presidents and politics. Global grain traders will simply shift purchases to other countries, with farmers assuming the risks of these trade wars, as well as other forms of volatility caused by speculative investments and climate change.

There are some rays of hope. The original *Crisis by Design* reported on the problems caused by U.S. food aid. For many years, the U.S. used shipment of international in-kind food aid to absorb excess production and open new markets. Shipping U.S. food to countries in crisis, besides being much more expensive than providing cash for local and regional purchases, is much slower than arranging for local purchases. In some cases, by the time the food aid arrived, the initial crisis was over, and the aid shipments displaced local harvests.

After considerable advocacy from U.S. development NGOs, the 2008 Farm Bill included a pilot program to study local and regional purchase of food aid. The initial program was expanded and made permanent in the 2014 Farm Bill. It is still just a fraction of total food aid deliveries, but it has opened the door to future changes. These changes also help to debunk the notion that U.S. farmers must feed the world, instead of supporting national efforts to strengthen local food supplies.[7]

That change in narrative matters. The concept of food sovereignty—that each country has the right to democratically determine its own food system and to prioritize local needs over exports—has gained ground since it was introduced by La Via Campesina in Nyeleni, Mali in 2007. It coincides with a period in which U.S. farmers are questioning reliance on cheap commodity crops and grain exports. Unfortunately, U.S. farm and trade policy does not yet support a real shift in incentives.

Still, another consequence of globalization is that the U.S. can learn from experiences in other countries. Mexico has initiated a program to achieve self-sufficiency in corn and other basic grains, starting with production incentives for small-scale farmers that include guaranteed prices set to cover costs plus a reasonable return. Canada's dairy supply management program provides important lessons on new ways to balance farmers' needs for stability at prices that are fair to both farmers and consumers. Coupled with new efforts to rein in corporate power in the food system, those experiences could point the way to a new kind of farm program in the U.S., one that ensures parity, sustainability and equity, all central goals outlined in the original *Crisis by Design*.

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LAND TENURE

- Increases in farm debt, bankruptcies and land values have far outstripped farm assets and income, making it increasingly difficult for farmers to hold on to their land.
- Corporate and investor-owned land has doubled since the 1980s, and the number of farms owned by corporations and investors rose by nearly 10% between 2012 and 2017.
- Farmers and landowners are aging while young and beginning farmers are eager to start operations. Yet, many aging farmers and landowners do not have a succession plan, and young and beginning farmers cite lack of access to land as their biggest challenge.
- There are fewer conservation practices on rented land, and fewer yet when farm profits are low.

Land is the most critical resource for a farmer. It's also challenging to access and afford, especially as farm debt is at a record high and farmers are facing the worst farm economy since the 1980s. Farmland value and ownership determine everything from production and conservation decisions, to succession planning, to whether young, beginning and socially disadvantaged farmers are able to start and maintain an operation. Today—similar to the last farm crisis —the costs for seeds, inputs and other capital are higher than what farmers are getting paid for their crops. This stark reality is jeopardizing farmers' ability to hold on to their land, whether they own or rent.

DEBT, LAND VALUES, AND CORPORATE OWNERSHIP:

46% of the cropland and 72% of the pastureland in the U.S. is owner-operated.[1] Small farms (as defined by the USDA Census of Agriculture) are the most likely type of farm to be owned by operators. Large farm operations are more commonly a mixture of rented and owned land.[2] In today's agriculture economy, where consolidation is encouraged by farm policy that prioritizes high yields and overproduction over everything else, renting land can be the only viable option.

Of the 39% of farmland in the U.S. that is rented, about one-third—roughly 10% of all U.S. farmland—is owned by corporations or trusts.[3] The 1987 Census of Agriculture showed that at that time, only 5% of U.S. farmland was owned by corporations.[4] That number has now doubled and the trend is continuing; between 2012 and 2017, the number of corporate and investor-owned farms rose by 9.4%. Investors are increasingly using agricultural land as an investment tool, including through Real Estate Investment Trusts, which allow investors to enjoy the profits of rising land values, but leave farmers to deal with the consequences of climate change and low commodity prices.

Farm bankruptcies and debt are on the rise, which could lead to a transfer of more land to corporations and investors. Farm bankruptcies rose 24% between September 2018 and September 2019, and were at decade-high levels in some parts of the country.[5] Farm debt is at a record high of $415 billion and has grown by nearly 40% since 2012, while asset values have climbed only 17%.[6] Meanwhile,

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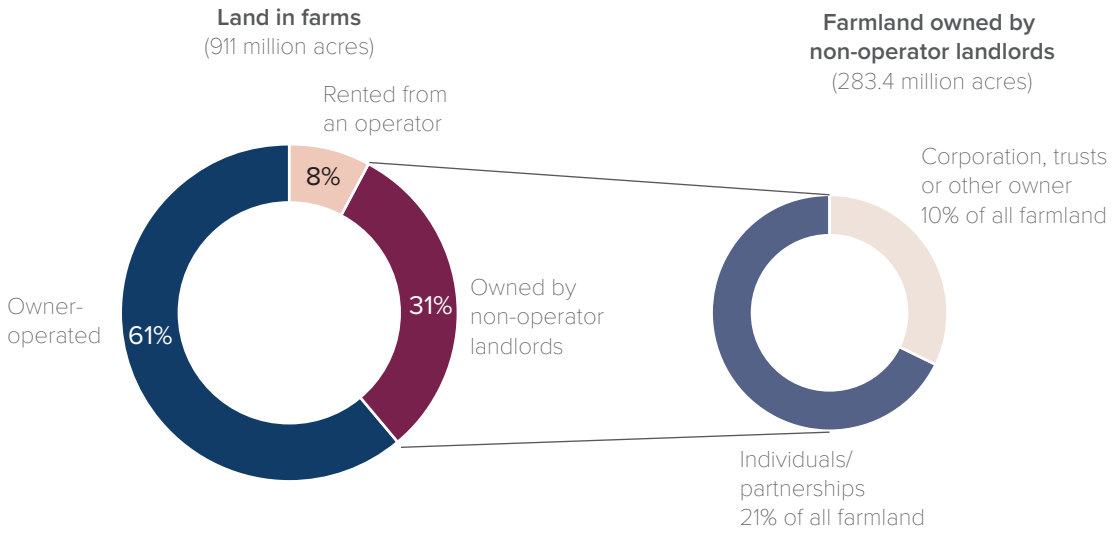
Figure 1: Acres owned by farmed operators, operator landlords, and non-operator landlords, 2014



Note: Data exclude Alask and Hawaii.
Source: USDA, Economic Research Service and National Agricultural Statistics Service 2014 Tenure, Ownership, and Transition of Agricultural Land (TOTAL) survey.

the Trump administration's trade war has driven down commodity prices, climate change has caused nationwide crop and livestock losses, and bottomed-out interest rates can only go up. This perfect storm has put many farmers in crisis—for dairy alone, the number of farms declined by 20% between 2012 and 2017.[7] This precarious situation could drastically change who owns the land and how it is used.

Farmland value has been steadily rising since the last farm crisis to a 2018 average of $3,140 per acre.[8] This has allowed landowners to borrow more money against their real estate to cover low prices, putting them further in debt as they hope for a good year. Renters are struggling to cover higher cash rents, and in many cases are also borrowing more money to do so.

Land values and cash rents have leveled off since 2014 and are just beginning to fall in some areas. Several states, including major agricultural states Minnesota and Iowa, saw a decrease in farmland values from 2018 to 2019.[9] In Minnesota, cash rents have fallen nearly 12% since 2014.[10] These declines coincide with the downturn in crop and livestock prices and reduced farm income. Paired with rising debt burdens, these conditions mirror those just before the 1980s farm crisis, where farmers' debt burdens increased as land values plummeted, causing a mass liquidation of farms.

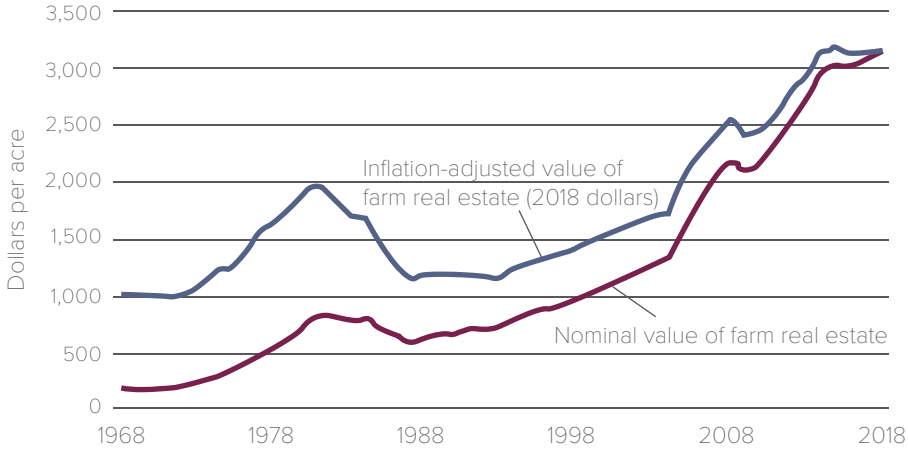
DEMOGRAPHICS AND SUCCESSION PLANNING:

The demographics of farmers and landowners have shifted. Landlords are on average 66.5 years old and the average farm operator is 58.3 years old.[11] This has increased since 1987 when the average farmer was 52 years old. The aging population of farmers and landlords will result in the transfer of significant amounts of farmland in the near future. Most land is expected to be passed on to the next generation, even if they never farm it. Still, the majority of farm owners do not have an exit plan.

Meanwhile, the number of young and beginning farmers is on the rise, and they cite access to land as their primary challenge.[12] Young and beginning farmers have higher student debt burdens than any previous generation and little collateral to access credit. This makes purchasing farmland challenging but finding land to rent can be just as hard. Most landlords have long-term relationships with their tenants and a majority of farmland is kept within the family. There's also a mismatch in needs; many older farmers and landlords have thousands of acres to sell or rent, but young and beginning farmers tend to maintain smaller operations and do not need such massive tracts of land.

In response to these barriers, USDA has increased its support to beginning farmers through programs like the Beginning Farmer and Rancher Development Program (BFRDP). The federal money invested in BFRDP supports the development, education and mentoring of beginning farmers. This program is a necessary investment but does

Figure 2: Average U.S. farm real estate value, nominal and real (inflation adjusted), 1968-2018



Note: Farm real estate includes land and buildings. Data reflect values as of June 1 of each year. The annual GDP implicit price deflator is used to convert nominal values to 2018 U.S. dollars (Department of Commerce, Bureau of Economic Analysis). For 2018, the average of the first and second quarter price deflators is used. Data exclude Alaska and Hawaii.
Source: USDA, Economic Research Service using annual National farm real estate data from USDA, National Agricultural Statistics Service, QuickStats.

not counter the systemic challenges that farmers are facing, especially those just starting.

One of the starkest demographic shifts in land ownership has been among black farmers. Since 1900, black farmers have lost 90% of their land. In 2012, 1.4% of the nation's farmers were black in comparison to the turn of the 20th century, when there were more black farmers than white farmers.[13] This decline happened for a number of reasons, including black farmers fleeing the Jim Crow South to the North during the Great Migration, discriminatory lending practices, heirs' property laws and systemic racism that stacked the deck against black farmers in countless other ways.

Heirs' property has been a major factor in black land loss. Black landowners frequently lacked a will transferring ownership of their property when they died, oftentimes due to distrust, lack of access or lack of knowledge of the legal system. This caused the land to be split among all known descendants, or heirs. Over time, properties became further split until there were sometimes hundreds of heirs. This made it nearly impossible to use the property as collateral, to subdivide it or to develop it. It also led to many partition sales, where all the land was forcibly sold in an auction when owners couldn't agree on how to split it.

The 2018 Farm Bill began to address heirs' property issues by allowing landowners without a clear title to obtain a farm number, which provides access to many USDA programs including lending and disaster relief. This is a long-overdue step in the right direction but does not make up for decades of removing black farmers from their land.

CONSERVATION:

The original *Crisis by Design* summarized what was happening in the 1980s and is still happening today:

> *"Low farm prices always force farmers to increase their production. Like any worker whose wages are cut in half, farmers faced with falling prices must work twice as hard and sell twice as much just to cover their bills. This has led to an abandonment of careful soil and water conservation practices and to the tilling of marginal, highly erodible land."*

Conservation practices are increasingly necessary as the impacts of climate change impacts worsen. Cover cropping, integrating crops and livestock, no-till, diversifying crop rotations, and taking land out of production can boost soil health, sequester carbon, and make farms more resilient to extreme weather events. Yet, adoption of conservation practices is low. There tend to be fewer conservation practices on rented land.[14] This is partially because much rented land is operated by very large farms who are expanding their operations for intensive production to make up for low prices.

The farm bill must fundamentally restructure its programs to be more inclusive of small and mid-sized operations and dramatically increase funding, outreach, and technical assistance for conservation programs. In addition, data show that young and beginning farmers are more likely to implement best management practices for soil, water, nutrient, and pest management. Investment in young and beginning farmer programs double as investments in the conservation of our land.

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REVISITING CRISIS BY DESIGN

ORGANIC, AGROECOLOGICAL AND REGENERATIVE AGRICULTURE

- Organic agriculture has grown substantially since its beginnings as an alternative movement, including by more than 50% in the last 15 years.
- Agroecology, which also embraces social and cultural dimensions of agriculture, is expanding internationally, especially in developing countries, while the term regenerative agriculture is being used to encompass environmental concerns beyond organic.
- Maintenance and enforcement of high standards in the USDA National Organic Program requires ongoing vigilance. Regenerative agriculture, which can encompass even broader practices, lacks uniform recognized standards, raising concerns about co-optation when products are sold in the marketplace beyond local. In principle agroecological approaches focus on production intended for very local markets and quality assurance is based on relationships of trust between farmers and consumers.
- Mergers and acquisitions in the organic industry continue, just as in the conventional industry, with the attendant risk that founding principles could be eroded by corporations beholden to shareholders and result in downward pressure on prices paid to farmers.

At the time the original *Crisis by Design* was written, the focus was on what we now call conventional agriculture. Organic and sustainable agriculture were not prominent in the U.S. Farm Crisis of the '80s, nor were they highlighted by activists on the front lines. The focus of the movement, rather, was on the policies that were undermining family farm-based agriculture, regardless of agricultural practices.

Since then, organic production and the standards that guide it have expanded dramatically, as have other expressions of sustainable agriculture, most notably agroecology and regenerative agriculture.

Organic production had been an alternative to the direction of U.S. agriculture in the '40s and '50s, albeit with fringe appeal and little presence in the market. The agricultural practices encouraged by J.I. Rodale[1] beginning in the '40s, based in building soil as the foundation principal, found an audience in response to increasing use of chemical inputs—pesticides and fertilizers—from off farm, and the trend toward monoculture and away from diversity of crops and livestock, as described in *Crisis by Design*.

By the '70s, as the conditions for the farm crisis of the '80s were stewing, there was a sprinkling of dedicated farmers who recognized the need to develop standards for the practices on the ground, in order to create a market in which they could differentiate their products from those that came to be known as conventionally produced goods. At the same time, there was a growing demand from consumers who had read Rachel Carson's "Silent Spring," who had an inkling that the food offered in supermarkets was maybe not healthy.[2]

Several independent certifying organizations sprang up during the '70s and '80s, some private and others associated with state programs. But while there was general and broad agreement on the philosophy of organic farming, there was a lack of standardization across these certifiers in regard to crop production, as well as a lack of standards at all for livestock and for handling and processing. Even

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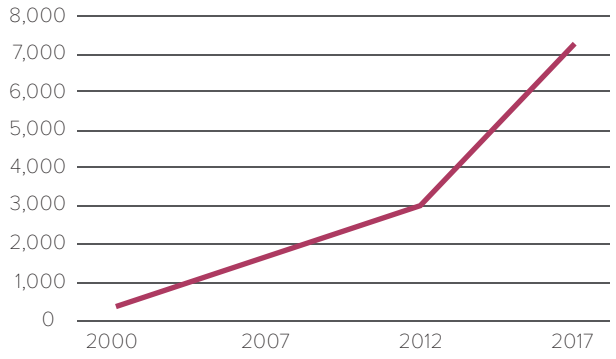
more significantly, as larger food companies became aware of the profit potential in organic foods, they wanted in. Many examples of "organic lite" surfaced in the market, where those generally agreed upon principles were watered down in significant ways. The fledging organic industry, in a non-typical move, then asked the federal government to step in to regulate it for standardization, consistency and enforcement.

Perhaps ironically, the failure of supply management legislation in the 1985 Farm Bill spurred the growth of organic in some sectors. Farmers were left with few options to control their supply and, therefore, their prices. Conditions were ripening for making a point of difference in food for consumers who were paying attention. With the realization that they were on their own, organizations like CROPP Cooperative started up in order to implement their own supply management program, using organic as a point of differentiation. They took on only as many farmers as met their standards and whose production they could sell at the price they set, using the "conventional" market to absorb any excess.[3]

It took over a decade from passage of the Organic Foods Production Act in 1990 to the full implementation of the regulations in 2002, with unprecedented numbers of commenters to ensure the new regulations were sufficiently rigorous. 2002 was the first year that organic agriculture was officially recognized by USDA and recorded in the census. That year, there were 12,000 certified organic farms in the U.S. totaling just under $400 million in sales. The 2017 census reports 18,000 organic farms and over $7 billion in revenue. So, while organic farms grew by 50% in that 15-year period, against the trend in agriculture in general, the per farm revenue from organic crops increased almost 18 times, reflecting an increasingly robust market, domestically and internationally.

Value of U.S. organic production (in $ millions)



Source: 2002, 2007 and 2017 U.S. Census of Agriculture

Organic retail sales reached over $50 billion for the first time in 2018. Significantly, year over year growth in organic food was 5.9%, while conventional growth was just 2.3%. In general, organic sales have grown by double digits for most of the last two decades.

Organic production has increased dramatically in other countries as well. According to surveys by the International Federation of Organic Agriculture Movements, global land under organic cultivation increased from 30.6 million hectares in 2007 to 69.8 million in 2017.[4] While this data covers certified organic production, there has also been a dramatic increase in agroecological production, which could be certified through more informal methods such as participatory certification or not certified but based on relationships of trust at the community level.

Alongside this growth in certified organic production, farmers around the world have embraced the principles of soil building, elimination of chemical inputs and expansion of biodiversity that characterize organic agriculture, with some important additions. The term regenerative agriculture has emerged in the U.S. to emphasize the synergies between agriculture and the natural environment, while operating within or outside of the system of certified organic agriculture.[5]

The term agroecology has emerged at the global level. Based on principles first described in the 1980s in Latin America, particularly in pioneering work by Dr. Miguel Altieri, agroecology emphasizes the interconnectedness among environmental, agricultural and social dimensions of food systems.[6] It includes the concept of a "dialogue of knowledge" among farmers and scientists. It has been embraced by social movements around the world, especially La Via Campesina, which represents small-scale producers.

The U.N. Committee on Food Security's High-Level Panel of Experts (HLPE) recently completed a study on agroecology as a solution to food security and nutrition. Acknowledging the transdisciplinary nature of agroecology and the diversity of definitions, the HLPE suggests "a concise and consolidated set of 13 agroecological principles related to: recycling; reducing the use of inputs; soil health; animal health and welfare; biodiversity; synergy (managing interactions); economic diversification; co-creation of knowledge (embracing local knowledge and global science); social values and diets; fairness; connectivity; land and natural resource governance; and participation."[7]

Many of these principles overlap with the definitions of organic agriculture, but they include a dimension of political agency and participation that reach beyond the definitions of organic agriculture. In his report to the United

Nations General Assembly on agroecology, U.N. Special Rapporteur on the Right to Food Olivier de Schutter emphasized that the most important policy support governments could provide (apart from removing obstacles such as corporate concentration) for this innovative approach was to invest in knowledge generation and social organizations, including farmer field schools and networks.[8]

A review of scientific literature examining social and economic indicators in 42 studies showed that adopting agroecological practices increased yields (in 60% of comparisons) and farm profitability (56% of comparisons).[9] Because of its emphasis on minimal use of external inputs, recycling of nutrients through a high reliance on biological processes and agrobiodiversity, agroecological practices can be labor intensive but not necessarily cash intensive.

Organic agriculture, regenerative agriculture and agroecology share some important traits. Taken together, they represent an important and growing alternative movement that responds to climate change, builds soils and enhances rural livelihoods. At the same time, the diversity of definitions of regenerative and agroecological production make them more compatible with local food systems based on relationships of trust than larger national or international markets.

The organic industry faces significant policy challenges today. Consumer interests have changed over the decades, expanding from the primary and general concern for personal health, to encompass animal welfare, climate change and social justice issues. Changes to organic standards, which are codified in federal regulations, require tedious, slow rulemaking. Over several years, the industry had done the hard work of agreeing on more prescriptive animal welfare language, passed by Congress at the tail end of the Obama administration but tragically allowed to die under the Trump administration.

Corporate concentration in the organic industry continues at a fast pace, as mainstream companies acquire organic brands in order to be able to participate in this robust and growing sector. Some of these acquisitions essentially leave the acquired organic brand alone to manage the business; others, however, become part of ambitious plans to grow the organic brand. This can result in various kinds of distortions; unrealistic stretch for supply; downward pressure on price paid to producers; or perhaps even downward pressure on standards.

And now, the organic industry faces a new challenge, that of highlighting that the basic principles of organic—building soil and soil health, deep-rooted plants, grass-based ruminants—are consistent with regenerative agriculture, which is being presented as the hope for minimizing climate change due to agriculture. There is currently no agreement on the definition of regenerative agriculture—and this is both the challenge and the opportunity, reminiscent of the status of organic back in the 1970s.

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RACE, ETHNICITY AND GENDER ANALYSIS

- Racial, ethnic and gender-based disparities in the U.S. agricultural and food system are most visible when we consider farm ownership and income from farm operations.
- The steady decline in the number of African American farmers and the share of their farmland ownership over the last century continue to affect the ability of the African American community to address ongoing discrimination and unequal access to information and loans.
- The current problems in the food and agricultural system impact each category of farm operators differently, depending on their ethnicity, gender, farm-size and crop type, as well as their differential access to information and institutional assistance such as loans. A detailed analysis of such disparities is needed.

As a result of massive transformations in the agricultural sector including around technology, finance and marketing, the nature of farming itself has been changing, impacting all farmers—white, black and minority. Data from the Census of Agriculture helps to understand how these factors have impacted distinct ethnic and racial groups and genders.[1] However, for a complete picture, such information needs to be complemented with qualitative data.

An analysis of data from the 2012 USDA Census of Agriculture, the 2014 Tenure and Ownership Agricultural Land survey and the 2013–2014 National Agricultural Worker Survey showed that:

> *From 2012 to 2014, white people comprised over 97 percent of non-farming landowners, 96 percent of owner-operators, and 86 percent of tenant operators. They also generated 98 percent of all farm-related income from land ownership and 97 percent of the income that comes from operating farms. On the other hand, farmers of color (Black, Asian, Native American, Pacific Islander, and those reporting more than one race) comprised less than 3 percent of non-farming landowners and less than 4 percent of owner-operators. They were more likely to be tenants than owners; they also owned less land and smaller farms and generated less wealth from farming than their white counterparts.*[2]

An initial analysis of data from the 2017 census shows that in 2017, 95.3% of the 3,540,690 farm-operators in the United States self-identified as white. Of these, only 1,473,011 of them identified farming as their primary occupation.[3] A U.S. Government Accountability Office (GAO) analysis has also shown that Socially Disadvantaged Farmers and Ranchers (SDFRs), including women, accounted for 41% of all producers, operated 21% of all acres and produced 13% of the total market value of production; in fact, 30% of them were owner-operators.[4]

> *Of these SDFRs 88.3 percent were women of any race, 8.1 percent were Hispanic, 4.2 were American Indian or Alaska Native, 3.3 percent were Black or African American and 1.6 percent were of Asian descent. In 2017, 30 percent of all farms were SDFR*

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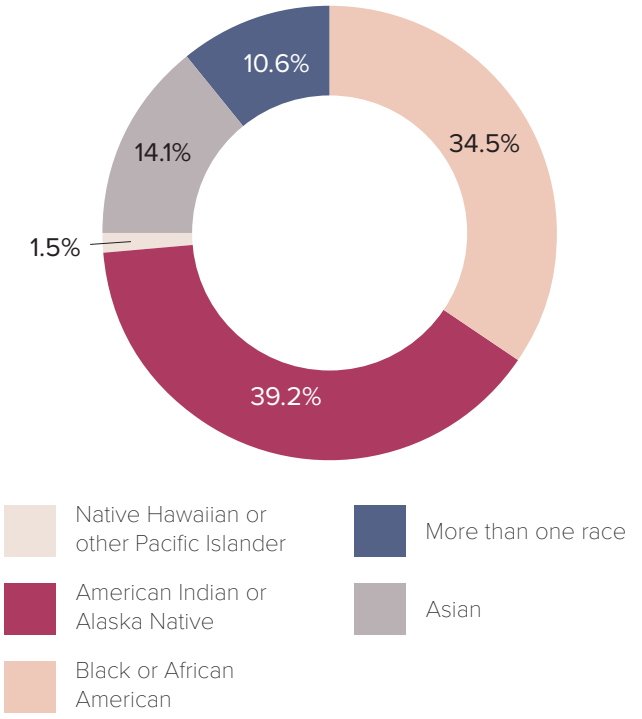
farms—meaning a SDFR was the principal operator. On average, SDFR farms were smaller and brought in less revenue than non-SDFR farms in 2017.[5]

When these are compared with data based on USDA-NASS Census 2012, it appears that other minority farmers—American Indians or Native Americans, Asians, native Hawaiian or other Pacific Islanders—are taking up farming. But at the same time, the share of African American farmers in the farming pool seems to have shrunk a little in this period. This is not surprising if we are to look at the history of the African American experience of farming.

The 20th century saw a devastating decline in the number of African American farmers: from 746,717 African American farmers in 1900, down to a mere 18,451 in 1997, a whopping 97.5% decline.[6] African American farmers also lost over 90% of the land they had at the turn of 19th century through a combination of legalized thievery and systematic discrimination.[7] Often, these experiences were compounded by a lack of financial and/or technical skills in dealing with predatory practices by land grabbers.

Figure 1: Race of nonwhite principal farm operators, 2012

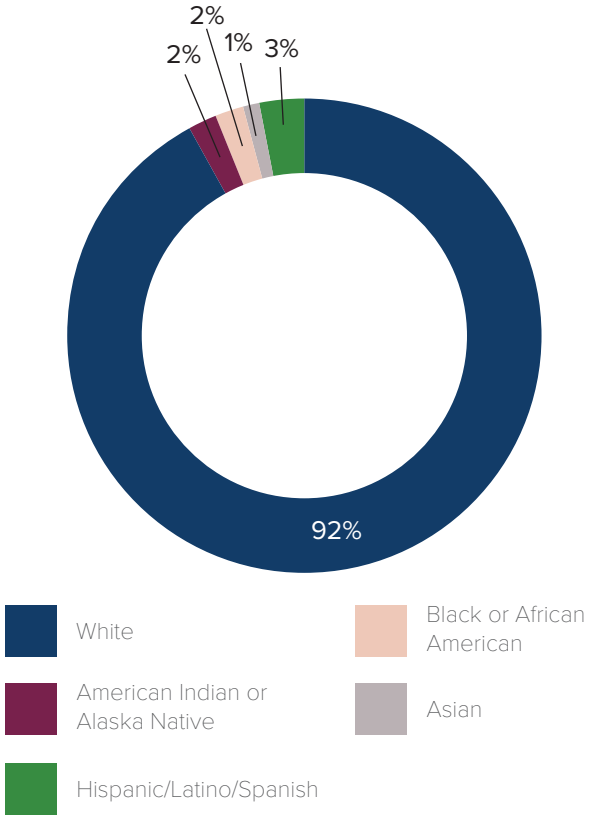


Note: Farmers of Hispanic origin have been included as part of distinct racial groups instead of as an ethnic group.

Source: USDA, Economic Research Service and National Agricultural Statistics Service, 2012 Agricultural Resource Management Survey.

This experience of historical trauma also results in distrust of the institutions and systems in place to help deal with discrimination, as has been elaborated by Cassandra Johnson Gaither in "Have not our weary feet come to the place for which our fathers sighed?: Heirs' property in the Southern United States." An example is how many African American farmers are reluctant to engage with and/or are unfamiliar with the legal institutions, leading to a prevalence of "heirs' property," a situation in which the owner-operator dies without making a will. The law stipulates that the property will go to all heirs and not simply to the children of the owner-operator. Land grabbers would then proceed to convince one of the heirs to sell his or her share and then proceed to force other heirs out, as they would lack the wherewithal—cash, influence, legal knowledge, alternatives—to keep the land. This was one of the main ways African Americans were dispossessed of their lands, as well as through violence. Also, such "heirs' property" could not be used as collateral, nor could the heirs access credit or other services if they were operating an heirs' property.[8]

Figure 2: Ethnicity/Race: US Farmers with farming as their primary occupation 2017*



*When factored into all US farmers, farmers that identified as Native Hawaiian/Pacific Islander made up less than 1% of the total.

Note: We have tried to capture the ethnic break up and here we can see that Hispanic farmers at 3% is the second largest ethnic group after white at 92%.

These experiences were compounded by systematic discrimination over decades when it came to accessing farm loans and assistance. This paved the way for two cases brought against the USDA by African American farmers: *Pigford v. Glickman* and *Brewington v. Glickman*.[9] Latino, Native American and women farmers raised similar cases against the USDA.[10] The decision in favor of the farmers in the *Pigford* case began redressing the systemic race-based discrimination by the USDA. Unfortunately, many of these discriminatory practices continue and impact African American farmers in specific ways even today.[11]

The 2018 Farm Bill addresses some of the barriers faced by African Americans such as the "heirs' property" issue.[12] While the new changes (such as enabling access to USDA programs and disaster relief) would address some of these challenges, especially in the 13 states and U.S. Virgin Islands where the Uniform Partition of Heirs Property Act (UPHPA) has been enacted, it will be a long while before the impacts of these efforts show real change.[13]

The original *Crisis by Design* looked at how the crisis impacts family farms differentiated primarily in terms of farm size; the overall focus was on how farms and farming families were being impacted by the changes in farm policies. Part of the gap in *Crisis by Design* could be due to the different priorities of that time, and part of it due to the lack of detailed data at the time. Also, since the publication of *Crisis by Design*, academics have helped shed light on the blind spots in mainstream data gathering. It is now possible to take an intersectional analytic approach with gender/race/ethnicity, rather than examining each issue exclusively.

Gender based disparities in agriculture were just beginning to be visible around the time *Crisis by Design* was written. The 1984 *Farm and Ranch Irrigation Survey* reported that by 1982, there were 120,000 farms operated by women, representing 5% of total number of farms; of this, about one-third were operated by women over 65 years old.[14] By 2017, among those whose primary occupation is farming, the number of women had risen to 21.8%. Over the last 40 plus years, one thing seems to be constant: women over the age of 65 constitute one-third of women farmers. But in addition, just as in the case of all farmers, well over 90% of women farmers self-identify as white. Given this, we could safely conclude that Socially Disadvantaged Farmers and Ranchers (SDFRs) (excluding women self-identifying as white) would be at most 10% of all producers. This could be part of a more in-depth analysis of the 2017 USDA Census of Agriculture.

Other questions that a more thorough analysis that goes beyond the census data could ask include: what is the impact of these agricultural and food policies on other actors in the food system, such as the immigrant workers who come seasonally or those working in food processing plants and retail sector? What are the impacts on those engaged in fishing? What impacts have these policies had on Native American food systems? We have not explored the specificity of Native American food producers (whose lands have been acquired forcefully and has formed the foundation of our U.S. economy, not just U.S. agriculture and food system), and it remains a major lacuna in this short piece.

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REVISITING CRISIS BY DESIGN

CRISIS BY DESIGN: AGRICULTURE AND WATER QUALITY

- Dramatic increases in agricultural use of chemicals and fertilizers and growing concentration of livestock production since the 1980s, linked to increasing farm size and the shift from family farms to larger corporate agribusiness, have worsened water pollution.
- A majority of waterways are unsuitable for aquatic life and/or human uses, and drinking water wells, particularly in rural areas, are also contaminated.
- The laws intended to control pollution from agriculture are weak both as written and as implemented, with powerful farm and agribusiness interests effectively blocking protective standards and effective enforcement.

AGRICULTURAL TRENDS

During the farm crisis of the 1980s, it began to be recognized that low farmgate prices, increasing corporate control of agriculture and absentee investors all contributed to farming practices that degraded the environment. These trends have only accelerated in the subsequent 30 years. Dramatic increases in the use of pesticides and chemical fertilizer, as well as factory farms producing massive amounts of manure, have degraded the nation's surface waters, aquifers, bays and estuaries.

Nationally, nitrogen from fertilizer used on farms doubled between the late 1960s and 2015, a nearly 30-fold increase from the early 1940s to 2015. Acreage with chemical applications (pesticides, herbicides, nematicides, and chemicals used to control growth or ripen fruit) increased 7% from 2012 to 2017[1] even though the number of farms using these chemicals dropped, suggesting that larger farms have increased their usage.[2] From 1992 to 2012 the use of the herbicide glyphosate increased dramatically, with at least half the country showing large increases.[3]

Since the 1990s there has been an extreme shift to industrialized farming, generating massive volumes of manure, in the central and southeastern U.S. in particular. In North Carolina, the state with the second largest production of hogs and pigs, the number of these animals nearly doubled between 1992 and 1997.[4] Nationally, there are more than 18,000 large (1,000 animals or more) animal feeding operations out of 450,000.[5]

AGRICULTURE IS A PRIMARY CAUSE OF POOR WATER QUALITY

In 2016, the U.S. Environmental Protection Agency (EPA) reported that nationally, 71% of assessed lakes, ponds and reservoirs, 53% of assessed rivers and streams, and 80% of assessed bays and estuaries did not meet water quality standards.[6] The most significant contributor to biologically impaired water quality is nutrient pollution, with 40% of stream and river miles having excessive levels of nitrogen and phosphorus resulting in algal blooms, low levels of oxygen and harm to aquatic life.

Nutrient contamination is directly linked to agricultural sources, including runoff from farm fields fertilized with chemicals or manure, and from animal feeding operations. Water quality data from 1992 to 2004 found elevated

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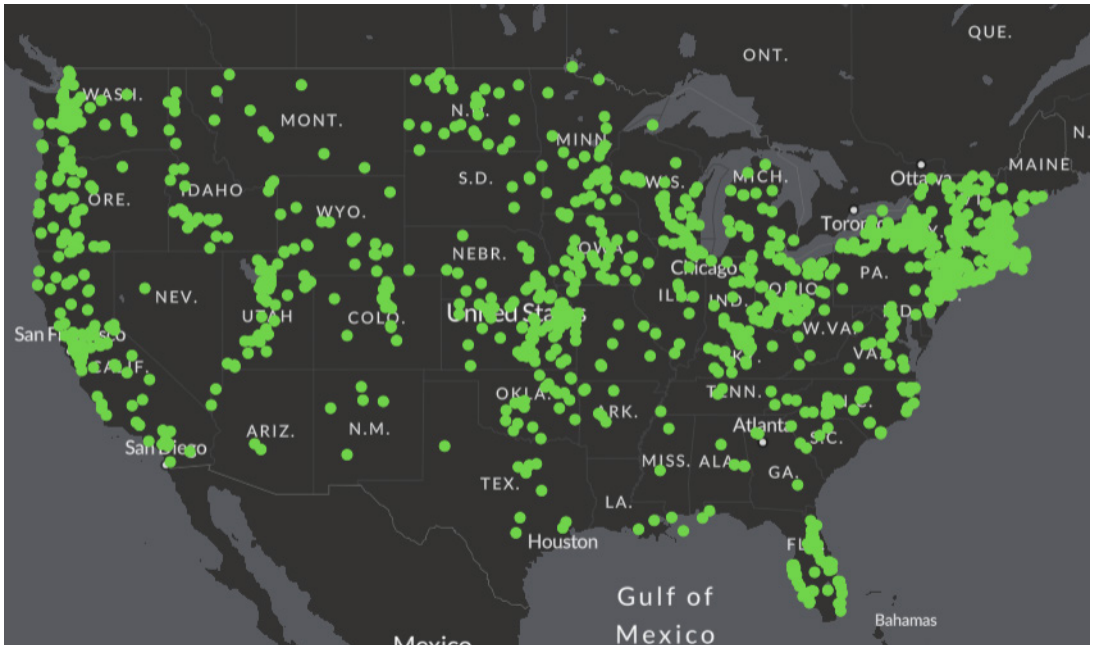
nutrient concentrations in both streams and groundwater in basins with significant agricultural development, and contamination rates increased over the study period.[7] Concentrations in streams routinely were 2 to 10 times greater than safe for aquatic life, and nitrogen also exceeded federally-set human health standards in many shallow domestic wells in agricultural areas.

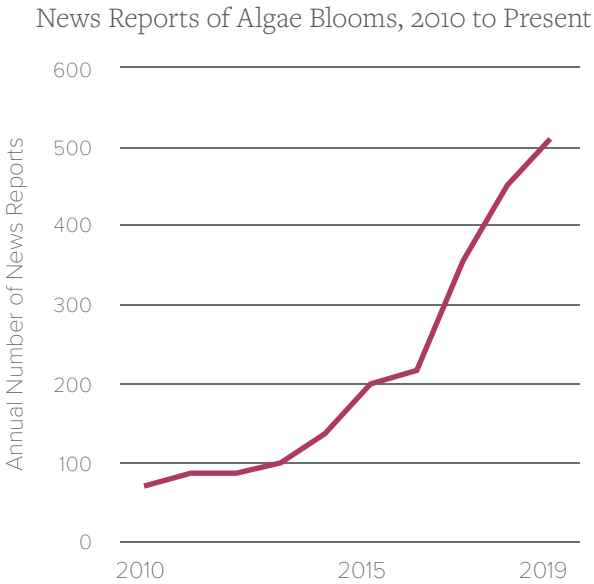


Contaminants from feedlots enter waterways through multiple pathways: leakage from poorly constructed manure lagoons, major precipitation events causing overflow of lagoons and runoff from recent applications of waste to farm fields, or atmospheric deposition.[8] Besides nutrients, contaminants present in livestock wastes include pathogens, veterinary pharmaceuticals including antibiotics, toxic chemicals such as Per- and Polyfluoroalkyl Substances (PFAS) and heavy metals.[9]

Agricultural nutrient runoff is causing algal blooms that produce extremely dangerous toxins that can sicken or kill people and animals and create "dead zones" in fresh, salt and brackish water.[10] All 50 states have experienced toxic algal blooms, and there has been a dramatic increase in their incidence since 2010, believed to be fueled in part by climate change.[11] The second largest algal dead zone in the world is in the northern Gulf of Mexico[12]—fed by manure- and fertilizer-rich waters of the Mississippi River draining Midwestern agricultural lands—in 2017 was about the size of New Jersey.[13]

Agricultural pesticides also contaminate the nation's waterways.[14] Data from 1992-2001 found pesticides typically present throughout most of the year in streams draining watersheds with substantial agricultural areas.[15] A comprehensive 2013 study of streams in 11 Midwestern states detected more than 180 pesticides and their byproducts.[16]

Public health is at stake. A U.S. Geological Survey study of private drinking wells found 23% contaminated in some way.[17] Rural communities and farming areas that rely on shallow groundwater wells are especially at risk from agricultural pollutants. Wisconsin and Iowa are among many



Source: https://www.ewg.org/interactive-maps/2019_algal_blooms/map/

states facing a rural water contamination crisis caused by chemical fertilizers, manure, contaminated sewage sludge, and pesticides.[18]

A BROKEN SYSTEM THAT VALUES AGRIBUSINESS OVER CLEAN WATER

Enacted in 1972, the federal Clean Water Act (CWA) was intended to "restore and maintain the chemical, physical, and biological integrity of [U.S.] waters.," with the twin goals of achieving fishable and swimmable ambient water quality throughout the U.S. by 1983, and eliminating discharges of pollutants into U.S. waters by 1985.[19] More

than forty years later, these goals are far from being met, and the institutional failure to control agricultural pollutants is a major reason why. This failure is both in the design of the law and in its implementation, which has consistently been thwarted by the powerful agribusiness lobby.

The CWA's point source program requires permits, reporting, and pretreatment for industrial wastes. While meat processing facilities are legally subject to these requirements, large operations often ignore permit limits without facing any consequences.[20] Enforcement is inadequate, with companies obstructing inspections or regulators failing to act.[21] In the absence of federal or state enforcement, Food & Water Watch is suing a slaughterhouse that processes animal fat, meat, pathogens, ammonia and excrement that is maintained by JBS USA and the Swift Beef Company in Greeley, Colorado for failing to meet toxicity testing standards, unpermitted discharges of total suspended solids and ammonia nitrogen, and failing to report violations.[22]

Other significant agricultural point sources, notably industrial-scale concentrated animal feeding operations (CAFOs), are even more loosely regulated.[23] EPA requires permits only for the largest operations discharging manure directly into designated waterways, and has exempted waste stored in lagoons and disposed of through application to cropland.[24] In 1987 Congress exempted from regulation "agricultural stormwater discharges" including weather-triggered leaks from manure pits. Feeding operations have been granted significant discretion to determine whether they are required to apply for a permit, and in 2012 the agribusiness lobby forced the withdrawal of regulations to create a central database of basic CAFO information.[25] In violation of the law, regulations in some of the 38 states with delegated water pollution permit-writing authority fail to meet even the weak federal minimum standards, and some states with large numbers of CAFOs do not require permits for the vast majority of these operations. Nationally, only an estimated 41% of CAFOs that EPA says should have water pollution discharge permits actually have them.[26]

The CWA provisions regulating nonpoint sources—such as runoff from agricultural fields—are even less effective, and do not give EPA express authority to mandate standards. Congress left it to individual states to decide how best to control pollution from nonpoint sources, and most continue to do so entirely through voluntary programs such as education and financial assistance.[27]

The human impact of the dramatic increase in industrial agriculture, and the failure to regulate the heavy load of pollutants it generates, falls disproportionately on poor, rural and minority communities.[28] The clustering of hog CAFOs in low-income, minority communities in North Carolina in particular has raised concerns of environmental injustice and environmental racism.[29]

Unfortunately, the rural pollution crisis is about to get even worse. Recent changes to the definition of "waters of the United States" (WOTUS) adopted by the Trump administration in 2019 will significantly limit the scope of the CWA, removing environmental protections from millions of miles of streams and roughly half of the country's wetlands, further limiting control of runoff from manure, fertilizers and pesticides.[30] This, too, is the direct result of agribusiness lobbying, as USDA Secretary Sonny Perdue made clear in announcing the change: "Repealing the WOTUS rule is a major win for American agriculture."[31]

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