### 1 - Innovation

#### We are on pace to cut emissions by half in 2030 and prevent 2 degree tipping point, but continued biotech innovation is key

**Mcmurry-Health 5-21** Michelle Mcmurry-Heath May 21, 2021, 5-21-2021, "To help solve climate change, look to the biosciences," STAT, <https://www.statnews.com/2021/05/21/climate-change-solutions-from-biosciences/> //Nato

President Biden’s pledge to cut U.S. greenhouse gas emissions in half by 2030 is an admirable and ambitious undertaking. It’s nearly double the goal set by President Obama in 2015. And it establishes the United States as a world leader in battling climate change. But reaching the president’s target in just under 10 years is a monumental task. It’s so big, in fact, that we’ll never get there by government action alone. No amount of vehicle efficiency standards, forest conservation efforts, or gas taxes can [fully solve the problem](https://www.rff.org/publications/issue-briefs/emissions-projections-for-a-trio-of-federal-climate-policies/). We have to science our way out of it. The biosciences, including biotechnology, will play a pivotal role in the fight against climate change. It is already leading the way on several fronts. According to a [report from BIO](https://www.bio.org/sites/default/files/2021-04/Climate%20Report%20Executive%20Summary_FINAL.pdf), the organization I work for, the biotech industry’s green initiatives could mitigate the equivalent of 3 billion tons of carbon dioxide every year by 2030, or [about half](https://www.eia.gov/environment/emissions/carbon/#:~:text=Energy%E2%80%90related%20CO2%20emissions%20in,economy%20declined%204.9%25%20in%202019.) of the country’s annual CO2 emissions. Take food, for example. Food consumption — and production — is central to human existence. Global food production accounts for [one-quarter of greenhouse gas emissions](https://ourworldindata.org/food-ghg-emissions). A recent report from an international team of researchers concluded that even if all other fossil fuel emissions were eliminated, [emissions from food production alone](https://science.sciencemag.org/content/370/6517/705) would prevent us from reaching a key goal of the climate change agreement signed in Paris: preventing the global temperature from [rising more than 2 degrees Celsius](https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement). Halting food production isn’t an option, so biotech companies are helping farmers become part of the climate solution. Take, for example, Boston-based [Joyn Bio](https://joynbio.com/). It is engineering bacteria that pull nitrogen directly from the atmosphere. These microbes then pass the nitrogen to crops like wheat and corn, reducing the need to make, transport, and apply nitrogen fertilizers, which reduces greenhouse gas emissions. Minnesota-based Acceligen is using a technique it calls [precision breeding](https://www.acceligen.com/precision-breeding/) that improves the health of livestock while reducing their waste, greenhouse gas emissions, and water usage. Biotechnology can also help protect food from climate change. As fungal and bacterial infections accelerated by [human-driven environmental disturbances](https://www.nature.com/articles/s41579-019-0222-5) threaten to wipe out Cavendish bananas, [Tropic Biosciences](https://www.tropicbioscience.com/) in the United Kingdom is using CRISPR gene-editing technology to engineer infection-resistant bananas. Companies are also rethinking how food is packaged to reduce plastic pollution and open high-tech paths to broader adoption of biodegradables. This would be a game-changer in the interlinked fight to modulate climate change and protect the oceans. Globally, [100 million tons](https://www.wwf.org.au/news/blogs/plastic-waste-and-climate-change-whats-the-connection#gs.0r1uqu) of plastic are produced every year, [8 million of which ends up in the oceans](https://www.wwf.org.au/news/blogs/plastic-waste-and-climate-change-whats-the-connection#gs.0r1uqu). The production of plastic requires at least 8% of the world’s petroleum. Greenhouse gas emissions from plastic production and incineration [could rise](https://www.wwf.org.au/news/blogs/plastic-waste-and-climate-change-whats-the-connection#gs.0r1uqu) from the current 850 million tons a year to 3 billion tons a year by 2050. And discarded plastic that ends up in the ocean slowly breaks down in sunlight, releasing greenhouse gases and toxic microplastics. Georgia-based [Danimer Scientific](https://danimerscientific.com/) — partnering with the Mars Wrigley candy company — is working on biodegradable packaging that uses plant oils to manufacture “plastic” that dissolves in soil and water. Bioplastics and biopolymers can reduce greenhouse gas emissions reductions by up to [80%](https://www.bio.org/sites/default/files/2021-04/Climate%20Report%20Executive%20Summary_FINAL.pdf) more compared to their petroleum-based counterparts. Fuel is another target for biotechnology. Transportation accounts for the [highest percentage](https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions) of U.S. greenhouse gas emissions. While electric cars are gaining popularity, and the $174 billion allocated to support the transition to electrics in Biden’s American Jobs Plan is important, biofuels — which are [carbon neutral](https://link.springer.com/chapter/10.1007/978-4-431-54895-9_6#:~:text=of%20climate%20change.-,Biofuels%20can%20reduce%20the%20consumption%20of%20fossil%20fuels%20and%20thus,because%20biofuels%20are%20carbon%20neutral.&text=The%20production%20of%20a%20biofuel,material%20for%20making%20liquid%20fuel.) — will be needed to help reduce emissions in transportation and need comparable support. The biotech company [Synthetic Genomics](https://syntheticgenomics.com/algal-cell-factories/#beyond_biofuels), for instance, is utilizing saltwater algae, which convert sunlight and carbon dioxide into biomass, to make sustainable auto fuel. By 2025, 10,000 barrels of the algal biofuel could be produced per day for commercial use. Biofuels will also play an important role in air travel. While flying accounts for less than [3% of global CO2 emissions](https://ourworldindata.org/co2-emissions-from-aviation) a year, on a per-mile calculation it’s the least green form of travel. With the number of air travel passengers expected to double by 2040, the Biden administration is upping the financial incentives — through tax credits — for companies that produce sustainable aircraft fuels. Biotech firms are already stepping up. Companies like [Neste](https://www.neste.us/neste-in-north-america), [Gevo](https://gevo.com/), and [World Energy](https://www.worldenergy.net/products/sustainable-aviation-fuel-saf/) are using everything from algae to used or wasted cooking oil to create sustainable jet fuels. [LanzaTech](https://www.lanzatech.com/) recycles carbon from industrial emissions and other sources and turns it into aviation fuel — and has recently [partnered with other corporations](https://techcrunch.com/2020/06/02/lanzajet-launches-to-make-renewable-jet-fuel-a-reality/) to bring that fuel to market for commercial airline use. With help from biotechnology, the U.S. can achieve the climate change goals outlined by the Biden administration and the Paris Agreement. Human progress and technology got us into this mess. That same ingenuity can help get us out.

#### Climate Patents and Innovation high now and solving Warming but patent waivers set a dangerous precedent for appropriations - the mere threat is sufficient is enough to kill investment.

Brand 5-26, Melissa. “Trips Ip Waiver Could Establish Dangerous Precedent for Climate Change and Other Biotech Sectors.” IPWatchdog.com | Patents & Patent Law, 26 May 2021, www.ipwatchdog.com/2021/05/26/trips-ip-waiver-establish-dangerous-precedent-climate-change-biotech-sectors/id=133964/. //sid

The biotech industry is making remarkable advancestowards climate change solutions, and it is precisely for this reason that it can expect to be in the crosshairs of potential IP waiver discussions. President Biden is correct to refer to climate change as an existential crisis. Yet it does not take too much effort to connect the dots between President Biden’s focus on climate change and his Administration’s recent commitment to waive global IP rights for Covid vaccines (TRIPS IP Waiver). “This is a global health crisis, and the extraordinary circumstances of the COVID-19 pandemic call for extraordinary measures.” If an IP waiver is purportedly necessary to solve the COVID-19 global health crisis (and of course [we dispute this notion](https://www.ipwatchdog.com/2021/04/19/waiving-ip-rights-during-times-of-covid-a-false-good-idea/id=132399/)), can we really feel confident that this or some future Administration will not apply the same logic to the climate crisis? And, without the confidence in the underlying IP for such solutions, what does this mean for U.S. innovation and economic growth? United States Trade Representative (USTR) [Katherine Tai](https://www.ipwatchdog.com/2021/05/05/tai-says-united-states-will-back-india-southafrica-proposal-waive-ip-rights-trips/id=133224/) was subject to questioning along this very line during a recent Senate Finance Committee hearing. And while Ambassador Tai did not affirmatively state that an IP waiver would be in the future for climate change technology, she surely did not assuage the concerns of interested parties. The United States has historically supported robust IP protection. This support is one reason the United States is the center of biotechnology innovation and leading the fight against COVID-19. However, a brief review of the domestic legislation arguably most relevant to this discussion shows just how far the international campaign against IP rights has eroded our normative position. The Clean Air Act, for example, contains a provision allowing for the mandatory licensing of patents covering certain devices for reducing air pollution. Importantly, however, the patent owner is accorded due process and the statute lays out a detailed process regulating the manner in which any such license can be issued, including findings of necessity and that no reasonable alternative method to accomplish the legislated goal exists. Also of critical importance is that the statute requires compensation to the patent holder. Similarly, the Atomic Energy Act contemplates mandatory licensing of patents covering inventions of primary importance in producing or utilizing atomic energy. This statute, too, requires due process, findings of importance to the statutory goals and compensation to the rights holder. A TRIPS IP waiver would operate outside of these types of frameworks. There would be no due process, no particularized findings, no compensationand no recourse. Indeed, the fact that the World Trade Organization (WTO) already has a process under the TRIPS agreement to address public health crises, including the compulsory licensing provisions, with necessary guardrails and compensation, makes quite clear that the waiver would operate as a free for all. Forced Tech Transfer Could Be on The Table When being questioned about the scope of a potential TRIPS IP waiver, Ambassador Tai invoked the proverb “Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime.” While this answer suggests primarily that, in times of famine, the Administration would rather give away other people’s fishing rods than share its own plentiful supply of fish (here: actual COVID-19 vaccine stocks), it is apparent that in Ambassador Tai’s view waiving patent rights alone would not help lower- and middle-income countries produce their own vaccines. Rather, they would need to be taught how to make the vaccines and given the biotech industry’s manufacturing know-how, sensitive cell lines, and proprietary cell culture media in order to do so. In other words, Ambassador Tai acknowledged that the scope of the current TRIPS IP waiver discussions includes the concept of forced tech transfer. In the context of climate change, the idea would be that companies who develop successful methods for producing new seed technologies and sustainable biomass**,** reducing greenhouse gases in manufacturing and transportation, capturing and sequestering carbon in soil and products, and more, would be required to turn over their proprietaryknow-how to global competitors. While it is unclear how this concept would work in practice and under the constitutions of certain countries, the suggestion alone could be devastating to voluntary internationalcollaborations. Even if one could assume that the United States could not implement forced tech transfer on its own soil, what about the governments of our international development partners? It is not hard to understand that a U.S.-based company developing climate change technologies would be unenthusiastic about partnering with a company abroad knowing that the foreign country’s government is on track – with the assent of the U.S. government – to change its laws and seize proprietary materials and know-how that had been voluntarily transferred to the local company. Necessary Investment Could Diminish Developing climate change solutions is not an easy endeavor and bad policy positions threaten the likelihood that they will materialize. These products have long lead times from research and development to market introduction, owing not only to a high rate of failure but also rigorous regulatory oversight. Significant investment is required to sustain and drive these challenging and long-enduring endeavors. For example, synthetic biology companies critical to this area of innovation [raised over $1 billion in investment in the second quarter of 2019 alone](https://www.bio.org/sites/default/files/2021-04/Climate%20Report_FINAL.pdf). If investors cannot be confident that IP will be in place to protect important climate change technologies after their long road from bench to market, it is unlikely they will continue to investat the current and required levels**.**

#### Climate change destroys the world.

Specktor 19 [Brandon; writes about the science of everyday life for Live Science, and previously for Reader's Digest magazine, where he served as an editor for five years; "Human Civilization Will Crumble by 2050 If We Don't Stop Climate Change Now, New Paper Claims," livescience, 6/4/19; <https://www.livescience.com/65633-climate-change-dooms-humans-by-2050.html>] Justin

The current climate crisis, they say, is larger and more complex than any humans have ever dealt with before. General climate models — like the one that the [United Nations' Panel on Climate Change](https://www.ipcc.ch/sr15/) (IPCC) used in 2018 to predict that a global temperature increase of 3.6 degrees Fahrenheit (2 degrees Celsius) could put hundreds of millions of people at risk — fail to account for the **sheer complexity of Earth's many interlinked geological processes**; as such, they fail to adequately predict the scale of the potential consequences. The truth, the authors wrote, is probably far worse than any models can fathom. How the world ends What might an accurate worst-case picture of the planet's climate-addled future actually look like, then? The authors provide one particularly grim scenario that begins with world governments "politely ignoring" the advice of scientists and the will of the public to decarbonize the economy (finding alternative energy sources), resulting in a global temperature increase 5.4 F (3 C) by the year 2050. At this point, the world's ice sheets vanish; brutal droughts kill many of the trees in the [Amazon rainforest](https://www.livescience.com/57266-amazon-river.html) (removing one of the world's largest carbon offsets); and the planet plunges into a feedback loop of ever-hotter, ever-deadlier conditions. "Thirty-five percent of the global land area, and **55 percent of the global population, are subject to more than 20 days a year of** [**lethal heat conditions**](https://www.livescience.com/55129-how-heat-waves-kill-so-quickly.html), beyond the threshold of human survivability," the authors hypothesized. Meanwhile, droughts, floods and wildfires regularly ravage the land. Nearly **one-third of the world's land surface turns to desert**. Entire **ecosystems collapse**, beginning with the **planet's coral reefs**, the **rainforest and the Arctic ice sheets.** The world's tropics are hit hardest by these new climate extremes, destroying the region's agriculture and turning more than 1 billion people into refugees. This mass movement of refugees — coupled with [shrinking coastlines](https://www.livescience.com/51990-sea-level-rise-unknowns.html) and severe drops in food and water availability — begin to **stress the fabric of the world's largest nations**, including the United States. Armed conflicts over resources, perhaps culminating in **nuclear war, are likely**. The result, according to the new paper, is "outright chaos" and perhaps "the end of human global civilization as we know it."

### 2 - Bees

#### Economic growth destroys bee populations

Porterfield 15 - Andrew Porterfield, writer, editor, and communications consultant, specializing in biotech, life sciences and healthcare, the Genetic Literacy Project, 12-3-2015 ["Trade and economic growth, not pesticides, major driver of beehive declines?", https://geneticliteracyproject.org/2015/12/03/trade-economic-growth-not-pesticides-major-driver-beehive-declines/, accessed 6-17-2019] BH

Trade and economic growth, not pesticides, major driver of beehive declines? The debate over whether bees are threatened and if so, why, is contentious. Globally, the number of bee hives has risen steadily over the past decade, and the number of bee hives is at record levels in North America and throughout most of Europe. But there are definite problems, say top entomologists. While the number of over-winter hives is at their highest numbers in years, losses during the summer are stubbornly high. “Such high colony losses in the summer and year-round remain very troubling,” said entomologist Jeff Pettis, a researcher at the USDA's Agricultural Research Service Bee Research Laboratory in Beltsville, Md., and a co-author of the government survey that tallied up the bee losses. But what's driving these losses? Activists say pesticides, neonicotinoids in particular, are the primary driver. But overall colony numbers have risen in the decade and a half since the pesticide was introduced. Most scientists say the issue if multifactorial. But which factors are most key? Honey imports and exports and dramatic economic changes in certain nations have been more responsible for honeybee colony decreases (and some increases) than GMOs, pesticides, mites or diseases, according to a new study by German researchers. The research, conducted by analyzing bee colony and honey production data collected by the U.N. Food and Agricultural Organization (FAO), countered popular assertions by environmental non-government organizations and even some European countries, which have advocated (and enacted) bans on neonic pesticides, and looked at mites and diseases as a cause for colony collapse disorder (CCD) and other declines in populations of European honey bees. Robin Moritz and Silvio Erler at Martin Luther University in Halle, Germany, crunched numbers submitted to the FAO by more than 100 countries over 50 years (from 1961 to 2013), and found that major economic upheavals and trade in honey accounted for decreases in bee colonies. Pesticide use, disease or mite infestation did not at all correlate with decreases in colonies. Moreover, the data clouded the picture often seen in media and NGO reports, pointing to a consistent, global decrease in bee colonies. While some countries, like the US and in Western Europe, have seen a consistent decline in colonies, other countries have seen dramatic increases in colonies and honey production. Southern Europe, for example, saw a doubling of colonies over the past 50 years, while South American colonies grew by 5.2 percent annually, African colonies grew by 3.3 percent annually, and Asian colonies grew by 4.4 percent annually (all over the past 50 years). Overall, despite the decreases in Western Europe and the United States, the FAO data showed an increase in the number of all colonies globally. Perhaps significantly, the data also showed an increase in demand for pollination which was higher than the number of existing honeybee colonies. In fact, “countries with a positive correlation between honey production and colony number are the main honey exporters, while countries with a negative correlation are those importing honey,” Moritz and d Erler wrote. “None of the colony number dynamics of the past 50 years, neither increase nor decrease, show any relation to the arrival of novel pests or the use of novel pesticides.” But the Natural Resources Defense Council, among other groups, have advocated banning neonics because of alleged links to colony collapse disorder and other bee population declines. The NRDC petitioned the EPA to ban use of neonicotinoids pesticides, and cited several studies that used “field realistic” levels of neonics in a solution to determine bee behavior. A recent NRDC blog noted that “Scientific studies have shown that chronic exposure of honeybees to field-realistic levels of neonics can impair learning and memory, making their pesticide habit a dangerous one.” EPA should cancel the use of neonics. An NRDC legal petition asks EPA to initiate cancellation proceedings for all neonicotinoids pesticide products, beginning with those for which safer alternatives are available. Systemic and persistent pesticides like the neonics pose too much risk to non-target and beneficial wildlife. But while the NRDC cited studies looking at sub-lethal behavior and mortality rates, it did not look at actual field studies, nor did it cite studies looking at mites, disease and other factors. And other groups, as we have covered in Genetic Literacy Project stories, continue to look at the herbicide glyphosate (and, by extension, genetically modified crops) as a culprit in colony collapses. Anti-GMO scientist Don Huber warned his readers to focus on “a more problematic cause of CCD”: glyphosate. Huber claimed that glyphosate’s widespread use worldwide could only link it to bee mortality. And the pro-organic website Natural News ran a headline in 2014, “Groundbreaking study shows that Roundup causes honeybees to starve,” based on an Argentine study that did not actually show that. The USDA and the White House have looked at a number of other factors to develop a picture of colony collapse disorder that has far more complex causes: Varroa mite, a parasite-containing bug that helped wipe out hives in the 1980s. Global climate change, which could be affecting how bee foraging behaviors respond to weather patterns. Decreases in numbers of flowering plants, to which a White House task force recommended the planting of flowers and other plants to increase opportunities for pollination. Insecticides, which may kill bees outright or affect their foraging behavior All in all, about 60 possible environmental causes of bee health threats have been investigated. But nobody, until the German study, has tried to systematically match economic issues, individual country dynamics, and the behavior of professional beekeepers with changes in colony numbers. The closest match, the German researchers wrote, were associated with severe political, social and economic changes, such as a 66 percent decline in colonies in Madagascar after a political coup in 1977, and a 73 percent decline in Burundi during that country’s civil war, and significant declines in eastern Europe after the collapse of the Soviet Union. But in the U.S. and Western Europe, the declines have been steady and significant. Last year in the US, the number of disappearing hives reached 42 percent. The researchers pointed to the growth of commercial beekeeping as a possible link to colony declines, especially in the US and Western Europe. According to Moritz and Erler: It may well be that slowly changing societal values, from hobby to business beekeeping, are important drivers of colony declines. Clearly, the increase of honey trade in relation to the national honey production in Europe goes hand in hand with the colony declines over the five decades listed in the FAO database. Beyond trade figures, the researchers did not clarity exactly how professional beekeeping practices could contribute to decreases in bee colonies, and how practices in South America or Southern Europe may differ from the United States and Western Europe. However, several beekeeping blogs and articles reveal a rather passionate rivalry between hobbyists and professional beekeepers, including blaming incompetence on either side for what eventually became colony collapse disorder. “I have a friend who works for a very large scale commercial beekeeping operation in California, and when I asked her about Colony Collapse she said they didn't have a problem, and if others did it probably had more to do with bad beekeeping,” wrote one. Meanwhile, a professional beekeeper told one writer: Ninety-nine percent of the so-called beekeepers are hobby beekeepers. In North Carolina there are thousands of hobby beekeepers. And there are less than ten commercial beekeepers. There’s a public misconception that a beekeeper’s a beekeeper’s a beekeeper. But the difference between a hobby beekeeper and a commercial beekeeper is like the difference between someone with an aquarium in his living room and somebody that owns three oceangoing deep-sea vessels. On the other hand, the long-distance transport of beehives practiced by commercial beekeepers also has been blamed for colony depletion. According to British beekeeper (and self-professed agent provocateur) Philip Chandler, the spread of the varroa mite is due to bee transport: Bees are now in trouble as never before and much of the blame for this potentially disastrous state of affairs must be placed at the door of negligent, commercial beekeepers. The inter-continental migration of pests and diseases has widely been blamed on climate change, but in fact the spread of the Varroa mite from its native Asia and its original host species, the Asian bee Apis cerana, can be directly linked to the commercial bee trade. So, while pressure has mounted on the United States to ban a pesticide that already is about halfway through a ban by the European Union, colony declines in some countries may continue despite any actions taken for or against neonics and other pesticides. And while correlation does not equal cause, the German research opens the door to including economic and business factors behind bee colony changes.

#### Extinction – bee collapse causes a pollinator apocalypse followed by extreme food scarcity

Baba 19 - Abu Imran Baba, In Alumni Hungary, 1-9-2019 Abu Imran Baba is a Freelance environmental writer and Research Scholar based in Europe at Molecular Genetics Lab, Biological Research Centre and University of Szeged, Hungary ["Yes, bee extinction could mark end of humanity", https://alumninetworkhungary.hu/magazine/blogs/yes-bee-extinction-could-mark-end-humanity, accessed 10-8-2020] BH

You might all have heard this famous quote, which is mostly attributed to famous scientist Albert Einstein probably, but there is no correct attribution and evidence that Einstein ever said that, said Michael Pocock, an ecologist with the Centre for Ecology and Hydrology. Despite whoever quoted this, it is quite worthy and an eye-opener for all of us. If bees get extinct, do we just realise that it will not be all about just lack of honey, but there is a very important and lethal fact about declining bee population which is rapidly decreasing than expected. These tiny creatures are of very importance to maintain an ecological balance. Infact without their existence we will be losing our most of food crops faster, so if you hate them, when they buzz around or sting you then it is time to love these creatures now as in reality they are our friendly species. It is quite alarming situation and of great concern that if bees go extinct, we will suffer from a pollinator apocalypse followed by extreme food scarcity and human extinction nearly after it. Even if we find other means of novel technologies to fulfil the food scarcity it won’t be enough to fill the needs of such blooming population worldwide. Though bees are not the only pollinators that play this role of pollination, but these tiny creatures contribute a lot in the pollination of around most of the crop species that feed 90% of the world (sources). They are responsible for the most of the food production by pollination of our important crop plants by acting as a mediator of pollen transfer between the different flowers. We already know that the population of bees has started to decline considerably and it’s leading to “Colony Collapse Disorder” (CCD) the name given to mass dying of bee populations by experts. This collapse of bees is worrisome and the most important cause for its decreasing population is from human sources may it be from the overuse of pesticides or our main role in direct or indirect participation of global warming and other sorts of climate concerns. The overuse of pesticides is drastically affecting the bee population of bees causing an extreme declination of these pollinators. To prevent such catastrophic activities of future we should create awareness and campaign to highlight such issues concerning the mortality of bee population at the basal level, because these creatures are of high economic importance. So losing such creatures in future we need to dwell in present and try to save them from extinction. As we are the one who are the main culprits of this disaster.

# Case

## Plan

#### Zero inherency since compulsory licenses are allowed

**WTO 2006**, 9-2006, "WTO", No Publication, https://www.wto.org/english/tratop\_e/trips\_e/factsheet\_pharm02\_e.htm, accessed 9-17-2021, [WTO means World Trade Organizing] PHS-CB

Compulsory licensing is when a government allows someone else to produce the patented product or process without the consent of the patent owner. In current public discussion, this is usually associated with pharmaceuticals, but it could also apply to patents in any field.

The agreement allows compulsory licensing as part of the agreement’s overall attempt to strike a balance between promoting access to existing drugs and promoting research and development into new drugs. But the term “compulsory licensing” does not appear in the TRIPS Agreement. Instead, the phrase “other use without authorization of the right holder” appears in the title of [Article 31](https://www.wto.org/english/tratop_e/trips_e/factsheet_pharm02_e.htm#art31). Compulsory licensing is only part of this since “other use” includes use by governments for their own purposes.

Compulsory licensing and government use of a patent without the authorization of its owner can only be done under a number of conditions aimed at protecting the legitimate interests of the patent holder.

For example: Normally, the person or company applying for a licence must have first attempted, unsuccessfully, to obtain a voluntary licence from the right holder on reasonable commercial terms — [Article 31b](https://www.wto.org/english/tratop_e/trips_e/factsheet_pharm02_e.htm#art31b). If a compulsory licence is issued, adequate remuneration must still be paid to the patent holder — [Article 31h](https://www.wto.org/english/tratop_e/trips_e/factsheet_pharm02_e.htm#art31h).

However, for “national emergencies”, “other circumstances of extreme urgency” or “public non-commercial use” (or “government use”) or anti-competitive practices, there is no need to try for a voluntary licence — [Article 31b](https://www.wto.org/english/tratop_e/trips_e/factsheet_pharm02_e.htm#art31b).

Compulsory licensing must meet certain additional requirements. In particular, it cannot be given exclusively to licensees (e.g. the patent-holder can continue to produce), and usually it must be granted mainly to supply the domestic market.

WHAT ARE THE GROUNDS FOR USING COMPULSORY LICENSING?

The TRIPS Agreement does not specifically list the reasons that might be used to justify compulsory licensing. In [Article 31](https://www.wto.org/english/tratop_e/trips_e/factsheet_pharm02_e.htm#art31), it does mention national emergencies, other circumstances of extreme urgency and anti-competitive practices — but only as grounds when some of the normal requirements for compulsory licensing do not apply, such as the need to try for a voluntary licence first. [Doha declaration 5(b) and (c)](https://www.wto.org/english/tratop_e/trips_e/factsheet_pharm02_e.htm#dohadecl5b).

## Adv 1

### Dedev

#### Growth causes converging ecological crises that culminate in extinction

Williams ‘19 (Casey Williams; freelance writer covering climate, environment, and labor politics, citing Ingrid Visseren-Hamakers, associate professor of environmental science and policy at George Mason University and a coordinating lead author of the IPBES report; 5/16/19; "The “Great Dying” Has Begun. Only Transforming the Economy Can Stop It."; *Medium*; https://onezero.medium.com/the-great-dying-has-begun-only-transforming-the-economy-can-stop-it-4eadd8f7ccf8)

Extinction has threatened Earth’s plant and animal life several times over the planet’s multibillion-year history. During the mass extinction event called the “Great Dying,” around 250 million years ago, 96% of all marine species died out – gone forever. Life is once again headed for total collapse. While coverage of last week’s major Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) report on biodiversity loss rightly played up the dire numbers – an estimated 1 million species gone by 2050 – what’s truly remarkable are the solutions the authors offer in response. Ditching the timid pragmatism of technocrats, these scientists are calling for nothing less than the total transformation of the global economy. Producing for profit has failed us, they say, and failed the planet. We need a new system. Only “transformative change” can stop massive species loss, according to the report’s conclusion. That means overhauling the global economy to prioritize human well-being and environmental sustainability rather than the pursuit of profit. “We’re not addressing the underlying causes of biodiversity loss, which is the way we organize economies, production and consumption patterns, our institutions, and our rules,” says Ingrid Visseren-Hamakers, associate professor of environmental science and policy at George Mason University and a coordinating lead author of the IPBES report. “We need to transform the sheer fabric of our society to become more sustainable.” Today’s great dying is happening faster than ever before, and its causes are clear: breakneck development, fossil-fueled global warming, industrial pollution, single-crop agriculture. Complex as these processes are, they point to a common culprit: A growth-based economic system bent on wringing cash from nature has exploited the planet’s ecosystems beyond what they can bear. Now, Earth’s fragile life-support system is entering a death spiral that threatens human existence and which no one is prepared to stop. Evidence of an impending mass extinction has been accumulating for years, but this report paints an especially dire picture of the pace and scale of the crisis. Plant and animal species are vanishing at an unprecedented rate: 1 million of Earth’s 8 million known species could go extinct within 30 years. Biodiversity “is declining faster than at any time in human history,” the report’s authors conclude. And with it, the ecological prerequisites for human life are dwindling: clean air and water, healthy food, stable climates, medicines, and much more. Efforts to slow the dying have proven woefully inadequate. Governments will miss key conservation targets in the coming years, signing death warrants for countless corals and amphibians and exposing up to 300 million additional people to dangerous flooding as coastal habitats vanish. That’s because governments, businesses, and others have failed to tackle root causes of ecosystem collapse. “It’s inevitable that you come to conclusions like this, because that’s what the science says.” IPBES is careful to remain nonpartisan and lays out options, not prescriptions, for policymakers. But the report’s conclusions are “in essence political,” Visseren-Hamakers says. “We’re changing the goals of our society. We want to switch the goal from making profit to living sustainably.” The authors of the report propose “steering away from the current limited paradigm of economic growth,” though they “expect opposition from those with interests vested in the status quo.” Given that growth is the market economy’s animating principle, this is essentially code for overhauling global capitalism and angering some large corporations in the process. Like the Intergovernmental Panel on Climate Change’s 2018 Special Report on Global Warming, the new study’s frankness is history-making. After years of highlighting piecemeal reforms, the scientific community is now asking us to completely rethink modern society. Not because they’re ideological, but because they’re scientists. They go where the evidence leads. “It’s inevitable that you come to conclusions like this, because that’s what the science says,” Visseren-Hamakers says. Of course, the authors also offer less drastic solutions. Deep in the report, they suggest that putting a price tag on “ecosystem services” can help account for and redress the costs of treating nature like a waste dump. It’s an old idea. Factoring nature’s value into economic calculations would eliminate “perverse incentives” to pollute and give companies and governments greater incentive to conserve biodiversity. For example, carbon pricing is designed to account for the value of a stable climate. Factoring environmental costs of carbon pollution into production decisions should discourage, in theory, the use of fossil fuels that, directly and indirectly, degrade ecosystems. Though not particularly ambitious, pricing nature was once widely believed to be a pragmatic response to species loss. “Fifteen years ago, financialization of nature schemes would have been front and center of a report like this,” says Jesse Goldstein, assistant professor of sociology at Virginia Commonwealth University. The fact that such policies are not front and center marks a historic shift in tone. Pragmatic scientists and policymakers want fast, achievable solutions to urgent problems. And so, for decades, they’ve resisted calling for fundamental changes to the economic system. Even when it’s been clear that economic growth accelerates biodiversity loss, reigning in global capitalism has seemed too drastic, cumbersome, and infeasible to count as a realistic solution to the crisis. “The overarching language [of the report] says everything’s got to change,” Goldstein says. “But the assumption is that massive, transformative political and economic change takes too much time and that technocratic and technological policy-based solutions are quicker.” But now it’s the pragmatic solutions that seem out of step with the reality of the extinction crisis. Given the deadly seriousness of species extinction, the most ambitious solutions have become the most necessary. It would be reductive to attribute biodiversity loss solely to modern capitalism. After all, humans have destroyed environments since they learned to whittle sticks into spears and clear forests to make farms. Indigenous peoples in North America wiped out the mastodon long before they could hope to cash in on its hide. But capitalism introduces a totally different set of incentives: Once plant and animal life is viewed as a production input, a cash engine, or an acceptable casualty of profit accumulation, it makes sense to wring revenue from life until it’s gone, especially when competitive pressures reward making a quick buck. The IPBES report makes clear that today’s great dying differs in kind, not degree, from earlier waves of biodiversity loss. Since 1900, the abundance of major species has declined by 20% globally. And since 1970, as industrial production has exploded, nature’s productivity has plummeted across the board. Species extinction is now “tens to hundreds of times higher than it has averaged over the past 10 million years,” the authors write. In The Sixth Extinction, journalist Elizabeth Kolbert documents the dizzying pace of modern ecological destruction. “Just in the past century, CO2 levels in the atmosphere have changed by as much – a hundred parts per million – as they normally do in a hundred-thousand-year glacial cycle,” she writes. “Meanwhile, the drop in ocean pH levels that has occurred over the past fifty years may well exceed anything that happened in the seas during the previous fifty million.” This past weekend, air temperatures around parts of the Arctic Ocean reached 84 degrees Fahrenheit, while the concentration of CO2 eclipsed 415 parts per million for the first time in human history. No matter how unsustainable our ancestors’ societies were, ours is infinitely worse. Amid the dying, however, the economy booms. Crop yields have increased 300% since the 1970s, per the IPBES report, and businesses are now extracting 60 billion tons of resources from the earth each year. Those resources run the gamut: oil for cars, timber for buildings, precious metals for our precious iPhones. It might be one thing if biodiversity loss were paying for better lives for everyone – an unfortunate cost of making sure everyone has a safe home, healthy food, and reliable transportation – but trends in wealth inequality tell a different story. America’s richest people have doubled their incomes since the 1970s, while working people have experienced wage stagnation and disproportionately suffered the effects of habitat loss, extreme weather, and food shortages. Given these trends, “it’s hard to make with a straight face the argument that green capitalism is going to save the planet,” Goldstein added. What seems needed is something far more radical. The world’s best scientists seem to agree. “The discourse on sustainability is changing,” Visseren-Hamakers says. “It’s now normal to talk about transformation, which is nothing less than a revolution.”

#### Transition is inevitable by 2030 --- attempting to cling to growth just deepens and intensifies the impact.

Nafeez Mosaddeq Ahmed, 2017. Dr. Nafeez Mosaddeq Ahmed is Executive Director of the Institute for Policy Research and Development. DPhil in international relations from the School of Global Studies at Sussex University. Member of the Executive Committee of the British Muslim Human Rights Centre at London Metropolitan University’s Human Rights and Social Justice Institute. Taught at the Department of International Relations, University of Sussex, and has lectured at Brunel University’s Politics & History Unit at both undergraduate and postgraduate levels. Formerly a senior researcher at the Islamic Human Rights Commission. Award-winning 15-year investigative journalist, noted international security scholar, bestselling author, film-maker, and creator of INSURGE intelligence, a crowdfunded public interest investigative journalism project. “Failing States, Collapsing Systems: BioPhysical Triggers of Political Violence,” SpringerBriefs in Energy Energy Analysis. *Conclusions: From Systemic State-Failure to Civilizational Transition*. Book. pp. 90-91

Concepts of the ‘circular economy’—involving a fundamental reorganization of the way societies produce, manage and consume resources through wide-scale practices of recycling across production and consumption chains—bear considerable importance to this sort of vision. The circular economy brings to the fore the necessity of reusing and recycling raw materials to the most efficient extent possible to support the sustainability of production and consumption chains relative to increasingly depleted mineral ores and higher energy costs for their extraction, refining and input into manufacturing. Numerous companies are taking the concept seriously in the recognition of current and looming environmental risks to their supply chains, but human civilization must begin to do so in the wider context of a recognition that the animating ideology of the current phase-shift of civilization is deeply misguided.

A major report to the Club of Rome tracking the depletion of the planet’s mineral ores finds that by the end of this century, higher quality ores critical to the growth of industrial civilization as we know it will be largely depleted. But the report shows that a ‘circular economy’ approach has strong potential to allow existing minerals to be recycled with minimum losses and a high degree of efficiency sufficient to maintain a high technology society in, however, a new post-capitalist economic context (Bardi 2014 ).

The ESD–HSD amplifying feedbacks discussed in this study demonstrate that the twenty-first century is rapidly transitioning to a crisis convergence threshold heralding the inevitable demise of the endless growth model of neoliberal finance capitalism that currently animates industrial civilization as we know it. This points to the urgency of adaptation to prepare for the emergence of a new evolutionary phase-shift in the form of post-capitalism—a concept whose unspecified nature is important precisely because it opens up new possibilities for economic organization which are not limited by the failures of prevailing economic orthodoxy. The rejection of that orthodoxy as limited springs from the recognition that the doctrine of unlimited economic growth is nothing less than a fundamental violation of the laws of physics. In short, it is the stuff of cranks—yet it is nevertheless the ideology that informs policymakers and pundits alike. Post-capitalism, on the other hand, seeks to ground itself in harmony with the biophysical environment, not by rejecting the ideals of human prosperity and well-being, but by decoupling them from the fetish for endless material growth.

That in turn paves the way, potentially, for a renewed sense of human value and purpose beyond the confines of material production and consumption, rejuvenated by a consciousness of humanity’s embeddedness in its environment. The magical thinking of endless growth must make way for a post-materialist ethic of human interconnectedness with itself and its biophysical context.

Groundbreaking economic work on this theme of ‘prosperity without growth’ has been forthcoming from several quarters, and provides mounting evidence that the endless growth model of economics has not just failed to deliver meaningful prosperity to the world’s poorest, but is incapable of doing so as it continues to generate inequality, environmental destruction, and to eventually undermine its very own basis (Jackson 2009). This body of work also demonstrates that meaningful prosperity in the sense of providing for human needs and well-being in high technology societies remains possible in a fundamentally re-organized post-capitalist economy. In this framework, human progress can continue but within a new paradigm in which limited material development is mobilized to meet fundamental human needs through extension of human relations instead of market relations, a deepening of democracy, enhancing ecosystems, and more equal distribution of wealth. Inevitably, therefore, post-capitalism will be incommensurate with the features of endless growth associated with industrial forms of capitalism: namely, continuously growing material throughput driven by ever growing consumption by unrestrained population growth (Victor 2010 ; Fournier 2008 ; Schneider et al. 2010 ; Fritz and Koch 2014 ).

Instead, the unsustainable nature of contemporary capitalism opens up the urgency of working toward a new post-capitalist era built on the following components: regulation of market mechanisms and corporate activities; support for social enterprises organized as community cooperatives; democratic money creation processes, including community currencies, in place of debt-based fractional reserve banking; communities reclaiming the commons, especially in the sense of communal land stewardship systems; redistribution of income and capital assets; a diversity of production scales and modes, including small-scale, subsistence and self- employment to widen economic democracy (Johanisova and Wolf 2012 ).

Such a vision may, in the current context, appear impossibly utopian. By 2030, and even more so by 2050—as the manifestations of global capitalism’s self-catabolic trajectory become more obvious—it will appear increasingly realistic.

## Adv 2

#### No precedence at all even tho high schoolers can edit genes

CL isn’t key since vaccines protect people even if only a portion – no extinction

#### Bioterrror will fail.

**Pinker 18** – Steven Arthur Pinker is a Canadian-American cognitive psychologist, Professor at Harvard University. [Enlightenment Now: The Case for Reason, Science, Humanism, and Progress, Viking, Penguin Group]//BPS

Biological agents are **particularly ill-suited** to terrorists, whose goal, recall, is not damage but **theater** (chapter 13).58 The biologist Paul Ewald notes that natural selection among pathogens **works against** the terrorist’s goal of sudden and spectacular devastation. 59 Germs that depend on rapid person-to-person contagion, like the common-cold virus, are selected to keep their hosts alive and ambulatory so they can shake hands with and sneeze on as many people as possible. Germs get greedy and kill their hosts only if they have some other way of getting from body to body, like mosquitoes (for malaria), a contaminable water supply (for cholera), or trenches packed with injured soldiers (for the 1918 Spanish flu). Sexually transmitted pathogens, like HIV and syphilis, are somewhere in between, needing a long and symptomless incubation period during which hosts can infect their partners, after which the germs do their damage. **Virulence** and **contagion** thus **trade off**, and the **evolution of germs** will **frustrate the terrorist’s aspiration** to launch a headline-worthy epidemic that is both swift and lethal. Theoretically, a bioterrorist could try to bend the curve with a pathogen that is virulent, contagious, and durable enough to survive outside bodies. But breeding such a **fine-tuned germ** would require **Nazi-like experiments on living humans** that even terrorists (to say nothing of teenagers) are unlikely to carry off. It may be more than just luck that the world so far has seen just **one successful bioterror attack** (the 1984 tainting of salad with salmonella in an Oregon town by the Rajneeshee religious cult, **which killed no one**) and one spree killing (the 2001 anthrax mailings, which killed five).60 To be sure, advances in synthetic biology, such as the gene-editing technique CRISPR-Cas9, make it easier to tinker with organisms, including pathogens. But it’s difficult to re-engineer a complex evolved trait by inserting **a gene or two**, since the effects of any gene are intertwined with the rest of the organism’s genome. Ewald notes, “**I don’t think that we are close** to understanding how to insert combinations of genetic variants in any given pathogen that act in concert to generate high transmissibility and stably high virulence for humans.”61 The biotech expert Robert Carlson adds that “one of the problems with building any flu virus is that you need to keep your production system (cells or eggs) alive long enough to make a useful quantity of something that is trying to kill that production system. . . . Booting up the resulting virus is still very, very difficult. . . . I would not dismiss this threat completely, but frankly I am much more worried about what Mother Nature is throwing at us all the time.”62 And crucially, advances in biology work the other way as well: they also make it easier for the good guys [public protectors] (and there are many more of them) to identify pathogens, invent antibiotics that overcome **a**nti**b**iotic **r**esistance, and **rapidly develop vaccines**.63 An example is the Ebola vaccine, developed in the waning days of the 2014–15 emergency, after public health efforts had capped the toll at twelve thousand deaths rather than the millions that the media had foreseen. Ebola thus joined a list of other falsely predicted pandemics such as Lassa fever, hantavirus, SARS, mad cow disease, bird flu, and swine flu.64 Some of them never had the potential to go pandemic in the first place because they are contracted from animals or food rather than in an exponential tree of person-to-person infections. Others were nipped by medical and public health interventions. Of course no one knows for sure whether an evil genius will someday overcome the world’s defenses and loose a plague upon the world for fun, vengeance, or a sacred cause. But journalistic habits and the Availability and Negativity biases **inflate the odds**, which is why I have taken Sir Martin up on his bet. By the time you read this you may know who has won.65

#### No extinction – COVID proves every internal warrant

Adalja 16 [Amesh Adalja, JUNE 17, 2016, “Why Hasn't Disease Wiped out the Human Race?”, The Atlantic, https://www.theatlantic.com/health/archive/2016/06/infectious-diseases-extinction/487514 // LEX JB]

**Any apocalyptic pathogen would need to possess** a very special combination of **two attributes**. **First**, **it would have to be so unfamiliar that no existing therapy or vaccine could be applied to it. Second, it would need to have a high and surreptitious transmissibility before symptoms occur**. The first is essential because any microbe from a known class of pathogens would, by definition, have family members that could serve as models for containment and countermeasures. The second would allow the hypothetical disease to spread without being detected by even the most astute clinicians. **The three infectious diseases most likely to be considered extinction**-level **threats** **in the world today—influenza, HIV, and Ebola—don’t meet these two requirements**. Influenza, for instance, despite its well-established ability to kill on a large scale, its contagiousness, and its unrivaled ability to shift and drift away from our vaccines, is still what I would call a “known unknown.” While there are many mysteries about how new flu strains emerge, from at least the time of Hippocrates, humans have been attuned to its risk. **And in the modern era, a full-fledged industry of influenza preparedness exists, with effective vaccine strategies and antiviral therapies.** HIV, which has killed 39 million people over several decades, is similarly limited due to several factors. Most importantly, HIV’s dependency on blood and body fluid for transmission (similar to Ebola) requires intimate human-to-human contact, which limits contagion. Highly potent antiviral therapy allows most people to live normally with the disease, and a substantial group of the population has genetic mutations that render them impervious to infection in the first place. Lastly, simple prevention strategies such as needle exchange for injection drug users and barrier contraceptives—when available—can curtail transmission risk. Ebola, for many of the same reasons as HIV as well as several others, also falls short of the mark. This is especially due to the fact that it spreads almost exclusively through people with easily recognizable symptoms, plus the taming of its once unfathomable 90 percent mortality rate by simple supportive care. Beyond those three, **every other known disease falls short of what seems required to wipe out humans—which is, of course, why we’re still here**. And it’s **not that diseases are ineffective**. On the contrary, **diseases’ failure to knock us out is a testament to just how resilient humans are**. Part of **our evolutionary heritage is our immune system, one of the most complex on the planet, even without the benefit of vaccines or the helping hand of antimicrobial drugs**. This system, when viewed at a species level, can adapt to almost any enemy imaginable. Coupled to **genetic variations amongst humans—which open up the possibility for a range of advantages**, from imperviousness to infection to a tendency for mild symptoms—**this adaptability ensures that almost any infectious disease onslaught will leave a large proportion of the population alive to rebuild, in contrast to the fictional Hollywood versions.** While **the immune system’s role can never be understated**, an even more powerful protector is the faculty of consciousness. **Humans are not the most prolific, quickly evolving, or strongest organisms on the planet, but as Aristotle identified, humans are the rational animals—and it is this fundamental distinguishing characteristic that allows humans to form abstractions, think in principles, and plan long-range**. These capacities, in turn, allow humans to modify, alter, and improve themselves and their environments. **Consciousness equips us, at an individual and a species level, to make nature safe for the species through such technological marvels as antibiotics, antivirals, vaccines, and sanitation. When humans began to focus their minds on the problems posed by infectious disease, human life ceased being nasty, brutish, and short. In many ways, human consciousness became infectious diseases’ worthiest adversary.**

#### No Impact to Bioterrorism — adequate defenses, no precedent, bioterrorists will fail

**Epstein, 10** (Gerald R. – Senior Fellow at the Center for Strategic Research and International Studies and assistant director for national security at the White House Office of Science and Technology Policy, October, “Are Microorganisms Macrothreats?”, BioScience 60.9, p. 759-760, JSTOR)

It is impossible for national security planners to know the real threat of bioterrorism, much less what it will become in the years ahead: There is little precedent for killing on a mass scale using biology. Nationstates demonstrated their ability to do so many decades ago, but whether nonstate groups will follow suit is—fortunately—harder to determine. It is certainly not easy to acquire deadly agents, produce them on the required scale, prepare them for dissemination in a way that will generate mass casualties, and get them successfully to their targets. There are numerous opportunities along the way for would-be bioterrorists to fail, be discovered, or accidentally kill themselves. But in an era when relevant technologies are becoming more powerful, prevalent, and easier to use; when more people around the planet have been trained in and are comfortable with the relevant disciplines; when every activity a bioterrorist would have to perform (and the associated expertise, materials, and equipment) has some legitimate application in research or commerce; and when motivated people with sufficient dedication and resources will work to identify and solve problems as they arise, how sure can we be that no such group will ever succeed? On this question hinges Breeding Bio Insecurity. Lynn C. Klotz, a senior science fellow with the Center for Arms Control and Nonproliferation, and Edward J. Sylvester, a science journalist, believe that nationally significant bioterrorism is so implausible that it should not be the basis for security planning, and that the current US biodefense effort is unjustifiable, unnecessary, and dangerous. They claim “the United States is building a biodefense empire that is putting us at greater risk than we face from an attack from terrorists or foreign powers in the foreseeable future” (p. 89). If they’re right about the threat, that’s correct; if they’re wrong, however, their recommendations would leave the country at greater risk.