## 1 – Nasa

### NASA is preserving resources by leveraging private partnerships

#### Kramer 21

Miriam Kramer 21, author of Space, “NASA's plans for the future hinge on the success of private companies,” Axios, 12-7-2021, https://www.axios.com/nasa-private-spaceflight-plans-5a5710e6-5223-4da3-8c5d-5a712e1d862e.html

The private space players who will drive NASA's plans for the coming decade are declaring themselves and defining the stakes. Why it matters: **NASA** plans to focus on getting people to Mars and the Moon, and its deep space exploration **ambitions hinge on the agency** **being able to successfully hand over major operations in low-Earth orbit to private companies.** The space agency hopes companies will build private space stations that its astronauts can use and to continue to buy space on private rockets for launching its satellites and other payloads to orbit and beyond.

 NASA's "big experiment" right now is to test where these commercial partnerships work, the Planetary Society's Casey Dreier told Axios. What's happening: Last week, NASA announced it would award multimillion-dollar contracts to three teams of commercial space companies to start designing and building privately operated space stations.

### Aff forces spending trade-offs that crush effective Earth sciences --- risks catastrophic climate change

#### Haymet 7

 (Tony, Director of the Scripps Institution of Oceanography – University of California, San Diego, Mark Abbott, Dean of the College of Oceanic and Atmospheric Science – Oregon State University, and Jim Luyten, Acting Director – Woods Hole Oceanographic Institution, “The Planet NASA Needs to Explore”, Washington Post, 5-10, [http://www.washingtonpost.com/wp-dyn/content/article/2007/05/09/AR2007050902451.html](http://www.lexis.com/research/retrieve))

Decades ago, a shift in NASA priorities sidelined progress in human space exploration. As momentum gathers to reinvigorate human space missions to the moon and Mars, we risk hurting ourselves, and Earth, in the long run. **Our planet** -- not the moon or Mars -- **is under significant threat from** the consequences of rapid **climate change**. Yet the **changing NASA priorities will threaten exploration** here **at home**. **NASA** not only launches shuttles and builds space stations, it also builds and **operates** our nation's **sat**ellite**s** **that** observe and monitor the Earth. These satellites **collect crucial** global **data** on winds, ice and oceans. They help us forecast hurricanes, **track** the loss of Arctic **sea ice and** the rise of **sea levels, and** understand and **prepare for climate changes**. NASA's budget for science missions has declined 30 percent in the past six years, and that trend is expected to continue. **As** more **dollars** **are reallocated** to prepare for missions back to the moon and Mars, sophisticated **new satellites** to observe the Earth **will be delayed, harming Earth sciences.** The National Academy of Sciences has noted that the Landsat satellite system, which takes important measurements of global vegetation, is in its fourth decade of operation and could fail without a clear plan for continuation. The same is true for the QuikSCAT satellite, which provides critical wind data used in forecasting hurricanes and El Niño effects. In January, a partnership of university and NASA scientists demonstrated that climate change and higher ocean temperatures were reducing the growth of microscopic plants and animals at the heart of the marine food web. Their analysis was based on nearly a decade of NASA satellite measurements of ocean color, which unfortunately are at risk of being interrupted for several years. Sea levels are rising, and the Arctic Ocean may be ice-free in summer. The buildup of carbon dioxide in the oceans threatens to make them more acidic, which may in turn hinder the ability of some types of marine life, including corals, to build their shells and skeletons. We must learn as much as we can to assess these threats and develop solutions. Satellites provide coverage of vast, remote regions of our planet that would otherwise remain unseen, especially the oceans, which play an important role in climate change. Without accurate data on such fundamentals as sea surface height, temperatures and biomass, as well as glacier heights and snowpack thickness, we will not be able to understand the likelihood of dangers such as more severe hurricanes along the Gulf Coast or more frequent forest fires in the Pacific Northwest. **Climate change is the** **most critical problem** the Earth has ever faced. Government agencies and the private sector, as well as individual citizens, need to better grasp the risks and potential paths of global climate change. **Mitigating** these **risks** and preparing for the effects of warming **will require scientific understanding** of how our complex planet operates, how it is changing, and how that change will affect the environment and human society. John F. Kennedy's brilliant call to put a man on the moon by the end of the 1960s set an arbitrary deadline, but the deadline we face today is set by nature. NASA must continue to play a vital role in helping find ways to protect our planet for (and perhaps from) its intelligent life. Exploration of space is a noble quest. But we can't afford to be so starry-eyed that we overlook our own planet.

### Warming is inevitable but adjusting government policy can address the worst effects – specifically, for sea level rise. US responses are modeled globally.

#### Economist 17

 "How government policy exacerbates hurricanes like Harvey," Economist, https://www.economist.com/news/leaders/21727898-if-global-warming-were-not-enough-threat-poor-planning-and-unwise-subsidies-make-floods

THE extent of the devastation will become clear only when the floodwater recedes, leaving ruined cars, filthy mud-choked houses and the bloated corpses of the drowned. But as we went to press, with the rain pounding South Texas for the sixth day, Hurricane Harvey had already set records as America’s most severe deluge (see Briefing). In Houston it drenched Harris County in over 4.5trn litres of water in just 100 hours—enough rainfall to cover an eight-year-old child. The fate of America’s fourth-largest city holds the world’s attention, but it is hardly alone. In India, Bangladesh and Nepal, at least 1,200 people have died and millions have been left homeless by this year’s monsoon floods. Last month torrential rains caused a mudslide in Sierra Leone that killed over 1,000—though the exact toll will never be known. Around the world, **governments are grappling with the threat from floods. This will ultimately be about dealing with climate change. Just as important, is correcting** short-sighted **government policy** and the perverse incentives that make flooding worse. Judgment day The overwhelming good news is that storms and flooding have caused far fewer deaths in recent decades, thanks to better warning systems and the construction of levees, ditches and shelters. The cyclone that struck Bangladesh in 1970 killed 300,000-500,000 people; the most recent severe one, in 2007, killed 4,234. The bad news is that storms and floods still account for almost three-quarters of weather-related disasters, and they are becoming more common. According to the Munich Re, a reinsurer, their number around the world has increased from about 200 in 1980 to over 600 last year. Harvey was the third “500-year” storm to strike Houston since 1979. At the same time, floods and storms are also becoming more costly. By one estimate, three times as many people were living in houses threatened by hurricanes in 2010 as in 1970, and the number is expected to grow as still more people move to coastal cities. The UN reckons that, in the 20 years to 2015, storms and floods caused $1.7trn of destruction; the World Health Organisation estimates that, in real terms, the global cost of hurricane damage is rising by 6% a year. Flood losses in Europe are predicted to increase fivefold by 2050. One cause is global warming. The frequency and severity of hurricanes vary naturally—America has seen unusually few in the past decade. Yet the underlying global trend is what you would expect from climate change. Warmer seas evaporate faster and warmer air can hold more water vapour, which releases energy when it condenses inside a weather system, feeding the violence of storms and the intensity of deluges. Rising sea levels, predicted to be especially marked in the Gulf of Mexico, exacerbate storm surges, adding to the flooding. Harvey was unusually devastating because it suddenly gained strength before it made landfall on Friday; it then stayed put, dumping its rain on Houston before returning to the Gulf. Again, that is consistent with models of a warmer world. Poor planning bears even more blame. Houston, which has almost no restrictions on land-use, is an extreme example of what can go wrong. Although a light touch has enabled developers to cater to the city’s rapid growth—1.8m extra inhabitants since 2000—it has also led to concrete being laid over vast areas of coastal prairie that used to absorb the rain. According to the Texas Tribune and ProPublica, a charity that finances investigative journalism, since 2010 Harris County has allowed more than 8,600 buildings to be put up inside 100-year floodplains, where floods have a 1% chance of occurring in any year. Developers are supposed to build ponds to hold run-off water that would have soaked into undeveloped land, but the rules are poorly enforced. Because the maps are not kept up to date, properties supposedly outside the 100-year floodplain are being flooded repeatedly. **Government failure adds to the harm**. Developing countries are underinsured against natural disasters. Swiss Re, a reinsurer, says that of the $50bn or so of losses to floods, cyclones and other disasters in Asia in 2014, only 8% were covered. The Bank of International Settlements calculates that the worst natural catastrophes typically permanently lower the afflicted country’s GDP by almost 2%. America has the opposite problem—the federal government subsidises the insurance premiums of vulnerable houses. The National Flood Insurance Programme (NFIP) has been forced to borrow because it fails to charge enough to cover its risk of losses. Underpricing encourages the building of new houses and discourages existing owners from renovating or moving out. According to the Federal Emergency Management Agency, houses that repeatedly flood account for 1% of NFIP’s properties but 25-30% of its claims. Five states, Texas among them, have more than 10,000 such households and, nationwide, their number has been going up by around 5,000 each year. Insurance is meant to provide a signal about risk; in this case, it stifles it. Mend the roof while the sun shines What to do? **Flooding strengthens the case for minimizing climate change**, which threatens to make wet places wetter and storms stormier. Even those who doubt the science would do well to see action as an insurance policy that pays out if the case is proven. However, that will not happen fast, even if all countries, including America, sign up to international agreements. More immediately, therefore, politicians can learn from Houston. Cities need to protect flood defences and catchment areas, such as the wetlands around Kolkata    and the lakes in and around Pokhara in Nepal, whose value is becoming clear. Flood maps need to be up to date. Civil engineers, often starved of funds and strangled by bureaucracy, should be building and reinforcing levees and reservoirs now, before it is too late. The NFIP should start to charge market premiums and developing countries should sell catastrophe bonds. All **this is a test of government**, of **foresight** and the ability to withstand the lobbying of homeowners and developers. But politicians and officials who fail the test need to realise that, sooner or later, they will wake up to a Hurricane Harvey of their own.

### This leads global war

#### Holthaus 15

Eric Holthaus 15, editor at rollingstone magazine citing James Hansen, former NASA climatologist, "The Point of No Return: Climate Change Nightmares Are Here," Rolling Stone, accessed 10-23-2016, http://www.rollingstone.com/politics/news/the-point-of-no-return-climate-change-nightmares-are-already-here-20150805

On July 20th, James Hansen, the former NASA climatologist who brought climate change to the public's attention in the summer of 1988, issued a bombshell: He and a team of climate scientists had identified a newly important feedback mechanism off the coast of Antarctica that suggests mean sea levels could rise 10 times faster than previously predicted: 10 feet by 2065. The authors included this chilling warning: **If emissions aren't cut**, "We conclude that **multi-meter sea-level rise would become** practically **unavoidable**. **Social disruption** **and** **economic consequences** of such large sea-level rise **could be devastating**. It is not difficult to imagine that **conflicts arising from forced migrations and economic collapse might make the planet ungovernable, threatening the fabric of civilization."**

## 2 – Mining

### Private sector mining is the key link to space exploration and resource collection.

#### Sharma 21

[Maanas Sharma, 9-7-2021, "The Space Review: The privatized frontier: the ethical implications and role of private companies in space exploration," The Space Review, https://www.thespacereview.com/article/4238/1]//DDPT

In recent years, private companies have taken on a larger role in the space exploration system. With **lower costs and faster production** times, they have **displaced** some functions of **government** space **agencies**. Though many have levied criticism against privatized space exploration, it also allows room for more altruistic actions by government space agencies and the benefits from increased space exploration as a whole. Thus, we should encourage this development, as the process is net ethical in the end. Especially if performed in conjunction with adequate government action on the topic, private space exploration can overcome possible shortcomings in its risky and capitalistic nature and ensure a positive contribution to the general public on Earth. The implications of commercial space exploration have been thrust into the limelight with the successes and failures of billionaire Elon Musk’s company SpaceX. While private companies are not new to space exploration, their prominence[’s] in American space exploration efforts has increased rapidly in recent years, fueled by technological innovations, reductions in cost, and readily available funding from government and private sources.[1] In May 2020, SpaceX brought American astronauts to space from American soil for the first time in almost 10 years.[2] Recognizing the greatly reduced costs of space exploration in private companies, **NASA’s** **budget** has **shifted to** significantly **relying on private companies**.[3] However, private space companies are unique from government space agencies in the way they experience unique sets of market pressures that influence their decision-making process. Hence, the expansion of private control in the space sector turns into a multifaceted contestation of its ethicality. [...] To create a conducive environment for new space-for-space exploration, one without confrontation but with protection for corporate astronauts, infrastructure, and other interests, governments must create key policies such as a framework for property rights on asteroids, the Moon, and Mars.[7,10] Another key matter to note is restricted capitalism in space “could also be our salvation.”[11] **Private** space **exploration** could **reap** increased access to **resources and other benefits** that can be used to solve the very problems on Earth that critics of capitalism identify. Since governments offset some of their projects to private companies, government agencies can focus on altruistic projects that otherwise would not fit in the budget before and do not have the immediate commercial use that private companies look for. Scott Hubbard, an adjunct professor of aeronautics and astronautics at Stanford University, discusses how “this strategy allows the space agency to continue ‘exploring the fringe where there really is no business case’” but still has important impacts on people down on Earth.[12] Indeed, this idea is a particularly powerful one when considering the ideal future of private companies in space exploration. Though there is no one set way governments will interact with companies, the consensus is that they must radically reimagine their main purpose as the role of private space exploration continues to grow. As governments utilize services from private space companies, “[i]nstead of being bogged down by the routine application of old research, NASA can prioritize their limited budget to work more on research of other unknowns and development of new long-term space travel technologies.”[13] According to the Council on Foreign Relations, such technologies have far-reaching benefits on Earth as well. Past developments obviously include communications satellites, by themselves a massive benefit to society, but also “refinements in artificial hearts; improved mammograms; and laser eye surgery… thermoelectric coolers for microchips; high-temperature lubricants; and a means for mass-producing carbon nanotubes, a material with significant engineering potential; [and h]ousehold products.”[2]

### Mining solves Water Shortages

#### Kean 15

Sam Kean December 2015 "The End of Thirst"<https://www.theatlantic.com/magazine/archive/2015/12/the-end-of-thirst/413176/> (writer based in Washington DC for the Atlantic)//Elmer

**Imagine turning on your tap and seeing no water come out**. Or looking down into your village’s only well and finding it dust-dry. Much of **the developing world** **could** soon **face such a scenario.** According to the United Nations, **1.2 billion** people already **suffer from** severe **water shortages**, and that number is **expected to increase to 1.8 billion** **over the next decade**, in part because of climate change. **Developed countries probably won’t be immune**. California and other states in the western U.S. are already experiencing extreme drought, and **climate experts warn of** even worse to come—multi-decade **megadroughts**. Mass migrations and wars over freshwater loom as real possibilities. Staving off disaster will require conservation, especially in agriculture, which consumes more than two-thirds of all the water humans use. Basic infrastructure maintenance would also go a long way: Some developing countries lose more than half their water through leaky pipes. But **conservation** and maintenance **won’t solve** all our water woes, especially as the planet warms and people continue to pack into cities. As a result, governments around the world are investing in new water-recycling and water-harvesting technologies. Here’s what the future of water might look like. 1. Drinking From the Sea … One obvious solution would be to drink ocean water. Converting seawater into freshwater by stripping out the salt—a process called desalination—offers several advantages. Roughly half the world’s population lives within 65 miles of an ocean, and saltwater accounts for about 97 percent of all water on Earth. Still, desalination presents obstacles. Older plants that boil seawater and collect the vapors, as many of those in the Middle East do, use ungodly amounts of energy. Newer plants that use reverse osmosis—whereby seawater is forced through membranes at high pressure—are more efficient, but still expensive and energy-intensive. The process also produces a briny waste that can harm marine life if not disposed of properly. We can nevertheless expect to see more desalination plants soon—thanks in part to Israel, which all but eliminated its chronic water shortages in the past decade by building four large reverse-osmosis plants, inspiring other countries to follow suit. A $1 billion plant operated by an Israeli company is about to open north of San Diego; it will be the largest in the Western Hemisphere, providing up to 50 million gallons of water a day to Californians. 2. … Or From the Toilet Instead of desalination, some experts favor recycling wastewater—cleaning the water from showers, washing machines, and, yes, toilets—for human consumption. Most water-recycling plants clean water in two basic ways. First, they force it through filters, some of which have holes hundreds of times narrower than a strand of human hair. These filters remove waste particles, organic chemicals, bacteria, viruses, and other dreck. Second, chemicals like hydrogen peroxide or ozone and pulses of ultraviolet light destroy any pathogens that have slipped through. Water recycling is a proven technology: California recycles hundreds of millions of gallons each day for irrigation and other uses. So what’s stopping recycled wastewater from going directly to our taps? Human psychology. The very idea of drinking it disgusts many people. They view such water as irredeemably dirty, little better than toilet water. In reality, recycled water is some of the cleanest drinking water around—as good as or better than the best bottled water. (Breweries in Oregon and California have plans to make beer with recycled water for this very reason—it’s so clean that it’s tasteless, a blank slate.) More to the point, recycled water is far purer than most tap water. By the time the water in the Mississippi reaches New Orleans, for instance, every drop has been used by cities along the river multiple times, and the treatment it gets before going through the taps is nowhere near as extensive as what a water-recycling plant provides. Singapore and Namibia have recycled water for years with no adverse health effects, and nasa began recycling water on the International Space Station in 2008. (The Russian cosmonauts there don’t recycle their pee, but they give the Americans bags of it to recycle and then drink.) In the United States, a few parched towns in Texas and New Mexico drink recycled wastewater already, and last year the city of San Diego—which gets most of its water from rivers that are running dry—approved a $3 billion recycling plant that would provide one-third of its tap water, 83 million gallons a day, by 2035. San Diego had rejected essentially the same plan in 1998, but this time the city decided it had no other choice. 3. Microbe Power Rather than filtering out organic waste, water-recycling plants might one day be able to break it down with microbes, a process that could bring an ancillary benefit: electric power. As they digest the gunk in wastewater, certain species of bacteria, called electricigens, can liberate electrons, the stuff of electricity. Producing electrons is actually common in nature—much of photosynthesis involves shuttling them around. Unlike plants, though, electricigens don’t store electrons internally. They use microscopic appendages that look like hairs to deposit the electrons onto external surfaces, usually minerals. In experimental fuel cells, scientists have replaced the minerals with wires and harvested electrons. Someday the bacteria might even generate enough power to run a water-recycling plant, making it self-sufficient. 4. Keeping It Simple Some up-and-coming water technologies are startlingly straightforward. People on arid plateaus, for instance, can string a fine plastic mesh between two posts and use it to capture water from fog that rolls through, collecting the drops in storage tanks. Existing systems in one small Guatemalan village can collect 6,300 liters a day, and more during the wet season. Scientists think that updating the mesh with new materials and tighter weaves could dramatically improve yields. People could even channel the water into hydroponic gardens to grow food. Imagine famously foggy San Francisco with a farm on every rooftop. Oil films present another low-tech opportunity. Reservoirs lose appalling amounts of water to evaporation: By some estimates, more water escapes into the air than is used by humans. But covering the surface with an extremely thin layer—even just one molecule thick—of nontoxic chemicals derived from coconut or palm oil can cut evaporative losses. Wind tends to break up layers of oil, re-exposing the water to the elements. But drones or blimps equipped with sensors could someday monitor reservoirs and signal where oil needed to be re-applied. In one recent test, spreading oil over a lake in Texas (via boats) appears to have cut evaporation by about 15 percent. 5. Making It Rain Of course, for every modest proposal to save water, there’s an audacious one floating around. Take weather modification. Advocates of the idea hope to significantly boost precipitation using a process called “cloud seeding”: spraying clouds with a chemical like silver iodide, which acts as a nucleus around which water droplets collect. The droplets then fall to Earth as rain or snow. That’s the theory, at least. The first large-scale experiments, in the 1940s, generated a lot of excitement. More recently, weather modification has been dogged by accusations of hype and questions about its reliability. A six-year program in Wyoming claimed to have squeezed 5 to 15 percent more precipitation out of the clouds it seeded. Unfortunately, conditions were suitable for seeding only 30 percent of the time, so the total increase in precipitation was closer to 3 percent. That’s not nothing, especially during droughts. But weather modification may be the flying car of water technology—a tantalizing idea that’s forever on the horizon. 6. The Moon Shot I**f Earth** does **run dry**, **we might** be able to **save ourselves by mining water from asteroids** and comets. Scientists have landed probes on these space rocks to study them. Future landers could mine them in deep space or possibly even drag them back toward Earth. Though the idea sounds far-fetched, space-mining companies already exist, and one of them, Planetary Resources, expects to start harvesting resources from asteroids in about a decade. According to Planetary Resources, **a single 1,600-foot-wide asteroid could yield** more platinum than has ever been mined in human history. But **water** could prove to be the real prize for space-mining companies. Some astronomers believe that **the asteroid Ceres**, which sits between Jupiter and Mars, may **contain** **more freshwater** (as ice) **than all of Earth does.** In addition to quenching people’s thirst, this water could be turned into fuel for interplanetary spaceships. In that case, an ample supply of water would be the key to a happy future not just down here on the ground, but up among the stars as well.

### Terrestrial resource scarcity goes nuclear

#### Klare 13

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Brace yourself. You may not be able to tell yet, but **according to global experts** and the US intelligence community, the earth is already shifting under you. Whether you know it or not, you’re on a new planet, a resource-shock world of a sort humanity has never before experienced. Two nightmare scenarios—a global **scarcity** of vital resources and the onset of extreme climate change—are already beginning to converge and in the coming decades are likely to **produce** a tidal wave of **unrest, rebellion, competition** and **conflict**. Just what this tsunami of disaster will look like may, as yet, be hard to discern, but experts warn of “water wars” over contested river systems, global food riots sparked by soaring prices for life’s basics, mass migrations of climate refugees (with resulting anti-migrant violence) **and** the breakdown of social order or the **collapse** of states. At first, such mayhem is likely to arise largely in Africa, Central Asia and other areas of the underdeveloped South, but in time, all regions of the planet will be affected. To appreciate the power of this encroaching catastrophe, it’s necessary to examine each of the forces that are combining to produce this future cataclysm. Resource Shortages and Resource Wars Start with one simple given: the prospect offuture **scarcities of** vital natural resources, including energy, water, land, food and **critical minerals.** This in itself would **guarantee** social unrest, geopolitical friction and **war**. It is important to note that **a**bsolute scarcity doesn’t have to be on the horizon in any given resource category for this scenario to kick in. A lack of adequate supplies to meet the needs of a growing, ever more urbanized and industrialized global population is enough. Given the wave of extinctions that scientists are recording, some resources—particular species of fish, animals and trees, for example—will become less abundant in the decades to come, and may even disappear altogether. But key materials for modern civilization like oil, uranium and copper will simply prove harder and more costly to acquire, leading to supply bottlenecks and periodic shortages. Oil—the single most important commodity in the international economy—provides an apt example. Although global oil supplies may actually grow in the coming decades, many experts doubt that they can be expanded sufficiently to meet the needs of a rising global middle class that is, for instance, expected to buy millions of new cars in the near future. In its 2011 World Energy Outlook, the International Energy Agency claimed that an anticipated global oil demand of 104 million barrels per day in 2035 will be satisfied. This, the report suggested, would be thanks in large part to additional supplies of “unconventional oil” (Canadian tar sands, shale oil and so on), as well as 55 million barrels of new oil from fields “yet to be found” and “yet to be developed.” However, many analysts scoff at this optimistic assessment, arguing that rising production costs (for energy that will be ever more difficult and costly to extract), environmental opposition, warfare, corruption and other impediments will make it extremely difficult to achieve increases of this magnitude. In other words, even if production manages for a time to top the 2010 level of 87 million barrels per day, the goal of 104 million barrels will never be reached and the world’s major consumers will face virtual, if not absolute, scarcity. Water provides another potent example. On an annual basis, the supply of drinking water provided by natural precipitation remains more or less constant: about 40,000 cubic kilometers. But much of this precipitation lands on Greenland, Antarctica, Siberia and inner Amazonia where there are very few people, so the supply available to major concentrations of humanity is often surprisingly limited. In many regions with high population levels, water supplies are already relatively sparse. This is especially true of North Africa, Central Asia and the Middle East, where the demand for water continues to grow as a result of rising populations, urbanization and the emergence of new water-intensive industries. The result, even when the supply remains constant, is an environment of increasing scarcity. Wherever you look, the picture is roughly the same: supplies of critical resources may be rising or falling, but rarely do they appear to be outpacing demand, producing a sense of widespread and systemic scarcity. However generated, **a perception of scarcity**—or imminent scarcity—regularly **leads to** anxiety, resentment, **hostility** and contentiousness. This pattern is very well understood, and has been evident throughout human history. In his book Constant Battles, for example, Steven LeBlanc, director of collections for Harvard’s Peabody Museum of Archaeology and Ethnology, notes that many ancient civilizations experienced higher levels of warfare when faced with resource shortages brought about by population growth, crop failures or persistent drought. Jared Diamond, author of the bestseller Collapse, has detected a similar pattern in Mayan civilization and the Anasazi culture of New Mexico’s Chaco Canyon. More recently, concern over adequate food for the home population was a significant factor in Japan’s invasion of Manchuria in 1931 and Germany’s invasions of Poland in 1939 and the Soviet Union in 1941, according to Lizzie Collingham, author of The Taste of War. Although the global supply of most basic commodities has grown enormously since the end of World War II, analysts see the persistence of resource-related conflict in areas where materials remain scarce or there is anxiety about the future reliability of supplies. Many experts believe, for example, that the fighting in Darfur and other war-ravaged areas of North Africa has been driven, at least in part, by competition among desert tribes for access to scarce water supplies, exacerbated in some cases by rising population levels. “In Darfur,” says a 2009 report from the UN Environment Programme on the role of natural resources in the conflict, “recurrent drought, increasing demographic pressures, and political marginalization are among the forces that have pushed the region into a spiral of lawlessness and violence that has led to 300,000 deaths and the displacement of more than two million people since 2003.” Anxiety over future supplies is often also a factor in conflicts that break out over access to oil or control of contested undersea reserves of oil and natural gas. In 1979, for instance, when the Islamic revolution in Iran overthrew the Shah and the Soviets invaded Afghanistan, Washington began to fear that someday it might be denied access to Persian Gulf oil. At that point, President Jimmy Carter promptly announced what came to be called the Carter Doctrine. In his 1980 State of the Union Address, Carter affirmed that any move to impede the flow of oil from the Gulf would be viewed as a threat to America’s “vital interests” and would be repelled by “any means necessary, including military force.” In 1990, this principle was invoked by President George H.W. Bush to justify intervention in the first Persian Gulf War, just as his son would use it, in part, to justify the 2003 invasion of Iraq. Today, it remains the basis for US plans to employ force to stop the Iranians from closing the Strait of Hormuz, the strategic waterway connecting the Persian Gulf to the Indian Ocean through which about 35 percent of the world’s seaborne oil commerce passes. Recently, a set of resource conflicts have been rising toward the boiling point between China and its neighbors in Southeast Asia when it comes to control of offshore oil and gas reserves in the South China Sea. Although the resulting naval clashes have yet to result in a loss of life, a strong possibility of military escalation exists. A similar situation has also arisen in the East China Sea, where China and Japan are jousting for control over similarly valuable undersea reserves. Meanwhile, in the South Atlantic Ocean, Argentina and Britain are once again squabbling over the Falkland Islands (called Las Malvinas by the Argentinians) because oil has been discovered in surrounding waters. By all accounts, resource-driven **potential conflicts** like these **will** only **multiply** in the years ahead **as** demand rises, supplies dwindle and more of **what remains will be found in disputed areas. I**n a 2012 study titled Resources Futures, the respected British think-tank Chatham House expressed particular concern about possible resource wars over water, especially in areas like the Nile and Jordan River basins where several groups or countries must share the same river for the majority of their water supplies and few possess the wherewithal to develop alternatives. “Against this backdrop of tight supplies and competition, issues related to water rights, prices, and pollution are becoming contentious,” the report noted. “In areas with limited capacity to govern shared resources, balance competing demands, and mobilize new investments, tensions over water may erupt into more open confrontations.”

### Modern wars don’t stay limited and are likely to cause extinction.

#### Edwards 17

[(Paul N. Edwards, CISAC’s William J. Perry Fellow in International Security at Stanford’s Freeman Spogli Institute for International Studies. Being interviewed by EarthSky/card is only parts of the interview directly from Paul Edwards.) “How nuclear war would affect Earth’s climate,” EarthSky, September 8, 2017, earthsky.org/human-world/how-nuclear-war-would-affect-earths-climate] TDI

We are not talking enough about **the climatic effects of nuclear war**. The “nuclear winter” theory of the mid-1980s played a significant role in the arms reductions of that period. But with the collapse of the Soviet Union and the reduction of U.S. and Russian nuclear arsenals, this aspect of nuclear war has faded from view. That’s not good. In the mid-2000s, climate scientists such as Alan Robock (Rutgers) took another look at nuclear winter theory. This time around, they used much-improved and much more detailed climate models than those available 20 years earlier. They also tested the potential effects of smaller nuclear exchanges. The result: an exchange involving just 50 nuclear weapons — the kind of thing we might see in an India-Pakistan war, for example — could loft 5 billion kilograms of smoke, soot and dust high into the stratosphere. That’s enough to cool the entire planet by about 2 degrees Fahrenheit (1.25 degrees Celsius) — about where we were during the Little Ice Age of the 17th century. Growing seasons could be shortened enough to create really significant food shortages. So the climatic effects of even a relatively small nuclear war would be planet-wide. What about a larger-scale conflict? A U.S.-Russia war currently seems unlikely, but if it were to occur, hundreds or even thousands of nuclear weapons might be launched. The climatic consequences **would be catastrophic:** global average **temperatures would drop** as much as **12 degrees Fahrenheit** (7 degrees Celsius) for up to several years — temperatures last seen during the great ice ages. Meanwhile, smoke and dust circulating in the stratosphere would darken the atmosphere enough to inhibit photosynthesis, causing disastrous crop failures, widespread famine and massive ecological disruption. **The effect would be similar to** that of **the** giant **meteor** believed to be **responsible for the extinction of the dinosaurs.** **This time, we would be the dinosaurs.** Many people are concerned about North Korea’s advancing missile capabilities. Is nuclear war likely in your opinion? At this writing, I think **we are closer to a nuclear war** than we have been **since the early 1960s**. In the North Korea case, both Kim Jong-un and President Trump are bullies inclined to escalate confrontations. President Trump lacks impulse control, and there are precious few checks on his ability to initiate a nuclear strike. We have to hope that our generals, both inside and outside the White House, can rein him in. North Korea would most certainly “lose” a nuclear war with the United States. But many millions would die, including hundreds of thousands of Americans currently living in South Korea and Japan (probable North Korean targets). Such vast damage would be wrought in Korea, Japan and Pacific island territories (such as Guam) that any “victory” wouldn’t deserve the name. Not only would that region be left with horrible suffering amongst the survivors; it would also immediately face famine and rampant disease. Radioactive fallout from such a war would spread around the world, including to the U.S. It has been more than 70 years since the last time a nuclear bomb was used in warfare. What would be the effects on the environment and on human health today? To my knowledge, most of the changes in nuclear weapons technology since the 1950s have focused on making them smaller and lighter, and making delivery systems more accurate, rather than on changing their effects on the environment or on human health. So-called “battlefield” weapons with lower explosive yields are part of some arsenals now — but **it’s** quite **unlikely that any exchange** between two nuclear powers **would stay limited** to these smaller, less destructive bombs.

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