### 1

#### **CP text : States should create a regulatory environment framework for space.**

#### **Solves the aff**

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First, as part of a general shift to that more decentralized, market-oriented space sector, policymakers should consider allowing private space tourists and settlers to voluntarily take on more risk than states would tolerate for government-employed astronauts. In the long run, ensuring high safety levels will be essential to convince larger numbers of people to travel or live in space, but in the early years of exploration, too great an aversion to risk will stop progress before it starts. An instructive analogy can be found in how NASA works with its contractors: In the mid-2000s, NASA shifted from using cost-plus contracts (in which NASA shouldered all the economic risk of investing in space) to fixed-price contracts (in which risk was distributed between NASA and their contractors). Because of private companies’ greater tolerance for risk, this shift catalyzed a burst of activity in the sector — sometimes referred to as “New Space.” A similar shift in how we approach voluntary risk-taking by private-sector astronauts may be necessary in order to launch the space-for-space economy. 2. Judiciously implementing government regulation and support. Second, as with most markets, developing a stable space economy will depend on judicious government regulation and support. NASA and the U.S. Commerce and State Departments’ recent recommitment to “create a regulatory environment in [low-Earth orbit] that enables American commercial activities to thrive” is a good sign that the government is on a path of continued collaboration with industry, but there’s still a long way to go. Governments should start by clarifying how property rights over limited resources such as water on Mars, ice on the Moon, or orbital slots (i.e., “parking spots” in space) will be governed. Recent steps — including NASA’s offer to purchase lunar soil and rocks, last April’s Executive Order on the governance of space resources, and the 2015 Commercial Space Launch Competitiveness Act — indicate that the U.S. government is interested in establishing some form of regulatory framework to support the economic development of space. In 2017, Luxembourg became the first European country to establish a legal framework securing private rights over resources mined in space, and similar steps have been taken at the domestic level in Japan and the United Arab Emirates. Moreover, nine countries (though Russia and China are notably missing) have signed the Artemis Accords, which lay out a vision for the sustainable, international development of the Moon, Mars, and asteroids. These are important first steps, but they have yet to be clearly translated into comprehensive treaties that govern the fair use and allocation of scarce space resources among all major spacefaring nations. In addition, governments should continue to fill the financial gaps in the still-maturing space-for-space economic ecosystem by funding basic scientific research in support of sending humans to space, and by providing contracts to space startups. Similarly, while excessive regulation will stifle the industry, some government incentives, such as policies to reduce space debris, can help reduce the costs of operating in space for everyone in ways that would be difficult to coordinate independently.

### 2

#### The Space Economy is rapidly growing – all thanks goes to the private sector

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This has drawn tremendous interest from both entrepreneurs and investors, as space became not just an exciting, but also a lucrative, investment. Figure 4 shows how SpaceX’s success has since sparked a rapid increase in private investments in space. From less than US$500 million per year in 2009, private investment in space had grown to over US$5 billion per annum by 2019. [32]. Fig. 4. Cumulative private investments. The next section offers an analysis of how the space economy is expected to grow in the future and the role that private investment will continue to play in it. Future Outlook of Space Revenues and Investments The analysis and research provided above clearly indicates that the commercial sector has a much higher impact on the monetary size of the space economy than the government sector. While the government may have started space research, the growth of the space economy is now driven primarily by private sector initiatives. The space economy’s growth looks promising over the next decades, as humans look to leverage the earthoriented opportunities (communications, earth observation, etc.) in the near term and the prospects of mining, space tourism, as well as Moon & Mars expeditions in future. Several organizations have made forecasts of the space economy using slightly different starting points and future assumptions. The Science & Technology Policy Institute [17] has collated and reviewed some of these forecasts, as provided in Table 4 below. According to its report published in 2017, Morgan Stanley estimates that the global space industry could generate more than US$1 trillion in revenue by 2040 [33]. As per the report, the industry growth in the next 5-7 years is likely to be driven by the launches of LEO satellite constellations and their associated services, while growth after 2026, to a substantial extent, will be determined by what are mentioned as ‘second order impacts’ in the report – essentially this will require the New Space Economy businesses to start pulling their weight from a commercial perspective. Fig. 5. The global space economy (US$ million). It is evident that while the near-term opportunities are satellite-led and relatively well-established, new space opportunities, that is, asteroid mining, space tourism and the colonization of Mars, are novel and riskier, in terms of both economic value and timelines. Significant investments will be required before some of these are realized. Keeping this in view, a forecast was made for space industry revenues till 2040. Investments required to achieve these revenues were also assessed through quantitative regression analysis. A. Space Economy Forecast Till 2040 The historical data for space economy size used earlier in Table 1 was projected forward to forecast the size of the economy till 2040. As per Table 1, the space economy grew at 6.5% from 2005-2019, with the commercial economy growing at 7.3% and the government at 3.9%. Significant recent growth can be attributed to the need for more satellites by a rapidly digitizing world. This is a relatively low-hanging fruit for private sector exploitation. However, it is expected that with increasing scale and greater technical challenges to be overcome in non-satellite business, the growth over the next two decades may be lower than what has been witnessed over the last decade. Hence, the following assumptions have been made for the forecast. Annual growth rate of Commercial Economy: 6.5% Volume 10 Issue 3 (2021) ISSN: 2167-1907 www.JSR.org 11 Annual growth rate of Government Economy: 3% The above assumptions led to a forecast for the space economy as per Table 5 below. The above forecast suggests that the space economy will grow from US$424 billion in 2019 to US$1.4 trillion by 2040, at an annualized rate of about 6%. The size of the commercial economy by 2040 will be US$1.26 trillion, while the government economy will be US$162 billion. This indicates that the share of the government economy in the total space economy would decline from 20.5% in 2019 to 11.3% in 2040.

#### Private Space Exploration *solves* recession

Sidorov 20 [ Konstantin Sidorov is chief executive of the London Tech Club. City AM “Need a way out of recession? Look to the stars” <https://www.cityam.com/need-a-way-out-of-recession-look-to-the-stars/> 11/23/2020] //aaditg

“We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard; because that goal will serve to organize and measure the best of our energies and skills.” These words by President John F. Kennedy are as important today as they were when he spoke in 1962. Asteroid mining may seem like something out of a sci-fi movie, and not the most obvious choice of investment, especially during a global pandemic and recession. But it is exactly these kinds of aspirations that have pushed human endeavour and technological advancement to new heights. The discoveries made along the way to achieving these sky-high goals have become integral parts of our daily lives — and could even help us out of this recession. The economics of space is now a crucial part of the market and no longer only in the realm of government endeavour. Private capital is paving the way for public partnerships. Supply chains in the “new space economy” are accelerating, startups are emerging, and clusters are forming. Old space discovery was defined by the Russian Voshod and Vostok and the US Apollo missions. We have entered a space age defined by private enterprise. Financial firms Goldman Sachs, Morgan Stanley and Bank of America Merrill Lynch have each conducted their own studies and found the space economy could reach between $1 trillion and $2.7 trillion by the 2040s. That would make it larger than the 2017 GDP of the UK. But are these astronomical figures relevant to people beyond the likes of Elon Musk, Jeff Bezos and Richard Branson? The answer is a resounding yes. The space sector is made up of a hidden infrastructure which most people do not see but is central to the technology that surrounds us. The strides humankind is making in space are integral to the day-to-day things we take for granted. Space plays an indispensable role in the global economy. The highest grossing sectors — agriculture, mining, transportation, IT, finance, and insurance — all heavily rely on systems and technology developed for space. We know that without satellite observation our navigation and mapping capacity would be significantly reduced. But that is only the start. Satellite data is being harnessed to protect critical infrastructure, and can be used to prevent disasters like the Morandi bridge collapse in Genoa by monitoring and holding critical information to better manage and maintain these types of structures. Given that there are over 80,000 ageing bridges in Canada alone, most with a design life of less than 100 years, the potential impact could be huge. The insurance industry can also be transformed by “mega constellations” — a group of artificial satellites working together as a system to provide permanent global coverage. Insurers are excited about the prospect of increased real-time data on hurricanes, especially the ability to use imagery and analytics to speed up or question claims. Amazon is rolling out plans to launch over 3,200 satellites to over 95 per cent of the Earth’s surface. The initiative is to launch a constellation of low Earth orbit satellites that will provide low-latency, high-speed broadband connectivity to the unserved communities around the world. Starlink, built by SpaceX, is launching “constellation broadband” to deliver higher-speed internet connections across the world. The volume of space spin-off industries is multiplying every year. NASA has created more than 2,000 inventions that later became widespread products and services. Innovations such as the dialysis machines, CAT scanners and freeze-dried food are all a result of space-related projects. Without investment in space exploration we would be without memory foam or GPS, while an adaptation of the spacesuit upgrade led to the creation of the Nike Air footwear. We are only going to become more dependent on space technologies as AI and the fourth industrial revolution take off. Satellite data and its deep-learning technology are being used to map and monitor solar energy assets for smart city and smart grid initiatives. The AI combines satellite data with other factors such as weather information and local government policies to provide a complete picture of the emissions and financial benefits the technology could bring. And yet, despite these strides, space exploration is still not considered a central part of our everyday lives. That needs to change. Governments must recognise its strategic importance. Consumers must realise how the space industry affects their everyday actions. Investors must consider the value of investment into the sector. Space is key to protecting our people, promoting our global influence, and providing future prosperity.

#### Recessions cause war – stats support transition wars, resource conflicts, terrorism, and diversionary wars – other authors don’t base their analysis on global studies

Royal ’10 [Jedediah, Director of Cooperative Threat Reduction at the U.S. Department of Defense, “Economic Integration, Economic Signaling and the Problem of Economic Crises”, 2010, Economics of War and Peace: Economic, Legal and Political Perspectives, ed. Goldsmith and Brauer, p. 213-215]PM

Less intuitive is how periods of economic decline may increase the likelihood of external conflict. Political science literature has contributed a moderate degree of attention to the impact of economic decline and the security and defence behaviour of interdependent slates. Research in this vein has been considered at systemic, dyadic and national levels. Several notable contributions follow. First, on the systemic level. Pollins (2008) advances Modelski and Thompson's (19%) work on leadership cycle theory, finding that rhythms in the global economy are associated with the rise and fall of a pre-eminent power and the often-bloody transition from one pre-eminent leader to the next. As such, exogenous shocks such as economic crises could usher in a redistribution of relative power (sec also Gilpin. 1981) that leads to uncertainty about power balances, increasing the risk of miscalculation (Fearon, 1995). Alternatively, even a relatively certain redistribution of power could lead to a permissive environment for conflict as a rising power may seek to challenge a declining power (Werner, 1999). Separately. Pollins (1996) also shows that global economic cycles combined with parallel leadership cycles impact the likelihood of conflict among major, medium and small powers, although he suggests that the causes and connections between global economic conditions and security conditions remain unknown. Second, on a dyadic level. Copeland's (1996. 2000) theory of trade expectations suggests that 'future expectation of trade' is a significant variable in understanding economic conditions and security behaviour of states. He argues that interdependent states are likely to gain pacific benefits from trade so long as they have an optimistic view of future trade relations. However, if the expectations of future trade decline, particularly for difficult to replace items such as energy resources, likelihood for conflict increases. as states will be inclined to use force to gain access to those resources. Crises could potentially be the trigger for decreased trade expectations either on its own or because it triggers protectionist moves by interdependent states.4 Third, others have considered the link between economic decline and external armed conflict at a national level. Blomberg and Hess (2002) find a strong correlation between internal conflict and external conflict, particularly during periods of economic downturn. They write, The linkages between internal and external conflict and prosperity are strong and mutually reinforcing. Economic conflict tends to spawn internal conflict, which in turn returns the favour. Moreover, the presence of a recession lends to amplify the extent to which international and external conflicts self-reinforce each other. (Blomberg & I less. 2002. p. 89) Economic decline has also been linked with an increase in the likelihood of terrorism (Blomberg. Hess. & Wccrapana. 2004). which has the capacity to spill across borders and lead to external tensions. Furthermore, crises generally reduce the popularity of a sitting government. "Diversionary theory' suggests that, when facing unpopularity arising from economic decline, sitting governments have increased incentives to fabricate external military conflicts to create a 'rally around the flag' effect. Wang (1996), DcRoucn (1995), and Blomberg. Mess, and Thacker (2006) find supporting evidence showing that economic decline and use of force are at least indirectly correlated. Gelpi (1997), Miller (1999), and Kisangani and Pickering (2009) suggest that the tendency towards diversionary tactics are greater for democratic states than autocratic states, due to the fact that democratic leaders are generally more susceptible to being removed from office due to lack of domestic support. DcRoucn (2000) has provided evidence showing that periods of weak economic performance in the United States, and thus weak Presidential popularity, are statistically linked to an increase in the use of force. In summary, recent economic scholarship positively correlates economic integration with an increase in the frequency of economic crises, whereas political science scholarship links economic decline with external conflict at systemic, dyadic and national levels.5 This implied connection between integration, crises and armed conflict has not featured prominently in the economic-security debate and deserves more attention. This observation is not contradictory to other perspectives that link economic interdependence with a decrease in the likelihood of external conflict, such as those mentioned in the first paragraph of this chapter. Those studies tend to focus on dyadic interdependence instead of global interdependence and do not specifically consider the occurrence of and conditions created by economic crises. As such, the view presented here should be considered ancillary to those views.

**That causes global nuclear war.**

Merlini ’11 [Cesare, was a nonresident senior fellow at the Center on the United States and Europe and is chairman of the Board of Trustees of the Italian Institute for International Affairs (IAI) in Rome, “A Post-Secular World?”, 03-30-2011, Routledge, https://www.brookings.edu/wp-content/uploads/2016/06/04\_international\_relations\_merlini.pdf]PM

Two neatly opposed scenarios for the future of the world order illustrate the range of possibilities, albeit at the risk of oversimplification. The first scenario entails the premature crumbling of the post-Westphalian system. One or more of the acute tensions apparent today evolves into an open and traditional conflict between states, perhaps even involving the use of nuclear weapons. The crisis might be triggered by a collapse of the global economic and financial system, the vulnerability of which we have just experienced, and the prospect of a second Great Depression, with consequences for peace and democracy similar to those of the first. Whatever the trigger, the unlimited exercise of national sovereignty, exclusive self-interest and rejection of outside interference would likely be amplified, emptying, perhaps entirely, the half-full glass of multilateralism, including the UN and the European Union. Many of the more likely conflicts, such as between Israel and Iran or India and Pakistan, have potential religious dimensions. Short of war, tensions such as those related to immigration might become unbearable. Familiar issues of creed and identity could be exacerbated. One way or another, the secular rational approach would be sidestepped by a return to theocratic absolutes, competing or converging with secular absolutes such as unbridled nationalism.

### 3

#### Private sector key to asteroid mining

**Britt 8/19** (Hugo Britt, 8-19-2021, "Companies Are Preparing for Space Mining ," Thomas Publishing Company, <https://www.thomasnet.com/insights/companies-are-preparing-for-space-mining/>) // VS

What Companies Are Preparing for a Future of Space Mining? One thing that is becoming clear is that off-earth mining is unlikely to be a state-run activity. Instead, several private companies are jockeying to be first in line to access minerals in space. iSpace (Japan) has a mission to “help companies access new business opportunities on the moon,” including the extraction of water and mineral resources to spearhead a space-based economy. Planetary Resources (defunct) was founded in 2009 with the goal of developing a robotic asteroid mining industry. Despite having high-profile founding investors including Alphabet’s Larry Page, Eric Schmidt, and Virgin Group founder Richard Branson, Planetary ran into financial trouble in 2018 and was gone by 2020. Deep Space Industries (defunct) was another early mover that intended to explore, examine, sample, and harvest minerals from asteroids. DSI was acquired by Bradford Space in 2019. Offworld is an AI company building “universal industrial robots to do the heavy lifting [including mining] on Earth, the Moon, asteroids, and Mars.” The Asteroid Mining Corporation (UK) is a venture currently crowdfunding for a 2023 satellite mission called “El Dorado,” which will conduct a spectral survey of 5,000 asteroids to identify the most valuable for mining. Alongside the U.S., the tiny European nation of Luxembourg has also developed a space mining framework and has subsequently emerged as a European hub for the fledgling industry.

#### Asteroid mining solves water access – only NEAs are sufficiently proximate and hydrated

Tillman 19 (Nola Taylor, has been published in Astronomy, Sky & Telescope, Scientific American, New Scientist, Science News (AAS), Space.com, and Astrobiology magazine, BA in Astrophysics) “Tons of Water in Asteroids Could Fuel Satellites, Space Exploration,” Space, 9/29/2019) // JL // recut by VS

When it comes to mining space for water, the best target may not be the moon: Entrepreneurs' richest options are likely to be asteroids that are larger and closer to Earth. A recent study suggested that roughly 1,000 water-rich, or hydrated, asteroids near our planet are easier to reach than the lunar surface is. While most of these space rocks are only a few feet in size, more than 25 of them should be large enough to each provide significant water. Altogether, the water locked in these asteroids should be enough to fill somewhere around 320,000 Olympics-size swimming pools — significantly more than the amount of water locked up at the lunar poles, the new research suggested. Because asteroids are small, they have less gravity than Earth or the moon do, which makes them easier destinations to land on and lift off from. If engineers can figure out how to mine water from these space rocks, they could produce a source of ready fuel in space that would allow spacecraft designers to build refuelable models for the next generation of satellites. Asteroid mining could also fuel human exploration, saving the expense of launching fuel from Earth. In both cases, would-be space-rock miners will need to figure out how to free the water trapped in hydrated minerals on these asteroids. "Most of the hydrated material in the near-Earth population is contained in the largest few hydrated objects," Andrew Rivkin, an asteroid researcher at Johns Hopkins University Applied Physics Research Laboratory in Maryland, told Space.com. Rivkin is the lead author on the paper, which estimated that near Earth asteroids could contain more easily accessible water than the lunar poles. According to the United Nations Office for Outer Space Affairs, more than 5,200 of the objects launched into space are still in orbit today. While some continue to function, the bulk of them buzz uselessly over our heads every day. They carry fuel on board, and when they run out, they are either lowered into destructive orbits or left to become space junk, useless debris with the potential to cause enormous problems for working satellites. Refueling satellites in space could change that model, replacing it with long-lived, productive orbiters. "It's easier to bring fuel from asteroids to geosynchronous orbit than from the surface of the Earth," Rivkin said. "If such a supply line could be established, it could make asteroid mining very profitable." Hunting for space water from the surface of the Earth is challenging because the planet's atmosphere blocks the wavelength of light where water can be observed. The asteroid warming as it draws closer to the sun can also complicate measurements. Instead, Rivkin and his colleagues turned to a class of space rocks called Ch asteroids. Although these asteroids don't directly exhibit a watery fingerprint, they carry the telltale signal of oxidized iron seen only on asteroids with signatures of water-rich minerals, which means the authors felt confident assuming that all Ch asteroids carry this rocky water. Based on meteorite falls, a previous study estimated that Ch asteroids could make up nearly 10% of the near-Earth objects (NEOs). With this information, the researchers determined that there are between 26 and 80 such objects that are hydrated and larger than 0.62 miles (1 km) across. Right now, only three NEOs have been classified as Ch asteroids, although others have been spotted in the asteroid belt. Most NEOs are discovered and observed at wavelengths too short to reveal the iron band that marks the class. Carbon-rich asteroids, which include Ch asteroids and other flavors, are also darker than the more common stony asteroids, making them more challenging to observe. Although Ch asteroids definitely contain water-rich minerals, that doesn’t necessarily mean that they will always be the best bet for space mining. It comes down to risk. Would an asteroid-mining company rather visit a smaller asteroid that definitely has a moderate amount of water, or a larger one that could yield a larger payday but could also come up dry? "Whether getting sure things with no false positives, like the Ch asteroids, is more important or if a greater range of possibilities is acceptable with the understanding that some asteroids will be duds is something the miners will have to decide," Rivkin said. In addition to estimating the number of large, water-rich asteroids might be available, the study also found that as many as 1,050 smaller objects, roughly 300 feet (100 meters) across, may also linger near Earth. Their small bulk will make them easier to mine (and) because their low gravity will require less fuel to escape from, but they will produce less water overall, and Rivkin expects that the handful of larger space rocks will be the first targets. "It seems likely that the plan for these companies will be to find the largest accessible asteroid with mineable material with the expectation that it will be more cost-effective than chasing down a large number of smaller objects," Rivkin said. "How 'accessible' and 'mineable material' and 'cost-effective' are defined by each company is to be seen."

#### Asteroid mining solves climate change through solar-powered satellites – provides infrastructure for existing tech

**Faure 11** (Jamie Faure, 7-15-2011, "Can space-based solar power save the climate? – Young Scientists Journal," No Publication, <https://ysjournal.com/can-space-based-solar-power-save-the-climate/>) // VS

Introduction How shall we tackle climate change? This is still an unresolved question. Here, I will put forward an idea and argue its case. Burning fuels creates carbon dioxide, which thickens the atmosphere. Consequently, an increasing amount of the Sun’s heat is trapped. So, to tackle climate change, we must stop burning fuels. However, fuel is needed for energy. Therefore, we (can use) need to find other sources of energy that do not adversely impact the environment. Space-based Solar Power What I think has the most potential in reducing global warming is Space-based Solar Power (SBSP) . This technology involves placing solar satellites in space, where their energy production is unaffected by seasons, weather, the day and night cycle, and the filtering effect of the Earth’s atmosphere, learn more at solar the gap. The Sun’s energy for us is virtually unlimited (around 5 billion years to go). In addition, the satellites are placed nearer to the Sun in space than to the Earth, so they receive more of the Sun’s energy. The satellite then transmits power to the Earth using a laser or microwave beam. Transmission by microwaves has already been tested by NASA, and proven possible. In space, solar irradiance is 144% higher than in the Earth, which means there is a lot more power available up there! Japan has already been working on this idea for 30 years and invested over 20 billion dollars, hoping to finish their project by 2030. The Americans and the Russians are also at the breach, working on a similar idea. The problem with this solution is that we would need to make sure the laser or microwave beam is perfectly orientated toward its receptor on Earth, and would not hit planes or other satellites. Further development is needed before this method is actually feasible.

#### Climate change exacerbates existing water shortages

**World Meteorological Organization 10/5** (World Meteorological Organization, 5-10-2021, "Wake up to the looming water crisis, report warns," World Meteorological Organization, <https://public.wmo.int/en/media/press-release/wake-looming-water-crisis-report-warns>) // VS

Geneva 5 October 2021 - Water-related hazards like floods and droughts are increasing because of climate change. The number of people suffering water stress is expected to soar, exacerbated by population increase and dwindling availability. But management, monitoring, forecasting and early warnings are fragmented and inadequate, whilst global climate finance efforts are insufficient according to a new multi-agency report. The State of Climate Services 2021: Water highlights the need for urgent action to improve cooperative water management, embrace integrated water and climate policies and scale up investment in this precious commodity which underpins all the international goals on sustainable development, climate change adaptation and disaster risk reduction. “Increasing temperatures are resulting in global and regional precipitation changes, leading to shifts in rainfall patterns and agricultural seasons, with a major impact on food security and human health and well-being,” says World Meteorological Organization Secretary-General Prof. Petteri Taalas. “This past year has seen a continuation of extreme, water-related events. Across Asia, extreme rainfall caused massive flooding in Japan, China, Indonesia, Nepal, Pakistan and India. Millions of people were displaced, and hundreds were killed. But it is not just in the developing world that flooding has led to major disruption. Catastrophic flooding in Europe led to hundreds of deaths and widespread damage,” he said. “Lack of water continues to be a major cause of concern for many nations, especially in Africa. More than two billion people live in water-stressed countries and suffer lack of access to safe drinking water and sanitation,” he told the official high-level launch event. “We need to wake up to the looming water crisis,” said Prof. Taalas. The report was coordinated by WMO and contains input from more than 20 international organizations, development agencies and scientific institutions. It is accompanied by a Story Map. Water-related hazards and stress Terrestrial Water Storage (TWS) trends of the past 20 years (2002-2021) According to figures cited in the report, 3.6 billion people had inadequate access to water at least one month per year in 2018. By 2050, this is expected to rise to more than five billion. In the past 20 years, terrestrial water storage – the summation of all water on the land surface and in the subsurface, including soil moisture, snow and ice – has dropped at a rate of 1cm per year. The biggest losses are occurring in Antarctica and Greenland, but many highly populated lower latitude locations are experiencing significant water losses in areas that are traditionally providing water supply, with major ramifications for water security. The situation is worsening by the fact that only 0.5% of water on Earth is useable and available freshwater. Water-related hazards have increased in frequency over the past 20 years. Since 2000, flood-related disasters have risen by 134% compared with the two previous decades. Most of the flood-related deaths and economic losses were recorded in Asia, where end-to-end warning systems for riverine floods require strengthening. The number and duration of droughts also increased by 29% over this same period. Most drought-related deaths occurred in Africa, indicating a need for stronger end-to-end warning systems for drought in that region.

#### Causes hydro-political conflict escalation which goes nuclear

Harvey 8/17 [(Fiona, the Guardian's environment correspondent, won the Foreign Press Association award for Environment Story of the Year and the British Environment and Media Awards journalist of the year) “Global water crisis will intensify with climate breakdown, says report,” The Guardian, 8/17/2021] JL // recut by VS

Mark’s words should be a call to attention, and a call to action. The plight of farmers in Australia illustrates a larger reality: As planetary temperatures continue to increase and rainfall patterns shift due to human-caused climate disruption, our ability to grow crops and have enough drinking water will become increasingly challenged, and the outlook is only going to worsen. The most recent United Nations Intergovernmental Panel on Climate Change report warned of increasingly intense droughts and mass water shortages around large swaths of the globe. But even more conservative organizations have been sounding the alarm. “Water insecurity could multiply the risk of conflict,” warns one of the World Bank’s reports on the issue. “Food price spikes caused by droughts can inflame latent conflicts and drive migration. Where economic growth is impacted by rainfall, episodes of droughts and floods have generated waves of migration and spikes in violence within countries.” Meanwhile, a study published in the journal Global Environmental Change, looked at how “hydro-political issues” — including tensions and potential conflicts — could play out in countries expected to experience water shortages coupled with high populations and pre-existing geopolitical tensions. The study warned that these factors could combine to increase the likelihood of water-related tensions — potentially escalating into armed conflict in cross-boundary river basins in places around the world by 74.9 to 95 percent. This means that in some places conflict is practically guaranteed. These areas include regions situated around primary rivers in Asia and North Africa. Noted rivers include the Tigris and Euphrates, the Indus, the Nile, and the Ganges-Brahmaputra. Consider the fact that 11 countries share the Nile River basin: Egypt, Burundi, Kenya, Eritrea, Ethiopia, Uganda, Rwanda, Sudan, South Sudan, Tanzania and the Democratic Republic of Congo. All told, more than 300 million people already live in these countries, — a number that is projected to double in the coming decades, while the amount of available water will continue to shrink due to climate change. For those in the US thinking these potential conflicts will only occur in distant lands — think again. The study also warned of a very high chance of these “hydro-political interactions” in portions of the southwestern US and northern Mexico, around the Colorado River. Potential tensions are particularly worrisome in India and Pakistan, which are already rivals when it comes to water resources. For now, these two countries have an agreement, albeit a strained one, over the Indus River and the sharing of its water, by way of the 1960 Indus Water Treaty. However, water claims have been central to their ongoing, burning dispute over the Kashmir region, a flashpoint area there for more than 60 years and counting. The aforementioned treaty is now more strained than ever, as Pakistan accuses India of limiting its water supply and violating the treaty by placing dams over various rivers that flow from Kashmir into Pakistan. In fact, a 2018 report from the International Monetary Fund ranked Pakistan third among countries facing severe water shortages. This is largely due to the rapid melting of glaciers in the Himalaya that are the source of much of the water for the Indus. To provide an idea of how quickly water resources are diminishing in both countries, statistics from Pakistan’s Islamabad Chamber of Commerce and Industry from 2018 show that water availability (per capita in cubic meters per year) shrank from 5,260 in 1951, to 940 in 2015, and are projected to shrink to 860 by just 2025. In India, the crisis is hardly better. According to that country’s Ministry of Statistics (2016) and the Indian Ministry of Water Resources (2010), the per capita available water in cubic meters per year was 5,177 in 1951, and 1,474 in 2015, and is projected to shrink to 1,341 in 2025. Both of these countries are nuclear powers. Given the dire projections of water availability as climate change progresses, nightmare scenarios of water wars that could spark nuclear exchanges are now becoming possible.