### Plan

#### The United States Federal Government, including the courts, should:

#### Interpret Section 16 of the Clayton Act to allow for antitrust injury to include the threat of loss of profits due to possible price competition following a merger;

#### Holistically analyzing the scope of potential merger’s market power;

#### Reinvestigate current corporations that have unruly market power and require divestiture where appropriate.

### Adv – Environment

#### Consolidation driving out small farming and sustainable ag – makes solving warming impossible

Tam and Beilskis, 4/1/2021; Kristen Tam, Olivia Bielskis. “Stimulating Antitrust Enforcement to Expand the Regenerative Agriculture Movement.” UCLA: Library. Retrieved from https://escholarship.org/uc/item/0m16g2r5

Competition in the agricultural marketplace has significantly declined as a result of decreasing antitrust enforcement and increasing consolidation. In the current market, the largest firms control disproportionate percentages of market power, threatening consumer prices, principles of equal economic opportunity, and viability of small farms and ranches. Contrary to the notions promulgated by Robert Bork’s “consumer welfare standard,” which claims that the federal government should regulate mergers sparingly for the supposed benefit of the consumer, consumer prices have increased due to this perspective being applied to jurisprudence and enforcement. Market consolidation also harms principles of fairness and objectivity in policy. Seeing as large firms often contribute such a substantial percentage of a given agricultural product’s output, if the firm is significantly compromised financially, they must be “bailed out” because the market inherently relies on their output and constructed dominance. When large firms or farms have such robust security, they are less likely to innovate, improve the quality of their products, and invest in more sustainable agriculture practices. The Intergovernmental Panel on Climate Change (IPCC) prescribes that the world needs to limit global temperature rise to 1.5 degrees Celsius by 2050, which is contingent upon decreasing greenhouse gas emissions. Agriculture contributes to 10.5 percent of the United States’ emissions, and the ability to reduce emissions is hindered by large farms’ tendency to employ practices that increase emissions, while small farms, which are being driven out by corporate merges, are more likely to employ sustainable farming practices such no-till, compost as fertilizer, and planting cover crops. Agriculture consolidation has largely increased due to non-precautionary approaches by the Supreme Court and federal regulation agencies, the Federal Trade Commission and Department of Justice. Specifically, the Supreme Court’s ruling that the “threat of loss of profits due to possible price competition” does not constitute antitrust harm has hindered the implementation of the Clayton Antitrust Act. Additionally, the federal agencies responsible for regulating mergers have increased the number of mergers they approve, allowing consolidation of the marketplace to continue. The lack of strict antitrust regulation to prevent mergers from holding hostage undue percentages of the marketplace is hindering the growth of regenerative farming, a set of practices that will be integral in meeting the IPCC climate change goals.

#### Warming causes extinction

David Spratt 19, Research Director for Breakthrough National Centre for Climate Restoration, Ian Dunlop, member of the Club of Rome, formerly an international oil, gas and coal industry executive, chairman of the Australian Coal Association, May 2019, “Existential climate-related security risk: A scenario approach,” https://docs.wixstatic.com/ugd/148cb0\_b2c0c79dc4344b279bcf2365336ff23b.pdf

An existential risk to civilisation is one posing permanent large negative consequences to humanity which may never be undone, either annihilating intelligent life or permanently and drastically curtailing its potential. With the commitments by nations to the 2015 Paris Agreement, the current path of warming is 3°C or more by 2100. But this figure does not include “long-term” carbon-cycle feedbacks, which are materially relevant now and in the near future due to the unprecedented rate at which human activity is perturbing the climate system. Taking these into account, the Paris path would lead to around 5°C of warming by 2100. Scientists warn that warming of 4°C is incompatible with an organised global community, is devastating to the majority of ecosystems, and has a high probability of not being stable. The World Bank says it may be “beyond adaptation”. But an existential threat may also exist for many peoples and regions at a significantly lower level of warming. In 2017, 3°C of warming was categorised as “catastrophic” with a warning that, on a path of unchecked emissions, low-probability, high-impact warming could be catastrophic by 2050. The Emeritus Director of the Potsdam Institute, Prof. Hans Joachim Schellnhuber, warns that “climate change is now reaching the end-game, where very soon humanity must choose between taking unprecedented action, or accepting that it has been left too late and bear the consequences.” He says that if we continue down the present path “there is a very big risk that we will just end our civilisation. The human species will survive somehow but we will destroy almost everything we have built up over the last two thousand years.”11 Unfortunately, conventional risk and probability analysis becomes useless in these circumstances because it excludes the full implications of outlier events and possibilities lurking at the fringes.12 Prudent risk-management means a tough, objective look at the real risks to which we are exposed, especially at those “fat-tail” events, which may have consequences that are damaging beyond quantification, and threaten the survival of human civilisation. Global warming projections display a “fat-tailed” distribution with a greater likelihood of warming that is well in excess of the average amount of warming predicted by climate models, and are of a higher probability than would be expected under typical statistical assumptions. More importantly, the risk lies disproportionately in the “fat-tail” outcomes, as illustrated in Figure 1. <<figure omitted>> This is a particular concern with potential climate tipping-points — passing critical thresholds which result in step changes in the climate system that will be irreversible on human timescales — such as the polar ice sheets (and hence sea levels), permafrost and other carbon stores, where the impacts of global warming are non-linear and difficult to model with current scientific knowledge. Recently, attention has been given to a “hothouse Earth” scenario, in which system feedbacks and their mutual interaction could drive the Earth System climate to a point of no return, whereby further warming would become self-sustaining. This “hothouse Earth” planetary threshold could exist at a temperature rise as low as 2°C, possibly even lower. 13

#### The interconnected nature of the supply chain means the threshold for our impacts are very low. Continued consolidation leads to increased ghg emissions and warming, spikes in gulf hypoxia, soil loss, and collapse of both biodiversity and the ag sector

Mary K. Hendrickson et. Al (University of Missouri) 11/19/2020 [“THE FOOD SYSTEM: CONCENTRATION AND ITS IMPACTS” w/ Philip H. Howard (Michigan State University), Emily M. Miller (Family Farm Action Alliance) & Douglas H. Constance (Sam Houston State University) online @ <https://farmactionalliance.org/wp-content/uploads/2020/11/Hendrickson-et-al.-2020.-Concentration-and-Its-Impacts-FINAL.pdf>, loghry]

The concentration and consolidation we have broadly outlined has often been justified on the basis of efficiency, despite failing to incorporate an enormous number of social, economic and ecological externalities when calculating such measures. Nearly 50 years ago, in a series entitled “Who Will Control Agriculture?,” agricultural economists Briemyer, Guither and Sundquist (1973) warned that the changing organization of agriculture did not enhance the efficiency or productivity of the system and would exact social and psychological costs on farmers and society. In addition, some recent studies have failed to measure efficiency gains (nor price reductions) from consolidation in manufacturing (Blonigen and Pierce 2016). Defenders of the current monopolized system cite that consumer welfare has not been harmed,17 yet consumer prices are “sticky,” rising when costs for powerful processors and retailers increase, but less likely to fall when prices paid to farmers decrease (Shields 2010). Recently, a number of lawsuits point to multiple cases of price-fixing, including in tuna, and allegedly in chicken, beef and pork.18 For those of us concerned with resilience, efficiency has often been the enemy of redundancy, which can provide fail-safe mechanisms, making systems more resilient. Here we present two cases – the meat industry and the widespread problems with the herbicide dicamba – to illustrate the fragility and interconnectedness of the dominant agrifood system. The Meat Industry Nowhere is this systemic vulnerability clearer than in the protein sector, which has been hard hit by the COVID-19 crisis, particularly in North America. Meat production, processing and consumption have risen steadily in recent years, part of the “meatification” of global society (Weis 2015; Winders and Ransom 2019). Increased meat consumption is a central component of the industrial diet developed in the United States (Winson 2013) and diffused globally, contributing to obesity epidemics throughout the world (Otero 2018). The feed/meat complex has developed with concerted cooperation between state and market actors through various subsidies and pro-business regulations (Howard 2019). Meatification, primarily the feed/cattle complex, is also a major contributor to greenhouse gas emissions (IPCC 2018). Meat processing is one of the most dangerous jobs in the United States, especially hazardous for immigrant groups with limited English-speaking skills and sometimes precarious legal status (GAO 2005; Choi and Constance 2019; Human Rights Watch 2005). The “chickenization” of the red meat industry has restructured meatpacking from a dangerous, but good paying, blue-collar, union job dominated by white males to an even more precarious working-class, non-union job, often staffed by marginalized female, immigrant, and refugee groups (Freshour 2019; Schwartzmann 2013; Stull 2019; Stull and Broadway 2005). Finally, “chickenization” is also restructuring the protein production sector away from open markets to contract farming, as captive supplies in beef (see Table 1) and contracting in pork further marginalize producers. This protein sector clearly illustrates the complex interconnectedness of one industry. Recently, this sector revealed how worker vulnerabilities triggered by COVID-19 created crises in worker welfare, animal welfare and farmer livelihoods during the pandemic. In our consolidated farm and food system, farmers, workers and the environment are interconnected, meaning that when problems hit one part, they quickly engulf others. For meatpacking, the coronavirus hit workers, and a supply chain focused on efficiency quickly broke down. Below we focus on the impacts to workers, farmers and the environment of this one massive disruption that is a wake-up call to redesign the system. Labor: According to reporting by Leah Douglas at the Food and Environment Reporting Network, over 40,500 workers in 417 meatpacking plants had tested positive for COVID-19 by mid-August, and 189 meatpacking have died from it (see Figure 5). Transmission of COVID-19 among workers has been rapid and difficult to control in almost all large-scale poultry, pork and beef processing plants in N. America, Europe and Latin America. For instance, the Centers for Disease Control (CDC) reported that in 14 states, 9% of meat and poultry processing workers were diagnosed with COVID19 by the end of May. Close working conditions for long time periods, shared transportation to work, and shared (congregate) housing were highlighted by the CDC as potential causes. When industry CEOs such as John Tyson warned of a meat supply crisis due to plant shutdowns, President Trump issued an executive order that declared meatpacking plants to be “critical infrastructure” under the Defense Production Act and prohibited their closure by state health authorities.19 Farmers/Animal Welfare: By mid-April, nearly 20 percent of daily pork processing capacity had been idled by COVID-19, with similar problems in beef processing.20 An early outbreak at a Smithfield Foods plant in S. Dakota shut down a plant responsible for 5 percent of the nation’s daily pork slaughter.21 When a plant that processes nearly 20,000 animals a day closes, it creates crises for farmers supplying that plant. They must either feed those animals, find an alternative market or euthanize them. Alternative markets for 20,000 pigs per day are difficult to find, even outside a pandemic situation. One agriculture press article estimated that nearly a million pigs had disappeared from slaughter markets in the second quarter of the year, with anywhere from 300,000 to 800,000 pigs euthanized.22 At the low estimate, that’s nearly 29,000 tons of pork destroyed.23 At least 2 million chickens were also euthanized by mid-May.24 Previous mass euthanizations occurred in the wake of livestock disease epidemics, such as porcine diarrhea virus epidemic in 2013 and avian influenza in 2015. The genetic uniformity of these animals contributed to their susceptibility—globally just one breed accounts for more than 99% of turkeys, for example, and in the U.S. more than 85% of dairy cows belong to the Holstein breed. Mass euthanasia of healthy, marketable livestock has undoubtably caused emotional trauma for farmers, and all of us can lament the tremendous loss of life and natural resources embodied in the once living animals. The wastefulness of a system with few fail-safe mechanisms is astounding. It also clearly illustrates that our agrifood system more heavily emphasizes relations of power rather than feeding people. Food, Feed and the Environment: Meat production at this scale requires enormous amounts of corn and soybeans, two of the seven so-called “program crops” that have historically been heavily subsidized by the U.S. Farm Bill, both through direct payments and subsidized crop insurance (Starmer and Wise 2007; see also Congressional Research Service 2018).25 Howard (2019) argues that firms like Tyson, Smithfield and JBS were able to consolidate due to low feed costs, made possible by direct and disaster payments that kept row-crop farmers producing even though market prices did not cover their costs. Most of the best soil in the U.S. is devoted to the production of corn and soybeans.26 In 2018-2019, just under 40% of the U.S. corn crop was used for feed27 - some of which those hogs and chickens ate before they were euthanized. 28 The cornsoy rotation that covers much of Corn Belt, contributed to the Heartland region having the lowest diversity in seven of the eight USDA census years between 1978 and 2012 (Aguilar et al. 2015).29 Monocultures negatively impact the provision of ecosystem services and biodiversity through simplifying the ecosystem and by requiring higher production inputs (Klasen et al. 2016). Corn and soybeans become the de facto crop rotation across large portions of the Corn Belt, with associated soil erosion that was estimated to cost Iowa farmers $1 billion per year (Eller 2014). Soil erosion costs the entire U.S. over $44 billion per year, including $100 million in lost farm income.30 The washing away of nitrogen and phosphorus fertilizers in top soil contributes to hypoxia, such as the Dead Zone in the Gulf of Mexico.31 A renewed interest in soil health has led to increased use of cover crops and reduced tillage which can alleviate these problems, but still fewer farmers on the land farming larger acreages make the labor and timing of such practices challenging (Hendrickson 2019). Few if any markets exist for diversified crops and livestock meaning crop rotations are limited (Roesch-McNally et al. 2018). Dicamba Debacle:“[T]he herbicide for which [Mike] Wallace literally gave his life”32 Dicamba, registered as an herbicide in 1967 and available in 1,000 products in the U.S.,33 has recently pitted farmer against farmer and farmer against community, as well as given “all of agriculture a black eye"34 in the words of one weed scientist. In the five years since Monsanto’s (now Bayer’s) Xtend dicamba resistant soybeans were approved, all of the large agrochemical-seed firms have introduced dicamba-tolerant seeds, including ChemChina, Corteva, BASF and Bayer.35 In the same time period, the Heartland has witnessed one related murder,36 thousands of dollars of uncompensated off-target injuries and failure of institutions to combat the power of agriculture firms. Power Play: In 2015, Monsanto’s Xtend (dicamba-glyphosate tolerant) soybeans were approved for the 2016 planting season, even though the accompanying less volatile formulation of dicamba was not approved.37 Thus the dicamba formulation available in 2016 was not allowed for “incrop” use as it was volatile and could easily drift. Monsanto continued to sell these beans, and seemed to blame farmers when some “tried using older formulations of dicamba and the off target movement was very bad.”38 Indeed, court documents in a peach grower’s lawsuit against Bayer and BASF suggest that the companies “created circumstances that damaged millions of acres of crops by dicamba in order to increase profits from a set of new dicamba-related products offered for sale beginning in 2015.”39 By 2017, the new formulations of dicamba had been approved so farmers could plant dicamba-tolerant soybeans and legally use dicamba to control weeds in mid-summer. Still dicamba damage continued. There were reports of so-called defensive planting, whereby farmers protected themselves from neighboring farmers’ use of dicamba by planting Xtend or other dicamba tolerant soybeans40 – especially if the price was not substantially different than other traited seeds.41 While dicamba resistant soybeans were widely planted from 2017- 2020, – largely because of resistant weeds like waterhemp and Palmer amaranth, problems with dicamba use remained. Weed scientists at the University of Missouri detailed potential problems with volatility even with new formulations.42 In February, 2020 a jury awarded Bader Farms, a peach orchard, $15 million in compensation for damages from off-target dicamba drift, and awarded over $200 million more in punitive damages.43 In June, the agriculture community was stunned when a federal court ruled that EPA’s approval of reformulated dicamba (XtendiMax, Engenia and FeXapan) in use on “an estimated 60 million acres of soybeans and cotton [was] vacated – or ended – effective immediately.”44 Farmers could apply any existing stocks of those herbicides through July 31, 2020.45 Environmental Consequences of Corporate Actions: To understand the problems with dicamba, Howard and Hubbard (2020) trace changes in the seed industry, with historic seed firms first being acquired in the 1970s by oil and grain trading companies, and then by agrochemical companies in the 1990s. The latter was spurred by slowing rates of growth in agrochemical sales largely due to environmental concerns. Then came herbicide-tolerant crops, starting with the introduction of Monsanto’s Round-Up Ready soybeans in 1996. Agrochemicalseed firms could now bundle seeds and chemicals, which could keep farmers dependent upon one firm for these inputs (James, Hendrickson and Howard, 2013). The herbicide dicamba has been in use since the 1960s, primarily in corn production, but tensions exploded in 2016. Why? Monocropping in cotton, corn, and soybeans have created a plethora of herbicide-resistant weeds46 that have occurred since the introduction of Round-Up Ready seeds. Dicamba-tolerant, as well as 2,4-D tolerant seeds, were seen as an urgently needed solution. As Missouri weed scientist Kevin Bradley notes, dicamba became a problem for two reasons: farmers spray more to combat weeds such as herbicide resistant pigweed (Amaranthus palmeri), which we note thrives particularly well in a rapidly changing climate; and dicamba is being used later in the season, which makes it vulnerable to drift due to hot and humid conditions.47 This overreliance on one single weed management tool – herbicides – alarmed soil scientists who argue that soil conservation gains are threatened by the tillage desperate farmers use to control weeds, and called for an “integrated weed management” approach (CAST 2012). Community Impact: The volatility of dicamba has pitted neighbor against neighbor in rural communities. The most poignant, of course, is the murder of Mike Wallace by his farming neighbor’s employee, Curtis Jones, over dicamba drift damage to an estimated 40% of Wallace’s crops. In the months after this murder, Wallace’s family worked to get a permanent ban on dicamba, “a quest that has put Wallace’s family at odds with many of their neighbors.”48 Others acknowledge the potential community problems, as this Arkansas farmer said in 2017, “We’re trespassing on our neighbors, and we’re trespassing on our neighbors in town. It’s not just our neighbor farmers. There’s a lot of damage in yards. You hate to say that and call attention to it, but it is a reality.”49 In 2018, just two years after dicamba tolerant beans were introduced, an investigation by the agricultural news service DTNPF on community impacts of dicamba drift exposed the destruction of a South Dakota CSA farm’s crops, a Tennessee rural resort struggling to save gardens and trees, and an Illinois homeowner who spent at least $10,000 investigating damage from dicamba on her “carefully landscaped yard.”50 In all these cases, individuals – in the first two instances, consumers and farmers attempting to build agrifood alternatives – were blindsided by the constrained choices of conventional farmers (e.g. Hendrickson and James 2005). In essence, the rights of rural community members to make choices about their livelihoods or even their enjoyment of rural properties is usurped by the right of dominant agrifood companies to profit or of conventional row-crop farmers to control weeds.51 Perhaps the situation is best summed up by a Missouri farmer interviewed in 2019 (James et al. 2020): “With Dicamba, you can do everything right and it can still move around and damage the neighbor’s orchard or the garden of the lady down the road….morally, can you spray a product that you have no control over once it leaves the boom tip and you have to rely on Mother Nature to keep it where it's at and you damage someone else's crop?” Failure of Institutions: The power of these dominant firms is also demonstrated by the failure of the EPA and state agencies to regulate dicamba, and the struggle by universities to provide accurate information about its use. University weed scientists were caught off-guard as dicamba related injuries accumulated in 2016 and 2017.52 Some state agencies have been in the crosshairs between corporate power, desperate farmers and community concerns. For instance, after the Arkansas Plant Board restricted use of dicamba-based herbicides in 2016 and 2017, Monsanto sued the board “arguing that the 2016 rule had effectively prohibited in-crop use of XtendiMax in 2017, and that the 2017 rule would effectively prohibit in-crop use of XtendiMax in 2018.” At the same time, farmers also sued the board after it set an early April, 2018 cut-off date for spraying dicamba instead of the May 25 date.53 Other state agencies responsible for regulating herbicides issued and rescinded bans limiting use at certain times,54 and pleaded with EPA to ban post-emergent use when reregistering the chemical.55 States were flooded with damage reports,56 even though some farmers felt state agencies were reluctant to investigate and even discouraged reports.57 The federal judiciary stepped in, vacating EPA’s approval of three specially formulated herbicides in the middle of the 2020 growing season.58 Farmer and Community Impacts Both of these cases serve as illustrations for the impacts of concentration in the food system across multiple, global scales. As Hendrickson (2015) argues, a consolidated system constrains the ability of farmers to manage their farms using agroecology, which requires diversity and redundancy, rather than specialization and efficiency. In Too Big to Feed, the International Panel of Experts on Sustainable Food Systems (IPES-Food 2017)59 argued that agrifood consolidation reduces farmer autonomy and redistributes costs and benefits across the food chain, thereby squeezing farmer incomes. The table below illustrates this squeeze. One can see that the median net farm income for intermediate farms, those grossing less than $350,000 and for which one of the operators considers farming an occupation, was -$1,524 in 2018.

#### Soil loss causes planetary extinction

Bernard W. Pipkin (Professor Emeritus in the Department of Earth Sciences at the University of Southern California) 2008 [Geology and the Environment, Ch. 6 “Soils, Weathering, and Erosion” (Dee. D. Trent, Richard Hazlett, and Paul Bierman) Geology and the Environment, p. 149, loghry]

Soil, the thin mixture of weathered rock and organic material below our feet, is Earth’s most fundamental resource. We live on it, and through it, we produce much of our food. Soil supports forest growth, which gives us essential products including paper and wood. Soil material, organisms within the soil, and vegetation constitute an ecological system critical to life on this planet. It is through soil that the four ingredients needed for plant growth are recycled: water, air, organic matter, and dissolved minerals (!Figure 6.1). The multiple uses of soil are reflected in the many definitions and classification schemes that have been developed for soils. To the engineer, a soil is the loose material at Earth’s surface; that is, material that can be moved about without first being dynamited and upon which structures can be built. The geologist and the soil scientist see soil as a mixture of weathered rock, mineral grains and organic material that is capable of supporting plant life. A farmer, on the other hand, is mostly interested in what crops a soil can grow and whether the soil is rich or depleted with respect to organic material and minerals. The carrying capacity of our planet, the number of people Earth can sustain—depends on the availability and productivity of soil. This is why understanding how soil is formed and how it can be best cared for are so important. Soil erosion removes this precious resource and for all practical purposes, once productive topsoil is removed, it is lost to human use forever. Soil pollution can render areas harmful to enter or unable to grow edible food products. The goal of this chapter is to give you an appreciation of how important soil is to our environment by giving you the information you need to understand how soil is formed, how it can be impacted by human actions, and how we as a society can better care for this invaluable resource.

#### Gulf hypoxia is growing because of ag runoff---it’ll collapse whole oceans---extinction

Dr. Ian Hendy 17, PhD in Trophic Marine Biology, Research and Communication Officer and Senior Scientific Researcher in Marine Ecology at the University of Portsmouth, Institute of Marine Sciences Laboratories, Gulf of Mexico 'Dead Zone' Is Already A Disaster – But It Could Get Worse, Phys Org, 8-14, https://phys.org/news/2017-08-gulf-mexico-dead-zone-disaster.html

Each summer, a large part of the Gulf of Mexico "dies". This year, the Gulf's "dead zone" is the largest on record, stretching from the mouth of the Mississippi, along the coast of Louisiana to waters off Texas, hundreds of miles away. Around 8,776 square miles of ocean, an area the size of New Jersey or Wales, is almost lifeless. John Muir, the famed naturalist and early conservation campaigner, once said that: "When we try to pick out anything by itself, we find it hitched to everything else in the Universe." His point was that everything in nature is connected, and that no part of our ecosystem exists entirely independently from any other. It is perhaps no surprise then that ultimate cause of the Gulf of Mexico's dead zone can be found many miles inland. Fertilisers used by farmers then wash into the Mississippi River and eventually into the sea, where nutrients such as nitrogen and phosphorus stimulate an explosion in microscopic algae, creating huge "algal blooms". The algae then die and sink to the bottom, where they decompose. But the same bacteria which decompose the algae also use the sea's oxygen during the process, leaving an "anoxic" ocean. Fish and other mobile sea creatures are able to escape the suffocating dead zone. Less lucky however are the sponges, corals, sea squirts and other animals who live their lives fixed in one place on the sea bed. Low oxygen levels place them under great stress and we have seen huge mortalities. Such losses will of course ripple up the food web, creating a negative chain reaction of increasing mortality rates in larger and larger animals. The "dead zone" has grown this year due to increased rainfall in America's Midwest washing ever greater amounts of nutrients into the Mississippi, which ultimately end up in the Gulf. Not only is this a huge conservation issue – the Gulf contains key nursery habitats such as mangrove forests, sea grass beds and coral reefs that benefit adjacent fisheries – but it also has huge consequences for the local fishing economy, particularly the shrimp industry. Steps are under way to slow down the ecological disaster. Some farmers in the Mississippi basin are using large grassy zones along waterways in order to soak up the agricultural fertilisers and filter out many of the nutrients before they make their way down the Mississippi to pollute the Gulf. However, it remains to be seen whether such measures are effective – and US farmers certainly need to greatly reduce the nitrogen and phosphates they use. In the century since Muir's death, things have sped up. A larger population demands more food which means more deforestation, more farmland and more fertiliser. The increase demand placed on our land is ultimately affecting the marine environment. These losses are unsustainable. The marine environment is integral for all life on earth, from an ecological and economic point of view. If we keep losing ecosystem services such as coastal nursery habitats and spawning grounds at this current rate, it will not just be an area the size of a state that is a dead zone, but the whole Gulf, or even whole oceans.

#### Biodiversity loss causes extinction

Phil Torres, Scholar at the Institute for Ethics and Emerging Technologies, 5-20-2016, "Biodiversity Loss: An Existential Risk Comparable to Climate Change," Future of Life Institute, https://futureoflife.org/2016/05/20/biodiversity-loss/

Catastrophic consequences for civilization. The consequences of this rapid pruning of the evolutionary tree of life extend beyond the obvious. There could be surprising effects of biodiversity loss that scientists are unable to fully anticipate in advance. For example, prior research has shown that localized ecosystems can undergo abrupt and irreversible shifts when they reach a tipping point. According to a 2012 paper published in Nature, there are reasons for thinking that we may be approaching a tipping point of this sort in the global ecosystem, beyond which the consequences could be catastrophic for civilization. As the authors write, a planetary-scale transition could precipitate “substantial losses of ecosystem services required to sustain the human population.” An ecosystem service is any ecological process that benefits humanity, such as food production and crop pollination. If the global ecosystem were to cross a tipping point and substantial ecosystem services were lost, the results could be “widespread social unrest, economic instability, and loss of human life.” According to Missouri Botanical Garden ecologist Adam Smith, one of the paper’s co-authors, this could occur in a matter of decades—far more quickly than most of the expected consequences of climate change, yet equally destructive. Biodiversity loss is a “threat multiplier” that, by pushing societies to the brink of collapse, will exacerbate existing conflicts and introduce entirely new struggles between state and non-state actors. Indeed, it could even fuel the rise of terrorism. (After all, climate change has been linked to the emergence of ISIS in Syria, and multiple high-ranking US officials, such as former US Defense Secretary Chuck Hagel and CIA director John Brennan, have affirmed that climate change and terrorism are connected.) The reality is that we are entering the sixth mass extinction in the 3.8-billion-year history of life on Earth, and the impact of this event could be felt by civilization “in as little as three human lifetimes,” as the aforementioned 2012 Nature paper notes. Furthermore, the widespread decline of biological populations could plausibly initiate a dramatic transformation of the global ecosystem on an even faster timescale: perhaps a single human lifetime. The unavoidable conclusion is that biodiversity loss constitutes an existential threat in its own right. As such, it ought to be considered alongside climate change and nuclear weapons as one of the most significant contemporary risks to human prosperity and survival.

### Adv – Food

#### Ag consolidation exploits and marginalizes labor while setting the stage for massive food shocks

Mary K. Hendrickson et. Al (University of Missouri) 11/19/2020 [“THE FOOD SYSTEM: CONCENTRATION AND ITS IMPACTS” w/ Philip H. Howard (Michigan State University), Emily M. Miller (Family Farm Action Alliance) & Douglas H. Constance (Sam Houston State University) online @ <https://farmactionalliance.org/wp-content/uploads/2020/11/Hendrickson-et-al.-2020.-Concentration-and-Its-Impacts-FINAL.pdf>, loghry]

In the last 150 years of relatively temperate and stable climate, we have come to rely on a high-yielding, mechanized, capital-intensive system of agriculture and food that operates at a global scale, impacting local places around the globe unevenly. Lyson (2004) succinctly illustrated how technological revolutions including mechanization, the use of chemicals, and biotechnology made agriculture more specialized, disconnecting food production and consumption from particular places and their communities. Big data/digitalization of agriculture continues this trend (Mooney 2018; Rotz et al 2019). These revolutions tend to deskill agrifood labor, rewarding the most powerful firms and exploiting vulnerable labor forces. Our fossil-fuel dependent transportation systems have enabled regional specialization across the globe – for example, fruit and vegetable specialization in places such as Spain, Kenya or Mexico, or highly industrialized grain production in the American Midwest or Eastern Europe. These processes have altered producers’ relationship with their land and communities, often marginalizing the labor process across the food chain, and changing the relationship of consumers with food acquisition and preparation – transforming ecological and community relationships in the process. These changes have paved the way for the current social and economic structure of our agrifood system. A capital-intensive system rewards those with access to capital (that is money), and marginalizes those without it. This has become particularly important in an increasingly unequal society, where money and power have accrued to a few, predominantly white households, with agriculture following the same trends. More importantly, money and wealth that is increasingly concentrated in the hands of a few risks the notions of dispersed power at the center of Western democracies (Wu 2018). This concentration of ownership, wealth and power is particularly apparent in the agrifood system where just a few companies dominate almost all aspects of food production. The social and ecological risks associated with our current agrifood system – rising levels of food insecurity and hunger, ecological degradation – are directly related to who has the power to make decisions in food and agriculture. Who decides where and what food will be produced, who produces it and how, and who will get to eat it? We observe that these decisions have increasingly migrated from a more community or public arena (c.f. Weis 2007; Wilkinson 2017) into the realm of private decision-making that largely involves those within the biggest firms, including their management teams, boards of directors and shareholders. Those decision-makers have their eye on increasing their power relative to other firms, and although this may increase their profits, it does not usually align with enhancing the public good. We need only look at the agrifood sector during the COVID-19 pandemic. In a time where the World Food Programme warned that the number of hungry people in the world will double to 270 million people1 and dairy farmers dumped their milk while facing bankruptcy,2 grain traders like Bunge and ADM reported healthy profits3 and privately held Cargill returned record profits to the family that constitutes their shareholders. 4 Consolidation and concentration are key features across the food system, from aggregating farmland holdings to seeds and fertilizers to processing and manufacturing to distributing and retailing. We have seen horizontal, vertical and global integration within and across the supply chain, across commodities and food sectors, and at multiple scales – from regional markets to global markets. The food system is not unique in the way capital and decision-making is concentrated. Studies show that concentration is a systemic rather than isolated feature of the broader economy, and within agrifood itself (Hendrickson, Howard and Constance 2019; Khan 2020). Recent authors of The Curse of Bigness (Wu 2018) and Goliath (Stoller 2019) argue that concentrated political and economic power threatens our democracy and must be addressed. From our perspective, it may be even more urgent to address within the agriculture and food system, both in the U.S. and globally, in order to ensure that humanity can be fed in the future. The distribution of power in the food system, embodied in the power to make decisions about what food is produced, how, where and by whom, as well as who gets to eat – and what they get to eat, is our major focus of concern because of the negative impacts of those decisions to farmers, workers, communities and our ecology. Without a rebalancing of economic and political power within the global food system, humanity confronts a crisis over our very sustenance.

#### Industry consolidation magnifies the impact – amplifies shocks and guts resiliency

Merkle et al 21 (Magnus Merkle, School, l of Geosciences, The University of Edinburgh, Institute of Geography, Dominic Moran, Global Academy of Agriculture and Food Security, University of Edinburgh, Frances Warren, School of Geosciences, The University of Edinburgh, Peter Alexander, School of Geosciences, The University of Edinburgh, “How does market power affect the resilience of food supply”, Global Food Security, Vol. 30, September) DB

Food systems are characterised by vertically integrated and increasingly global commodity supply chains. In such systems, regional shocks can quickly cross geographies, causing price spikes and shortages for consumers. Shocks can be caused by a wide range of events, including extreme weather, unsustainable agricultural practices, political crises affecting trade, and pandemics (Bailey et al., 2015; Bakalis et al., 2020; Hamilton et al., 2020). Supply chain configuration can mitigate or exacerbate the associated risks to food supplies. Systems that are resilient have the capacity to maintain food supply in spite of unforeseen disturbances (Tendall et al., 2015). One characteristic of global food supply chains is the concentration of market power, which can emerge from consolidation through mergers and acquisitions assisted by the availability of alternative forms of corporate financing. Power imbalances are manifest in many food supply chain relations (ETC Group, 2015; Hendrickson, 2015; iPES Food, 2017; Renwick, 2012; Swinburn, 2019; Woodall and Shannon, 2018), and a split between corporate ownership and control can create tension between consumer and supplier interests, and those of often-remote shareholders. The power and influence of large companies in the food system has been likened to the role of “keystone species” crucial to the function of ecosystems (Österblom et al., 2015). This ecological analogy leads to the examination of the role of such actors in system resilience. More specifically, how their dominant position affords more or less resilience to other actors and to the overall system. While market concentration and elevated power of individual firms is critically framed in some food system literature, there is little systematic understanding of the effects that market power can have on the resilience of food supply. Literature on indicators of food system resilience (Cabell and Oelofse, 2012; Speranza et al., 2014; Tendall et al., 2015) overlooks the role of market power. Economic literature (Bakucs et al., 2014; McCorriston, 2013; Weldegebriel, 2004) focuses on short-term price movements, without considering resilience or wider adaptive capacity. Most studies either only consider one aspect of market power (e.g. Bakucs et al., 2014 considering market concentration), or else offer no explicit definition of market power (e.g. Woodall and Shannon, 2018). Sexton and Xia (2018) are an exception in considering a range of defined aspects of market power, and their potential effects on agricultural supply chains. Building on economic and socio-ecological systems literatures, we consider how market power affects supply chain resilience to external shocks. We also draw on experience from recent food supply shocks in the UK, a country that is considered to be threatened by “inherent systemic risks”, with 50% of its domestic food sales dependent imports (Benton et al., 2017). The UK also has a recent history of government inquiries into alleged anti-competitive market practices (see CMA, 2019). We outline a differentiated conceptualisation of market power for food system resilience research, and speculate on ways to improve the adaptive capacity of food systems. We first derive working definitions of resilience and market power from the literature. The resilience implications of different dimensions of market power is then analysed, using literature from multiple disciplines and cases from the UK. We end with a reflection on regulatory needs. 2. Resilience and market power The focus on the resilience of food supply arises as a desirable attribute of food systems and concern about food security more generally. This is particularly so when food systems are subject to an increasing array of foreseen and unforeseen shocks. Conceptually, resilience has roots in engineering as well as in ecological literature, which focus on the equilibrium of complex systems and the thresholds that define the boundaries of stable and unstable dynamic systems. Although resilience is defined differently by several disciplines (Thorén, 2014), it is commonly viewed in conjunction with the concept of vulnerability (Nelson et al., 2007). An early definition of system resilience is the dynamic ability of systems to persist in a functional way (Holling, 1973), which can also be termed as the capacity “to continue providing a function over time despite disturbances” (Tendall et al., 2015). Helfgott (2018) suggests specifying this function in terms of resilience of what, to what, for whom, and over what time frame. Following this suggestion, the focus of this study is on the resilience of food supply to external shocks for consumers, over the short to medium time frame. A similar focus on food supply is adopted by Tendall et al. (2015), who define food system resilience as. “the capacity over time of a system and its units at multiple levels, to provide sufficient, appropriate and accessible food to all, in the face of various and even unforeseen disturbances”. Food system resilience has been described as the stability dimension of food security (ibid.). It is also possible to frame system resilience from a perspective of environmental sustainability, or producer livelihoods, which imply a different focus and metrics. Resilience at one end of a supply chain does not always imply resilience at the other points in the chain, and it is important to consider conflicts and trade-offs that can appear (Oliver et al., 2018; Zurek et al., 2020). It is also important to consider larger-scale interactions between consumption, production and ecosystem services, which are all part of the same complex socio-ecological system, hierarchically linked through ecological and economic dependencies and systemic feedback loops (Nyström et al., 2019). A persistently stable food supply is thus underpinned by the sustainability of the whole system. Indicators for resilience in socio-ecological systems include capacity buffers, redundancy, flexibility, diversity, and the right balance between cooperation and autonomy (Cabell and Oelofse, 2012; Speranza et al., 2014). Resilience implies a system's capability to deal with change, namely (1) through system persistence, (2) through incremental system adjustments, or (3) through more fundamental transformational change to maintain a system's function (Doherty et al., 2019). These capacities have been reinterpreted as (1) Robustness to resist disruptions, (2) Recovery, the ability to return to a desired state following disruption, and (3) Reorientation, the ability to change to a different state in order to maintain the function despite the disruption (GFS-FSR, 2019). These three capacities can be conflicting, i.e. a highly robust system might lack capacity to change fundamentally and vice versa (Doherty et al., 2019). Market power refers to the influence of a firm (or a group of colluding firms) over its customers or its suppliers, which increases in less competitive markets (White, 2013). Power can be associated with different and sometimes interrelated causes, including (1) market concentration, for example in the current market for smartphone operating systems largely dominated by two firms, (2) cooperation and collusion between firms, for example in case of an oil oligopoly manipulating oil prices, (3) rigid contracts, for example when a supplier is locked into a contract preventing a change of business partners, (4) exclusive rights or unique products, for example when a firm owns an important patent providing it with a unique technology, or when consumers consistently consider a firm's product more desirable than comparable products by other firms; or (5) infrastructure and size, for example when economies of scale have enabled a firm to grow significantly larger than others, preventing rivals from competing in terms of handling capacity and cost advantage. In each case the extent of actual power and anti-competitive practice can be contested because of data challenges that hamper estimation (Sexton and Xia, 2018; Swinnen and Vandeplas, 2010), and the fact that market concentration indicators are not always indicative of market power (Adajar et al., 2019). Power can be deployed subtly and is difficult to measure as it does not always manifest in the same way. Firms can exercise power for different objectives, including the maintenance of supernormal profits, which is often considered socially detrimental in terms of consumer and producer welfare relative to perfectly competitive markets. In practice, power can enable a variety of outcomes that are tied to questions of accountability, agency, and contracts. In some cases, market power can enable higher levels of consumer welfare (Williamson, 1968). 3. Resilience implications of market power 3.1. Market concentration and vulnerability Market concentration can increase the power of individual firms, as suppliers and customers have fewer alternative firms to do business with. Concentrated markets in the food system include the global agricultural inputs market, where Bayer-Monsanto, Dow-Dupont, ChemChina-Syngenta, and BASF control 70% of the market (DeCarlo, 2018), or the UK retail market, where Tesco, Sainsbury's, Asda, and Morrisons control 67% of the market (KANTAR, 2020). In earlier studies, market concentration has been related to low levels of diversity and redundancy, and thus vulnerability to shocks (e.g. Hendrickson, 2015; Rotz and Fraser, 2015). The rationale is that a disruption hitting one dominant firm, will have more severe consequences for the food system, and low firm diversity is therefore expected to lead to systemic vulnerability. Market concentration at some levels can nevertheless coexist with system (functional) diversity elsewhere. A concentrated retail market, for example, is not necessarily vulnerable to supply disruptions if its upstream supply base remains diversified. Furthermore, a firm can have numerous subsidiaries, contractors, regionally distributed business locations, and functionally independent divisions and operations. Drucker (2010) makes an important distinction in emphasising the difference between economic diversity as “variety of heterogeneous activities comprising an economy at a specific time”, and industrial concentration as “the extent to which the economic activity of an industry or industrial sector is accounted for by one or a few large firms”. Garmestani et al. (2006) highlight that functional richness and functional diversity are central attributes of resilience and these do not necessarily correlate with market concentration. Vulnerability to shocks is associated with homogenous processes that are not robust, have low capacity of recovery, or for reorientation. A lack of diversity on a functional level can impair redundancy and therefore impair resilience (Cabell and Oelofse, 2012). Accordingly, food system resilience assessments need to specifically consider diversity at the functional level rather than only at the level of the market. 3.2. Firm size: a trade-off between infrastructure and flexibility? Power concentrated in fewer larger firms can often imply larger infrastructure and varying flexibility to address shocks. The last UK food security assessment noted that large conglomerates such as Cargill, Archer Daniels Midland and ConAgra help to safeguard supply by managing contracts and providing knowledge, capital, and infrastructure (DEFRA, 2010). This suggests that economies of scale, itself conducive to market power, can be beneficial for the resilience of food supply in terms of providing ability to handle bulk (Garmestani et al., 2006). Size might also be an asset in case of a regional crisis, when access to global infrastructure and strong logistics enable a firm to divert supply between production regions. In contrast, some have argued that large organisational structures can reduce the reactive flexibility to a shock, compared to smaller more diverse actors that are more flexible and reactive when conditions change (Garmestani et al., 2006; Hendrickson, 2015). When the hospitality sector was closed during the Covid-19 pandemic, for example, several small farms swiftly redesigned their business model to supply directly to consumers (Farming UK, 2020). Socio-ecological systems literature considers flexibility as a central prerequisite to be able to deal with changes (Nelson et al., 2007). Size can therefore imply a resilience trade-off between infrastructure and flexibility. Garmestani et al. (2006) suggest that industries with firms of varying sizes (i.e. some are big and some are small) might be the most resilient as they combine both capacities. 3.3. Conflicts between efficiency and resilience Economic theory suggests that reduced competition leads to lower production levels, economic efficiency and welfare, because the profit-maximising quantity in a non-competitive market is lower than in a competitive setting (White, 2013). However, when considering resource extraction and external costs, a less competitive “slower race” might enable more sustainable practices (Crona et al., 2016). Natural resource literature has shown that resource exploitation rates can be lower when competition is reduced (Solow, 1974; Stiglitz, 1976). When it comes to resource depletion and external costs, the advantages of imperfect competition may therefore offset its disadvantages. A similar efficiency vs. resilience trade-off is evident along supply chains. Efficiency, as defined in a competitive market, implies that slack or redundancy is minimal. Capital and other resources are fully employed, leaving little leeway to buffer disruptions. However, the ability to mitigate a shock impact requires some form of leeway, for example financial capacity to offset price fluctuations caused by a disruption in production. If this capacity to mitigate shock impacts results from additional profit margins due to market power, the higher prices for consumers or lower prices for producers could be considered as a resilience ‘insurance premium’ at the expense of sector efficiency. Price-buffering behaviour happens in the potash industry, where the dominant legal cartel has been able to maintain price stability despite frequent supply shocks (Gnutzmann et al., 2019). An illustrative case in the UK food system was the weather-induced Southern European vegetable shortage in 2017, where financial capacity enabled packers and retailers in the UK to maintain the supply of lettuce to consumers by contracting American producers at higher freighting costs (BBC Radio 4, 2018). However, as shown by price transmission research (Lloyd, 2017), a firm may not automatically make use of this buffering ability. McCorriston et al. (2001) as well as Weldegabriel (2004) analysed whether elevated profit mark-ups due to market power generally absorb price fluctuations, and concluded that this depends on assumed demand and supply elasticities. Without knowing firm-specific incentives, price transmission models are therefore ambiguous as to whether elevated profit mark-ups increase the resilience of food supply. 3.4. Costs and benefits of power imbalances Market power for any supply chain actor typically comes at the cost of reduced freedom and autonomy for other supply chain actors. If producers are dependent on a powerful buyer, a large part of their decision-making control is passed on to the buyer, who can now dictate rules and conditions for their business relationship. The impact of power imbalance on food system resilience is completely dependent on the powerful firm. Power can enable firms to act as positive change makers, for example, though the promotion of sustainable production practices (Folke et al., 2019; Rueda et al., 2017) or through the promotion of robustness in agricultural landscapes to better be able to withstand shocks (Macfadyen et al., 2015). Powerful retailers can also shape consumer attitudes and inform about environmental issues associated with certain food, in order to incentivise sustainable production and possibly higher resilience of ecosystems (ibid.). However, without accountability for social or environmental consequences, powerful retailers can be detrimental. An example are the North Sea cod crises of 2006 and 2019, where stocks fell below safe biological levels (MSC, 2019). As retailers diverted to Atlantic cod to offset the domestic shortage, consumers remained unaffected and unaware of the acute ecosystem depletion in the North Sea (Crona et al., 2016). Power in the supply chain structure prevented the price signal from signalling scarcity (Crona et al., 2016; Nyström et al., 2019). The cod crisis is an example for how continued supply at the consumer end can coincide with an undermining of resilience at the individual ecosystem and producer level. It can also be framed as an information failure wherein powerful firms fail to a transmit information about ecological impacts and, by extension, to promote ecosystem resilience. Similarly, if powerful firms systematically withhold information, knowledge and technology, they impair the adaptive capacity of other firms (iPES Food, 2017). Power imbalances can create both winners and losers, as they shift vulnerability to where there is least power in the supply chain. The combination of downstream competition (i.e. competition amongst retailers) with upstream buyer power (i.e. power of retailers towards suppliers), for example, may reduce consumer prices and hence be beneficial to ensure consumer access to food (Swinnen and Vandeplas, 2010; Zhao, 2019), but at the expense of producers who may be exploited (iPES Food, 2017). An example was the BSE crisis in 1996, when UK beef exports were stopped, and domestic beef consumption decreased drastically over concern that eating beef could lead to fatal Creutzfeldt-Jacob Disease. Using their buyer power, UK retailers reduced the prices paid to livestock farmers by twice the level of the decrease in retail prices, taking advantage of a shock to make additional profits at the expense of producers (Competition Commission, 2000; Lloyd et al., 2003). Beef producers were made doubly vulnerable due to the combined effects of BSE and their lack of bargaining power. Suggested indicators for agroecosystem resilience include social self-organisation, calibrated connectedness, global autonomy and local independence (Cabell and Oelofse, 2012). Dependencies, in contrast, reduce the ability of individual firms to act according to their own locally specific knowledge to adapt to changed circumstances (Hendrickson, 2015; iPES Food, 2017). If power imbalances imply low autonomy and reduced ability along the supply chain to react to changes, the net impact of power imbalance on resilience of food supply may be negative. 3.5. Competition vs. cooperation Collusion between firms increases their joint power in a market and is usually regulated by competition authorities to control any exploitative behaviour. In a crisis however, cooperation can increase capacity to maintain food supplies to consumers, because infrastructure, resources, logistics, and knowledge can be shared. Cooperation can enhance resilience, as long as cooperating firms face incentives to act in a benign way. Cases showing how cooperation increases both resilience and efficiency have been found in seafood supply (Nyström et al., 2019), pork supply (Leat and Revoredo-Giha, 2013) and UK retailer supply networks (Duffy and Fearne, 2004). The collaboration-competition tension was also illustrated during the Covid-19 pandemic, when the UK government relaxed competition laws allowing retailers to collaborate to address distribution challenges (UK Government, 2020). Concerns about the fine line between cooperation and collusion have nevertheless been raised (BBC, 2020). Sykuta and Cook (2001) observe that ownership structure of a firm can be a factor in the extent of cooperative contracting. If so, then the question of the distribution of power (i.e. who holds the firm) is an important corollary to resilience outcomes. A comparison of investor-owned and producer-owned firms illustrates how cooperative contracting between producers is more efficient than contracting in which distrust between the parties leads to an incentive to withhold information (ibid.). Producer ownership creates accountability towards producers, which can be an incentive to act in a resilience-promoting way. This was illustrated by a case from the UK milk supply chain in winter 2018, when cold weather conditions interrupted logistics and UK dairy farmers were forced to discard thousands of litres of milk that could not be collected (Perrett, 2018; Yates, 2018). Although this milk did not reach supermarkets, big co-operatives such as Arla continued to pay farmers for their production (ibid.). This decision to support producers is an example for producer risk diversification through cooperation, as Arla is owned by 2500 farmers (Perrett, 2018). However, the line between voluntary cooperation based on trust and involuntary cooperation based on coercion is difficult to determine (Dapiran and Hogarth-Scott, 2003), and power imbalances can prevail in cooperative and competitive systems. Regulatory scrutiny may sometimes find this distinction hard to detect. 4. Regulating for resilient food systems Resilience has been assumed as an emergent property of largely self-regulating market structures that comprise the food system in many countries. However, there is no guarantee that self-organisation, shared underlying infrastructures and other information flows between actors configure to generate a socially optimal compromise between lowest possible consumer prices and resilience to exogenous shocks. This includes stability of food supplies, plus consideration of other environmental and health external costs that might reasonably be expected of a system that seeks to promote sustainable production and consumption or a “whole society approach to food” (Lewis, 2020). The dominant food system in the UK is arguably focused predominantly on financial returns to shareholders, an objective that is not always convergent with this broader scope of resilience or transparent stewardship of the natural resource base on which it depends (Clapp and Isakson, 2018). As with the financial system at the time of the global financial crisis of 2007–2008, risk taking – arguably amplified by market power – is largely sanctioned by current regulation on the presumption that internal incentives align with broader social goals, and that the system has an in-built incentive not to fail. This presumption is an article of faith, both untested and risky. Notwithstanding largely coping with the recent stress-test from COVID-19 (Moran et al., 2020), there is nothing intrinsically self-correcting about current systems, which are responsible for a significant burden of national health and environmental externalities (Afshin et al., 2019; Springmann et al., 2018). Some have suggested that voluntary market discipline, corporate responsibility initiatives, and spontaneous collective action by some market participants, could correct detrimental social and environmental impacts. However, this notion has not been proven to be very reliable (Jones and Nisbet, 2011) and there are no market mechanisms to drive corrective actions to market failure. Expecting the delivery of a public good – resilience – by a system in private hands and increasingly concentrated in structure may therefore be hazardous. Regulation is a response to market failure. Current food system regulation largely monitors and controls some aspects of market power and the maintenance of food safety, the latter a credence attribute of food and therefore associated regulation is a public good function. If resilience is a public good, then there is a need for more regulation and research beyond market power and food safety, to understand risks and to untangle the additional elements of responsibility and agency of both private and public sectors with regards to resilience. 5. Conclusion Interest in food system resilience has increased in the wake of several regional and global crises, which have revealed systematic vulnerabilities that can be both amplified and neutralised by the presence of market power in parts of the supply chain. Power relations are not extensively discussed in resilience literature, and resilience is not extensively discussed in economic literature. Efficient markets constituted by profit-seeking actors have no built-in mechanism to deliver resilience. We highlight that some aspects associated with market power, such as infrastructure, financial capacity, and cooperation can be enablers for enhanced resilience in times of crisis. We equally highlight the need to consider how resilience can be jeopardised when the interests of dominant powerful firms are not aligned with societal interests, and when detrimental environmental and social effects are not regulated for. In such circumstances, risk is amplified by power imbalances. The provision of resilience – as a public good attribute of a system that is largely in private hands – potentially calls for wider scope of regulation that scrutinises elements such as functional diversity, flexibility, efficiency/redundancy trade-offs, autonomy, cooperation, agency and the regulation of environmental impacts to make firms accountable. This gets us nearer to whole society approach to food governance, suggested by some commentators.

#### Food prices high now and more increases on the horizon, only the plan’s use of antitrust can reverse the trend

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Agribusiness executives and government policymakers often praise the U.S. food system for producing abundant and affordable food. In fact, however, food costs are rising, and shoppers in many parts of the U.S. have limited access to fresh, healthy products. This isn’t just an academic argument. Even before the current pandemic, millions of people in the U.S. went hungry. In 2019, the U.S. Department of Agriculture estimated that over 35 million people were “food insecure,” meaning they did not have reliable access to affordable, nutritious food. Now, food banks are struggling to feed people who have lost jobs and income thanks to COVID-19. As rural sociologists, we study changes in food systems and sustainability. We’ve closely followed corporate consolidation of food production, processing, and distribution in the U.S. over the past 40 years. In our view, this process is making food less available or affordable for many Americans. Fewer, Larger Companies Consolidation has placed key decisions about our nation’s food system in the hands of a few large companies, giving them outsized influence to lobby policymakers, direct food and industry research, and influence media coverage. These corporations also have enormous power to make decisions about what food is produced how, where and by whom, and who gets to eat it. We’ve tracked this trend across the globe. It began in the 1980s with mergers and acquisitions that left a few large firms dominating nearly every step of the food chain. Among the largest are retailer Walmart, food processor Nestlé, and seed/chemical firm Bayer. Between 1996 and 2013 Monsanto acquired more than 70 seed companies, before the firm was itself acquired by competing seed/chemical firm Bayer in 2018. (Image credit: Philip Howard) Between 1996 and 2013 Monsanto acquired more than 70 seed companies, before the firm was itself acquired by competing seed/chemical firm Bayer in 2018. (Image credit: Philip Howard) Some corporate leaders have abused their power–for example, by allying with their few competitors to fix prices. In 2020, Christopher Lischewski, the former president and CEO of Bumblebee Foods, was convicted of conspiracy to fix prices of canned tuna. He was sentenced to 40 months in prison and fined $100,000. In the same year, chicken processor Pilgrim’s Pride pleaded guilty to price-fixing charges and was fined $110.5 million. Meatpacking company JBS settled a $24.5 million pork price-fixing lawsuit, and farmers won a class action settlement against peanut-shelling companies Olam and Birdsong. Industry consolidation is hard to track. Many subsidiary firms often are controlled by one parent corporation and engage in “contract packing,” in which a single processing plant produces identical foods that are then sold under dozens of different brands–including labels that compete directly against each other. Recalls ordered in response to food-borne disease outbreaks have revealed the broad scope of contracting relationships. Shutdowns at meatpacking plants due to COVID-19 infections among workers have shown how much of the U.S. food supply flows through a small number of facilities. With consolidation, large supermarket chains have closed many urban and rural stores. This process has left numerous communities with limited food selections and high prices–especially neighborhoods with many low-income, Black or Latinx households. Widespread Hunger As unemployment has risen during the pandemic, so has the number of hungry Americans. Feeding America, a nationwide network of food banks, estimates that up to 50 million people– including 17 million children–may currently be experiencing food insecurity. Nationwide, demand at food banks grew by over 48 percent during the first half of 2020. Today’s food system is complex. Simultaneously, disruptions in food supply chains forced farmers to dump milk down the drain, leave produce rotting in fields, and euthanize livestock that could not be processed at slaughterhouses. We estimate that between March and May of 2020, farmers disposed of somewhere between 300,000 and 800,000 hogs and 2 million chickens–more than 30,000 tons of meat. What role does concentration play in this situation? Research shows that retail concentration correlates with higher prices for consumers. It also shows that when food systems have fewer production and processing sites, disruptions can have major impacts on supply. Consolidation makes it easier for any industry to maintain high prices. With few players, companies simply match each other’s price increases rather than competing with them. Concentration in the U.S. food system has raised the costs of everything from breakfast cereal and coffee to beer. As the pandemic roiled the nation’s food system through 2020, consumer food costs rose by 3.4 percent, compared to 0.4 percent in 2018 and 0.9 percent in 2019. We expect retail prices to remain high because they are “sticky,” with a tendency to increase rapidly but to decline more slowly and only partially. We also believe there could be further supply disruptions. A few months into the pandemic, meat shelves in some U.S. stores sat empty, while some of the nation’s largest processors were exporting record amounts of meat to China. U.S. Senators Elizabeth Warren (D-MA) and Cory Booker (D-NJ) cited this imbalance as evidence of the need to crack down on what they called “monopolistic practices” by Tyson Foods, Cargill, JBS, and Smithfield, which dominate the U.S. meatpacking industry. Tyson Foods responded that a large portion of its exports were “cuts of meat or portions of the animal that are not desired by” Americans. Store shelves are no longer empty for most cuts of meat, but processing plants remain overbooked, with many scheduling well into 2021. Toward a More Equitable Food System In our view, a resilient food system that feeds everyone can be achieved only through a more equitable distribution of power. This in turn will require action in areas ranging from contract law and antitrust policy to workers’ rights and economic development. Farmers, workers, elected officials, and communities will have to work together to fashion alternatives and change policies.

#### Ag collapse induces cascading failures that risk all life

C. E. Richards et al (With R. C. Lupton & J. M. Allwood, Department of Engineering, University of Cambridge) 2021 [“Re-framing the threat of global warming: an empirical causal loop diagram of climate change, food insecurity and societal collapse” Climatic Change (2021) 164: 49, <https://link.springer.com/article/10.1007%2Fs10584-021-02957-w>, loghry]

The distribution of data-driven methods used across the evidence base is notably different for each societal collapse proxy. Evidence points for natural mortality mostly use collection/ analysis of interview/survey data. This is likely because the minimum daily food intake for human survival is well established (FAO 2004); as such, statistical analysis of food and mortality data sets would not yield significantly new insights into thresholds whereas interviews/surveys can provide insight into an individual’s circumstances influencing this relationship. Evidence points for conflict mortality mostly use statistical analysis of existing datasets. This likely reflects the interest in rigorously curated conflict datasets, such as UCDP/ PRIO (2019), across the conflict and peace fields. Evidence points for emigration mostly use collection/analysis of interview/survey data, likely because this provides nuanced insight into an individual’s decision to migrate. It may also be due to data availability and quality challenges that limit quantitative statistical analyses, which are being addressed by groups such as IOM GMDAC (2019). Amongst these data challenges, it is important to recognise the issue of reconciling different types of voluntary and forced migration with causal drivers, given the complex social, economic and political factors at play; this challenge similarly applies to the other societal collapse proxies but is particularly noted in the migration studies. We observe from these studies that a food insecurity threshold for natural mortality is well established but thresholds for conflict mortality and emigration are not. Indeed, distinguishing causal drivers within datasets and defining quantitative thresholds for these determinants remains a ‘grand challenge’ (Kintigh et al. 2014). Each data-driven method offers different advantages. The complex systems models each describe ‘chunks’ of the system at different scale and granularity. The models provide mathematical definition, are calibrated to real-world data and enable quantitative simulation of key relationships in the system. The statistical analyses quantitatively examine relationships between a dependent variable and one or more independent variables within the system, which can be used as a mathematical basis for extending modelling capabilities. The collection/ analysis of interview/survey data provides insight into qualitative aspects of human perspective and decision-making that quantitative data sets cannot provide directly. The data-led case study/scenarios combine quantitative data with qualitative expert interpretation to better understand global trends and forecasts. These latter two methods can also be used to inform the development of modelling capabilities, the scenarios analysed by such models and their application in decision-making processes. Collectively, these different data-driven methods can yield useful insights into the nuances of relationships in the system of interest. 4.2 Causal loop diagram of the climate change, food insecurity and societal collapse in contemporary society at global scale and national granularity The main result of this paper is the CLD (the f-CLD from Section 3, Step V), presented in Fig. 5. It structures the relationships between climate change, food insecurity and societal collapse as described in our new empirical evidence base (presented in Fig. 4 and discussed in Section 4.1.). We discuss three key aspects of the CLD, namely insights related to the spread of empirical evidence, the qualitative complex system depicted, and quantitative complex system modelling, below, alongside consideration of well-established benefits and limitations of CLDs. Our CLD is presented in a novel format that documents the spread of our empirical evidence base. We use line thickness and colour, respectively, to depict the density and type of the data-driven methods used by the empirical evidence points to analyse a given link between two variables. Doing this aids comprehension of where existing work has been focused with respect to the climate change, food insecurity and societal collapse causal pathway. It may also help with the identification of gaps in existing analyses. For example, we can see that the link between food insecurity and conflict has been investigated mostly by evidence points using statistical analyses (blue), whereas the links between food insecurity and migration, and food insecurity and natural mortality, have been investigated mostly by evidence points using interviews/ surveys (green). This hints that it may be useful to investigate the former using quantitative statistics, and the latter using qualitative interviews/surveys, to gain further insights offered by the different data-driven methods as described in Section 4.1. It is important to recognise that our CLD may show negligible density for important links or even be missing important variables and/or links, either because they have not yet been studied or because our key word search failed to identify evidence points that have studied them. For example, our study focused on the climate change, food insecurity and societal collapse causal pathway, so the density of our empirical evidence is concentrated along links central to this pathway; whereas, the links between peripheral variables in the system, such as between fertility and births, show a lower density of empirical evidence. Similarly, our use of the population loss set of societal collapse proxies means that the evidence base details natural mortality, conflict mortality and emigration; whereas, the institutional breakdown set are not detailed. In considering this issue, our methodology attempted to maximise the rigour and transparency of our study by documenting the spread of our empirical evidence base to help make the reader aware of exactly how much and what type of evidence was supporting the CLD presented here. Further, we can see that while empirical studies have linked climate change via food insecurity to our societal collapse proxies of natural mortality, conflict mortality and emigration, we found no empirical studies linking these proxies to the explicit term of societal collapse. This was expected given the motivation of this study (Section 1) and is due to the fact that there are no contemporary events of societal collapse, under the same definition as those in the historical studies pre-dating contemporary society, that enable these links to be empirically studied (Beard et al. 2020). Having considered the spread of empirical evidence, we now consider the complex system documented. A key benefit of CLDs is that they simply present a myriad of information in a single diagram; in doing so, CLDs enable comprehension of the structure and behaviour of complex systems, including feedbacks, intervention points and far-reaching interdependencies (Sterman 2011). Our CLD visually depicts a system of 39 variables, 105 links and 32,000 feedback loops,1 integrating information from different fields including climate science, food security, conflict, migration and health research. Walking through the CLD at a high-level, we can see how population growth and lifestyle emissions, influenced by institutional/demographic factors (e.g. emission reduction incentives), combine to directly drive climate change. Similarly, they indirectly drive climate change via consumer demand on food production, which produces emissions directly (e.g. ruminant livestock) and indirectly via industrial capital/output (e.g. processing factories). The environmental risk factors (e.g. extreme weather events) of climate change may cause losses of food production either directly (e.g. plant disease) or indirectly via agricultural input availability (e.g. loss of water source for irrigation). A country’s food availability is influenced by domestic food production and international food trade. Food accessibility is influenced by its food price, which responds to domestic (e.g. cost of food production and distribution) and international (e.g. international food price) markets, and institutional/demographic factors (e.g. food subsidies). Food utilization is influenced by infrastructure/services (e.g. education) and institutional/demographic factors (e.g. cultural traditions). Food insecurity is underpinned by these three pillars of food availability, food accessibility and food utilization. For a given country, food insecurity can drive natural mortality (i.e. starvation), conflict and migration, contributing to population loss, as well as economic shocks and socio-political instability, contributing to institutional breakdown, which exacerbates the risk of societal collapse. Beyond a given country suffering increased natural mortality, famines (i.e. food insecurity) can place pressure on international humanitarian efforts (i.e. institutional risk factors). Conflict may occur domestically or internationally and can feedback to exacerbate food insecurity and institutional fragility (i.e. institutional risk factors). Potential mass emigration can increase pressure on food availability, natural resources and infrastructure/services in the destination nation, which can lead to socio-cultural tensions (i.e. institutional risk factors) that fuel conflict. Food insecurity can also directly contribute to institutional risk factors such as social unrest, political instability and economic inequality, which increase the risk of societal collapse due to institutional breakdown, that may also cascade internationally. While already fragile states are expected to be hit the worst directly, these insights reveal the indirect ramifications of climate change on our globalised society (Kemp 2020), with serious consequences for humanity’s ‘existential security’ (Sears 2020).

#### Breaking up big ag consolidation key to avoiding massive food supply disruption

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But the outsized media, political and social attention paid to the tech industry has diverted focus from other important sectors. There are monopolies and domestic cartels elsewhere—in healthcare, pharmaceuticals, media and communications, as well as food and agriculture. These industries produce goods and services that are essential to the health, safety and well-being of consumers, and even to our national security, which is why antitrust laws must be enforced against violations in these sectors, too. The food system has been particularly fertile ground for rising concentration, the emergence of dominant firms and formation of domestic cartels. Some of the largest players have been allowed to engage in anticompetitive mergers and practices that are as serious, if not more so, than those of which Big Tech stands accused. Much like their counterparts in the tech sector, many of the largest food and agriculture corporations have acquired their way to dominance by gobbling up rival businesses. This has occurred across the food system, including digital farming startups, biotechnology firms, food manufacturers, flour millers, farm machinery manufacturers and grocery store chains. But nowhere has it been more pronounced than agricultural inputs. In acquiring competitors both small and large, the six biggest agricultural biotechnology firms collapsed rapidly into the Big Three—Bayer, DuPont and ChemChina. This wave of consolidation, which was met with little resistance from antitrust authorities, gave these corporations control of proprietary, multi-level systems of traits, seeds, agrochemicals and digital technology that limit farmers’ choices and lock them into limited cropping systems. But some parts of the agricultural sector are rife with other damaging antitrust violations that we haven’t seen in Big Tech. This includes alleged conspiracies to fix prices and allocate markets—practices that are made possible by high levels of consolidation and concentration. One of the most notable examples of this is in beef packing, where the top four firms now control about 85 percent of the national market. Given the market power that the packers possess, it comes as no surprise that they have allegedly abused it: On multiple occasions, these packers have been accused of colluding to pay ranchers less for cattle and charge consumers more for beef. However, this behavior isn’t unique to the beef-packing sector. Similar allegations of price fixing have been leveled against tuna, chicken, turkey, egg, pork and peanut producers, among others. These cartels are especially egregious because processors allegedly collude on both the sell and buy sides, hurting both farmers and consumers—including independent restaurants and grocery stores. Beyond anticompetitive practices, rising concentration has implications for our national food security. Concentration-driven bottlenecks along the supply chain make the entire food system vulnerable to disruption, a fact that has become painfully obvious during the pandemic. Following a rash of COVID-19 outbreaks at meatpacking plants, national meat processing capacity declined by nearly half, resulting in supply chain breakdowns and price gouging that affected millions of Americans—many of whom were already experiencing food insecurity. If disruption in the food supply system weren’t enough, the communities that support our food system are also at risk. Foreign companies now own a non-trivial portion of the United States’ farmland and food system. These entities not only resist food labeling and regulations that protect and inform consumers, they also take jobs and resources out of rural communities, accelerating social and economic decline and suppressing the growth of independent businesses that would contribute to revitalization. Kudos to antitrust enforcers for finally taking aim at Big Tech. Monopolization cases—if they produce meaningful results—will improve the welfare of hundreds of millions of people that engage in online search, social networking and shopping. But we should not stop there. Americans depend on a safe, functional and resilient food system at least as much as they depend on their social media networks or ability to search the internet. Antitrust enforcers must turn their attention there next.

### Solvency

#### Plan solves warming, food prices, and soil loss

Tam and Beilskis, 4/1/2021; Kristen Tam, Olivia Bielskis. “Stimulating Antitrust Enforcement to Expand the Regenerative Agriculture Movement.” UCLA: Library. Retrieved from https://escholarship.org/uc/item/0m16g2r5

In order to uphold competition in the marketplace, the Courts and federal regulation agencies must take deliberate action against mergers that will inevitably have profound effects on long-term competition. In order to address prong one, where the Courts have not erred on the side of precaution and have not granted antitrust injury to parties that claim “the threat of loss of profits due to possible price competition,” the Courts should interpret American antitrust laws with Congress’s intent to protect competition, rather than through the lens of consumer welfare, a strategy that has failed to uphold empirical integrity, seeing as consumer prices have risen.110Specifically, they should interpret Section 16 of the Clayton Act to allow for antitrust injury to include the threat of loss of profits due to possible price competition following a merger. Not only will this rightfully decrease the barrier to bringing forth an antitrust injury, but it will bring precedent back into alignment with the purpose and intention of the Clayton Act and prevent further consolidation in the agriculture marketplace. In order to address prong two, where the DOJ and FTC have largely allowed consolidation in the marketplace to transpire with limited regulation, the DOJ and FTC must increase the number of agriculture and meatpacking merger acquisitions that they block by holistically analyzing the scope of the merger’s market power. Additionally, they must reinvestigate current corporations in the market that have unruly market power, such as Tyson, and require divestiture. Tyson is sued on average 2.7 times every month, however, it still holds a substantially large percentage of the meat processing and packingindustry.111 By implementing both of these recommendations, the federal government can truly fulfill their regulatory responsibilities by laying the groundwork for increasing competition by maintaining or increasing the number of farms, distributors and meatpacking businesses. CONCLUSION The growing consolidation of America’s agriculture industry is alarming and poses a continuous threat to the expansion and transition to regenerative farming practices. The DOJ, FTC and the Courts have embraced Robert Bork’s “consumer welfare standard” philosophy and employ stricter standards to prove antitrust injury, allowing more consolidation to occur in the agriculture industry. These conglomerates have increased market prices,112and in the long run, are implementing farming practices that are destroying the soil and security of America to produce its own food. There are more small and medium sized farms that implement regenerative practices such as applying manure and organic fertilizers. In order to expand the implementation of regenerative practices, large operations need to be broken down and further prevented from forming. Ultimately, allowing merges to occur and limiting regulation on the current marketplace by the Courts and federal agencies is harming consumers, farmers, and the government. The principles of fairness and equal opportunity in the United States economy are threatened if we allow the few consolidated corporations to exist in the marketplace. The government, consumers, and farmers rely on these few firms as key suppliers and buyers; such dominance by a handful of corporations gives way to their disproportionate influence on regulatory and political processes meant to hold them accountable. The DOJ, FTC and Courts must utilize their statutory responsibilities to break down this corrupt system and create a more competitive marketplace. This will allow more firms to implement regenerative practices and protect our food systems and environment for generations to come. A failure to act constitutes a dereliction of duty to the people, the planet, and the purpose behind antitrust laws intended to uphold fair and ethical business practices.

#### US is key—no other country can stimulate the global change.

Dernbach 9—Professor of Law @ Widener University Law School [John C. Dernbach, “Chapter 1: Sustainable Developme and the United States,” Agenda for a Sustainable America, Edited By: John C. Dernbach, January 2009]

The Rio agreements also make clear that developed countries must lead the effort to achieve sustainability; they have the most resources, the most sophisticated technologies, the greatest know-how—and also the greatest responsibility for causing many of the environmental problems that sustainable development addresses. While all countries have a role to play, developed countries have the greatest responsibility. And among the developed countries, the dominant nation—in economic, military, educational, scientific, and technological terms—is the United States. This country thus has a major role to play. Our nation’s global energy, ecological, and economic footprint is so large that it is difficult to imagine how the world can achieve sustainability unlessless the United States also does. We can lead or follow, but we are too big to get out of the way. What we do within our own borders, moreover, can influence other countries, both positively and negatively. We can create models of sustainability that are so attractive that other countries will want to emulate or improve on them. Or, by appearing fearful or indifferent in spite of our wealth and power, we can dissuade less wealthy and powerful countries from doing what they also need to do. For better and for worse, the success or failure of the United States in moving toward sustainability will influence and perhaps determine whether the rest of the world succeeds in the project of sustainable development. The ancient Greek mathematician Archimedes famously said, “If I had a lever big enough, I could move the world.” The United States could be that lever for sustainable development. This book is going to press as the United States is in its sixth year of the war in Iraq, which has undermined America’s standing in the eyes of many. In addition, our status as the “one great superpower” is likely to change with the growth of Chinese and Indian economic and political power and the continuing integration of Europe. Because of America’s global footprint and its history of international leadership on other issues, however, the United States could—and should—take a leadership role on sustainable development. Pg. 3-4

#### All data suggests no war—interdependence, international actors, deterrence. And if there is war, it doesn’t escalate

Szayna et al. 17. Thomas S. Szayna is a senior political scientist at the RAND Corporation. Stephen Watts is a senior political scientist and associate program director for the Arroyo Center's Strategy, Doctrine, and Resources Program at the RAND Corporation. Angela O'Mahony is assistant dean for academic affairs at the Pardee RAND Graduate School and a senior political scientist at the RAND Corporation. Bryan Frederick is a senior political scientist at the RAND Corporation. Jennifer Kavanagh is a senior political scientist at the RAND Corporation and director of the Arroyo Center's Strategy, Doctrine, and Resources Program. 2017, "What Are the Trends in Armed Conflicts? What Do They Mean for U.S. Defense Policy?," RAND Corporation, <https://www.rand.org/pubs/research_reports/RR1904.html> - AM

As the U.S. national military strategy (Joint Chiefs of Staff, 2015) recognizes, the current global security environment is highly unpredictable, leading the United States to face “simultaneous security challenges from traditional state actors and transregional networks of sub-state groups—all taking advantage of rapid technological change.” These security challenges reflect a variety of factors—for example, a highly interconnected and interdependent global economy, the unprecedented stress on the earth’s resources created by population growth, the creation of new and highly fragile sovereign states, and the rapid rise of emerging powers outside the Euro-Atlantic sphere. Some believe that these security challenges have, in turn, increased the potential for armed conflicts to emerge—a potential that seems borne out by conflict in Iraq, Syria, Afghanistan, Ukraine, Yemen, Libya, and elsewhere. With global and regional security challenges increasing and the world focused on the armed conflicts unfolding now, it would seem that the world has become a much more dangerous place.1 But viewed from a longer-term perspective, is this really the case? Analysts and conflict scholars have noted widely that the incidence of armed conflict in the world had actually decreased substantially in the past few decades before spiking in 2014–2015. Interstate war (that is, war between states) has become a rare event. And while territorial and other disputes between countries persist, analysts and conflict scholars argue that they are much less likely to escalate to interstate wars. Similarly, from a high-water mark in deadly intrastate armed conflict (that is, civil wars, terrorism, and related political violence) in the early 1990s following the dissolution of the communist federal states, such scholars contend that intrastate armed conflict had declined steadily for two decades, before the wars in Syria, Ukraine, and elsewhere partially reversed those trends beginning in 2014. When we turn from looking at the number of wars and conflicts to the number of people killed in armed conflict, we find that the human death toll of these disputes remains lower than in the early 1990s or in the prior decades, the recent uptick in the number of conflicts notwithstanding. These findings are in line with the projections of the National Intelligence Council’s Global Trends 2030 (2012) and with the large literature in the field of conflict and peace science during the past two decades. We went further and drew implications for U.S. defense policy. What explains this apparent puzzle of persistent disputes in the world coupled with a decline in longer-term trends in the incidence of armed conflict? Are the current wars in such places as Syria and Ukraine indications of a world order that is fraying, with sectarian and ethnic violence worsening? Are major powers increasingly likely to challenge the United States, ultimately leading to wars between states? Or are the implications of the current set of violent conflicts being overstated? Looking at the deeper determinants of armed conflict, will continued advances in prosperity, economic interconnectedness, democracy, and other factors contribute to a more peaceful world in the long term? To answer such questions, we took a rigorous empirical approach. Specifically, we (1) analyzed armed conflict data from the past century from conflict-specific databases for both the incidence and intensity of intrastate conflict (i.e., civil wars, insurgencies, and other domestic unrest) and interstate conflict (i.e., wars and other conflicts between states); (2) examined the literature to understand what factors drive such conflict; (3) projected trends in the key factors for the period 2013–2040 and examined alternative future scenarios to understand the implications of unexpected but plausible future events; and (4) assessed what the trends mean for U.S. defense policy. The ultimate goal was to look beyond today’s crises and assess long-term trends in armed conflict—particularly the potential for growth in the incidence of deadly political conflict —to better understand the degree and nature of national security risks the United States will face as it makes decisions about force structure, acquisitions, and other issues with long-term implications. WHAT ARE THE HISTORICAL CONFLICT TRENDS? Despite the prominence of war and strife in the daily news cycle, our empirical research demonstrated that, up until 2014, the overall levels of deadly political conflict had been declining for decades—since the end of the 1960s in the case of interstate wars (Figure 1) and since the mid-1990s in the case of intrastate conflict (Figure 2). Comparing the two figures, interstate armed conflict has decreased the most, both in the incidence and intensity of armed conflict, so that its incidence is increasingly rare and occurs mostly at lower intensities. Importantly, the same patterns emerged no matter what databases were used. At least in terms of fatalities stemming from political armed conflict, the world is a safer place than it has been for many decades. While many groups in the world remain willing to pursue violent means to attain their ends, the number of armed conflicts that have resulted from these tensions has declined. WHAT ARE THE KEY FACTORS AFFECTING CONFLICT? The key question for policymakers, however, is not whether armed conflict has declined in the past. Rather, it is whether such declines are likely to continue in the future or if the recent uptick in violence is the beginning of a trend that would return the global incidence of conflict to levels last seen decades earlier. We cannot attempt to answer these questions without understanding why peaceful disputes turn violent. To better understand the drivers of armed conflict, we examined the extensive literature on this subject, focusing on scholarly work that uses rigorous empirical approaches. That research identified 12 key factors as the primary drivers of the incidence of conflict: • capacity of state institutions • degree of ethnic and sectarian polarization • prevalence of consolidated democracies • rate of economic growth • extent of economic interdependence • capabilities of international organizations • degree of U.S. preeminence • strength of international norms • diffusion of lethal technology • degree of resource stress because of population pressures • degree of regional hegemony • degree of territorial contestation. A quick review of these factors suggests why conflict has declined over the past decades. The world has experienced a dramatic expansion in economic growth and international trade over the past several decades, which has elevated hundreds of millions of people out of poverty in Africa, Asia, and Latin America and has given them a stake in a stable environment conducive to further development and the accumulation of wealth. These trends have been accompanied by the development of many stronger and more-democratic states, allowing for conflict resolution mechanisms that defuse or resolve conflicts peacefully. Similarly, the emergence of international organizations and norms that aim to promote peaceful relations between states, along with the growth of active peacekeeping and peace enforcement by international actors, has clamped down on some of the conflicts and perhaps deterred others. As these factors have become more prevalent throughout the international system, the incidence of deadly political conflict has generally declined alongside them. These positive trends have not been evenly distributed, and many states or regions continue to be plagued by frequent armed conflict. However, the long-term global trends in these key factors help to explain why deadly political conflicts have generally become less frequent, the wars of the past few years notwithstanding. Moreover, the potential for these trends to continue into the future supports the belief that the observed long-term decline in armed conflict may persist. WHAT DO THE TRENDS IN FUTURE CONFLICT LOOK LIKE? We used our historical analysis to better understand future conflict trends and what factors could reverse the long-term trend toward gradually declining levels of war. To do so, we built models of conflict incidence based on both historical conflict data—since 1900 for interstate conflict and since 1964 for intrastate conflict—and historical data for the key factors discussed already. We then projected data for these key factors out to 2040 and used these projections, together with the conflict models, to project the future incidence of conflict out to 2040 as well. These calculations form a “baseline” projection of future conflict and war—that is, the levels of violence that can be expected if the future contains no major surprises. We first compared the levels of interstate war predicted by our model to the historical record to see how well the model performed. As can be seen in Figure 3, the model predicted surges in armed conflict (represented by the green line in the figure) that roughly corresponded to the spikes in conflict during the two World Wars and the early Cold War (represented by the vertical bars), strengthening confidence in the model. Looking forward with the help of projected data for the key factors that predict the occurrence of armed conflict, the model projects a low, but not zero, incidence of interstate war going forward. Notably, there is a potential modest increase after 2020 following projected power transitions in Eurasia and East and Southeast Asia. We developed a similar model and conflict projections for the incidence of intrastate war (Figure 4). As with the projections for interstate war, the baseline projection for intrastate war also shows declines in the future.2 These projections suggest that the increase in violence in 2014–2015 is likely to prove short-lived unless there is a radical change in the decades-long trend toward higher levels of economic development, guarantees of minority rights, democratic governance, and other factors affecting the incidence of intrastate conflict. Of course, the future routinely surprises us; projections are littered with examples of unanticipated events that turn things on their heads. We therefore adopted an approach to identify potential conflict risks in the future. We identified four worst-case scenarios that could affect the propensity for conflict: global depression, a revisionist China, state decay, and an environmental catastrophe. These are not all the possible “wild card” events, nor are they necessarily the most likely. Rather, we chose them to represent frequently discussed cases with extreme values on the key factors that drive conflict propensity. They can be seen as “stress tests” of the stability of the international system, roughly analogous to the “stress tests” designed to test the resilience of U.S. and other banking systems following the 2008 financial crisis. The table on page 6 discusses the worst-case scenarios and the rationale for them. Figures 5 and 6 illustrate the projections for interstate and intrastate conflict and what might happen in the “stress tests.” In these alternative future scenarios, only two show potential for interstate conflict that substantially exceeds the baseline: Global Depression and Revisionist China. A global depression is projected to send levels of interstate war sharply upward, but it will only elevate such level of war to the levels seen in the late Cold War period, well below the historical highs experienced in prior decades. However, a revisionist China would send the projected incidence of war to levels nearly on par with some of the most violent periods of the past century. While not reaching the levels of the two World Wars, these levels do parallel the early Cold War period, which most notably included the Korean War. For intrastate war (Figure 6), only Global Depression shows sharp projected increases in the incidence of intrastate war and conflict. The projected levels of intrastate war rise to a level that approaches the peak values projected by the RAND model for the early post–Cold War period. This finding suggests that long-term economic and political trends, such as economic growth and gradual democratic consolidation in many parts of the developing world, are and have been quite positive—positive enough, in fact, to offset the effects of most (but not all) short term crises on the long-term anticipated likelihood of conflict. These four extreme scenarios, however, are only a handful of the possible futures U.S. decisionmakers might encounter. Consequently, we also developed a tool to examine how an enormous number of possible changes in key factor projections affect the baseline conflict projections. This tool allows Army planners to explore 1,160 alternative futures based on combinations of changes in key factor projections. WHAT DO THE TRENDS MEAN FOR U.S. DEFENSE POLICY? Our long-term perspective looks beyond the headlines in today’s news and provides indications of a more pacific world. Overall, deadly political conflict has been gradually declining, and anticipated trends in the major drivers of war and peace suggest that such conflict is likely to continue to decline over the next couple of decades. Even the worst-case alternative scenarios examined here—designed to serve as stress tests— did not produce the same extremes of armed conflict seen in the past century, although some of them did yield violence well beyond current levels.