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LOADING THE DICE EXTREME HEAT AND GLOBAL SECURITY

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Extreme heat is becoming more frequent and severe with significant implications for human health, agricultural systems, infrastructure, and stability. The United Nations Security Council can steer the world to address this existential threat to global security.

Extreme heat events are on the rise globally with climate change ‘making heat waves longer, hotter, more likely, and more dangerous’¹. In the US² and Canada³, a ‘heat dome’ brought record-breaking heat, exacerbating wildfires. Researchers estimate the heatwave was made 150x more likely due to climate change⁴. In Europe, a heatwave made more intense by climate change pushed temperatures to near record highs, exacerbating fires in Turkey, Greece, Italy, and Finland⁵. Recent extreme heat in Iraq and Iran⁶ resulted in power outages and protests⁷ while in Siberia extreme heat has led to severe wildfires⁸ and, in Pakistan, extreme heat⁹ exceeded wet bulb temperatures safe for humans^a.

The World Weather Attribution initiative observed that the events experienced ‘were so extreme that they lie far outside the range of historically observed temperatures’¹⁰. The impact of extreme heat on health, infrastructure, agriculture, and other vital aspects of society in isolation are well documented. However, how direct, indirect, and systemic impacts of extreme heat interact, and cascade poses significant security risks to be managed as the global community operates in a warmer world. For example, the security consequences of extreme heat can domino across systems with rising air conditioning demand crashing power grids leading to disrupted livelihoods, compromised food and medical supply chains, protests, and political instability. Extreme heat is a risk multiplier of insecurity.

^a To measure wet bulb temperatures, a thermometer is covered in a water-soaked cloth to account for heat and humidity. At a wet bulb temperature of 35C, humans can not cool themselves by sweating with health and mortality consequences.



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The UN Security Council is positioned to initiate a discussion and prioritize preparedness for extreme heat, galvanized by potential global security impacts.

Understanding the security risk of extreme heat: direct, indirect, and systemic impacts

Climate change brings with it direct (heatwaves, floods, storms) and indirect risks (increased mortality, fragile livelihoods, hunger) that can stoke systemic risks (political instability, conflict, mass migration)¹¹. Extreme heat – temperatures that are much hotter and/or more humid than average¹² – carries direct, indirect, and systemic risks with significant implications for global security.

Direct risks of extreme heat to human health, mortality, and infrastructure

Prolonged exposure to excessive heat has a wide range of health impacts

including dehydration, heat exhaustion, and respiratory distress¹³. Children, the elderly, people who are pregnant, outdoor workers, those who lack access to cooling, and with underlying health conditions are vulnerable to heat impacts¹⁴.

Extreme heat leads to higher rates of mortality. Deaths related to extreme heat can be difficult to track, often established in retrospect and challenging to attribute given underlying conditions¹⁵ – extreme heat is dubbed a ‘silent killer’¹⁶. Globally in 2018, an estimated 300,000 people over the age of 65 died due to extreme heat, primarily in India and China¹⁷. In the US, hundreds of deaths have already been linked to recent extreme heat events¹⁸ with heat the single largest cause of death among natural disasters¹⁹. One study reported more than one third of all heat-related deaths can be attributed to climate change²⁰.

Extreme heat has direct impacts on infrastructure. In 2021, extreme heat buckled asphalt roads and melted power cables shutting down streetcar systems in the US Pacific Northwest²¹. Infrastructure is designed to perform within specific temperature ranges. However, as we see these ranges exceeded, for longer – as was the case with buckled rail lines in the US in 2021²² and in the UK in 2019²³ resulting in reduced, slowed, and cancelled services – how infrastructure is designed, tested, and used must be adapted or risk failing.

Excessive heat, made worse by climate change, may make some geographies uninhabitable. Athens’ first Chief Officer of Heat has warned the Greek capital may become uninhabitable if steps are not taken to adapt to worsening heat²⁴. Regions in India, Pakistan, China, and the Arabian Peninsula may experience high wet-bulb temperatures under which humans are unable to cool themselves



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through perspiration. Exceeding this threshold may lead to higher rates of urbanization, migration, and increased resource pressures²⁵.

Indirect risks of extreme heat on health, food, power, and economic systems

Heat events have indirect health outcomes including increased risk of violence, injuries, and exposure to disease²⁶. Compounding this, intersecting shocks place strain on health systems. For example, groups at high-risk to heat-related health issues overlap with those at high-risk for severe illness from Covid-19. This confluence resulted in higher rates of hospitalization and required adapted heat plans for medical staff operating in full protective gear²⁷. Extreme heat can also threaten medical cold chains, compromising essential medicines and vaccines²⁸.

Food security is threatened by extreme and prolonged heat causing crop losses and heat stress among livestock²⁹. Higher temperatures are projected to reduce yields and crop suitability, particularly in tropical and semi-tropical regions³⁰. Cold chains play a vital role in resilient agriculture; however, cold chain fragmentation results in 25% of food being lost in the supply chain and more than 50% of food lost post-harvest in developing countries³¹. Heat also impacts labour, increasing the number of unsafe working days³².

Extreme heat can compromise energy security with spikes in air conditioning (AC) demand. In 2016, a heatwave in Thailand caused record demand, requiring emergency power saving measures³³. During the 2021 US heatwave, power utilities implemented rolling blackouts³⁴ and, in Iraq and Iran, recent heatwaves resulted in 24-hour blackouts³⁵. The frequency of planned and unplanned outages is increasing, with blackouts in the US rising by 60% over five years³⁶.

Extreme heat takes a toll on the global economy. Heat stress is projected to cost \$2.4 trillion in GDP and reduce working hours by 2.2% by 2030³⁷ – the equivalent of losing 80 million full time jobs. The impact of heat stress is expected to be felt most in lower-middle and low-income economies³⁸. Wealthy economies will be affected too: in the US, the EPA estimates that in 2100, over 1.8 billion labour hours will be lost; equivalent to \$170 billion in lost wages³⁹.

Systemic risks of extreme heat for stability, conflict, and human rights

Extreme heat is a risk multiplier of insecurity contributing to a range of negative outcomes. These include upticks in violent crime, increased political instability, and, in some cases, the collapse of political regimes⁴⁰. A ground-breaking paper in 2013 found that a change in temperature of one standard deviation was

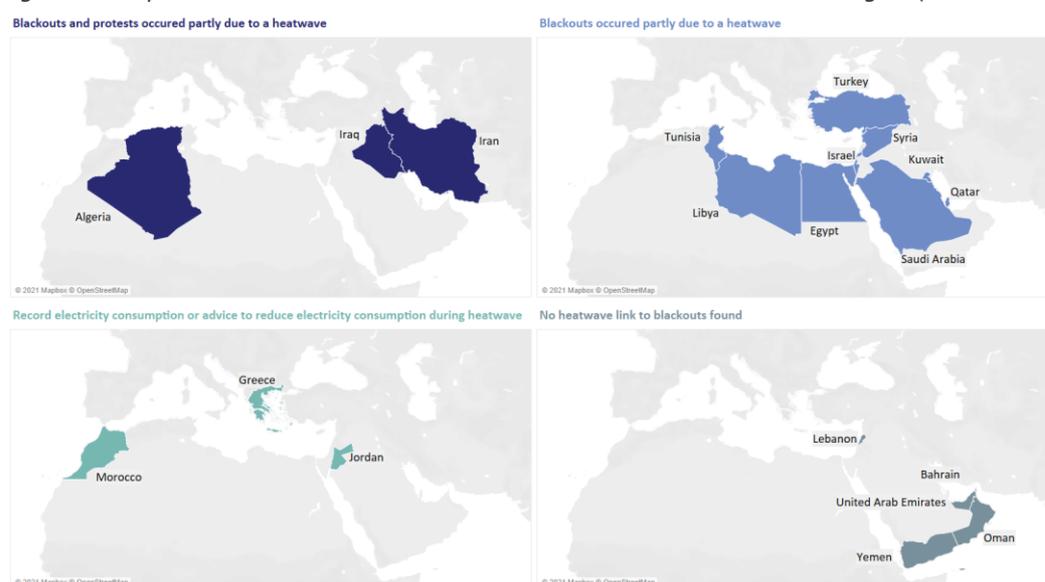


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associated with a 13.2% rise in the rate of intergroup conflict. By 2050, with temperatures expected to rise by at least two and up to four standard deviations, heightened intergroup conflict is a critical systemic risk⁴¹.

Heatwaves stoke protest and instability, undermining political systems, and disrupting livelihoods. During recent heatwaves in Iraq, 24-hour power outages were experienced across the country. While some have access to generators and AC, for most, blackouts mean sweltering conditions inside and out, disrupted livelihoods, and limited access to water from electric pumps⁴². Following the outages, the Electricity Minister submitted his resignation, and protests broke out in Basra and Baghdad with residents frustrated by the lack of services⁴³.

Figure 1⁴⁴: Reported correlation between heatwaves and blackouts^b in MENA region (2010–2021)



The impact of prolonged heat and drought on agriculture can result in price rises, export restrictions, and fomenting of political instability. The 2006-2010 Syrian Drought destroyed agricultural activity, disrupted livelihoods, and drove urban migration. The drought, combined with government mismanagement, has been highlighted as a key driver in the 2011 uprising⁴⁵ with the killing and displacement of hundreds of thousands of civilians⁴⁶.

'Climate risks make upholding human rights ever more challenging. Extreme weather events bring acute disruptions to the normal rhythms of human life and squeeze access to basic human needs.' – Mabey et al (2011) Degrees of Risk

^b Power system failure compounded by sandstorms, weakened infrastructure, and water and fuel shortages.



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Cascading risks of extreme heat will exacerbate ongoing global challenges including resource pressures, widening inequality, and political instability⁴⁷. These risks – with the indirect and systemic impacts uncertain – must be monitored and managed precisely and with urgency.

A challenge for global security: role of the United Nations Security Council on extreme heat

The UN Security Council (UNSC) recognizes the core drivers of conflict and insecurity are rooted in economic, social, and environmental issues⁴⁸. Climate change – and extreme heat as a key impact of climate change – is a threat multiplier with significant risks to global security.

Since 2007, the UNSC has addressed climate risk and security in a range of forms from initial discussions of energy, climate, and security to a 2009 publication underscoring climate change as a ‘threat multiplier’ with the potential to exacerbate ongoing threats to global security. Subsequent UNSC Open and Arria Debates have touched on climate change and security issues including rising temperatures, climate-fragility, and climate-related disasters⁴⁹. In 2018, the Climate Security Mechanism (CSM) was created as a joint initiative to foster comprehensive UN response to climate-related security risks. The CSM sits within the UN Department of Political and Peacebuilding Affairs (DPPA) with support from UNDP, UNEP, and a network of practitioners.⁵⁰

In 2020, Germany along with 9 other UNSC Member States organized a high-level debate on climate change and security, announcing the creation of an Informal Expert Group on climate-related risks to peace and security, calling for a Special Representative on Climate and Security. Nineteen countries participated in the first meeting of the Informal Expert Group in November 2020, signalling the strategic importance of the topic to UNSC members nationally and globally.⁵¹ For example, in February 2021, in a speech to the UNSC, UK Prime Minister Johnson highlighted the necessity of addressing the security impacts of climate change⁵² and, in August 2021, following successive heatwaves, the US Administration announced two new interagency working groups focused on wildfires and extreme heat⁵³.

Looking ahead, in 2021, Niger and Ireland share the presidency of the Informal Expert Group. Ireland⁵⁴, as well as other members – Kenya, Norway – have committed to continue engagement on climate change as a security issue into 2022. With this capacity to elevate and address concerns of climate change and global security, the UNSC is positioned – supported by the CSM and the mandate of the Informal Expert Group – to initiate a discussion and prioritize

preparedness for and action on extreme heat impacts, galvanized by the global security implications explored above.

To address this issue, the UN Security Council should:

1. **Hold an Open or Arria Debate in 2021, ahead of COP26 in Glasgow, on the global security implications of extreme heat, supported by the efforts of the Climate Security Mechanism and the Informal Expert Group on Climate and Security.** Use extreme heat as a test case to stress-test UN operations against climate risk, corroborate or challenge climate data, analysis and decision-making on mitigation, adaptation, and resilience.
2. **Review and determine the need for the Climate Security Mechanism to expand the research base and monitoring of climate tipping points and fat-tail risks, in particular, extreme heat occurrence, severity, and length.** At present, the implications of crossing climate tipping points are not well understood, nor are they being tracked or prepared for. Given the recent record-breaking heatwaves across the globe, with heatwave temperature thresholds significantly exceeded, extreme heat is a timely and critical topic for further investigation. Further research would deepen understanding, informing contingency planning and preventive action for the worst impacts.

The interaction of increasingly severe and frequent climate impacts across society is uncertain. However, what is certain is that climate change will multiply global security threats. Climate risks such as extreme heat require precise management as – without visibility of how these impacts will interact – scenario mapping will not be comprehensive.

The UNSC – and the wider UN system – face a multitude of risks, made more challenging by climate change, that threaten delivery of the UN mandate. Across UN institutions, further capacity is required to understand, test, implement, and scale reformed approaches to manage operational exposure to climate risks at speed. With devastating climate impacts already hitting, funds need to be mobilized for adaptation and resilience to climate risks, including extreme heat. Ahead of COP26, UN members – including UNSC members - have a critical role to support enhanced action on adaptation with new finance and operationalization of the global goal on adaptation.

The direct, indirect, and systemic risks of extreme heat have significant implications for the capacity and ability of the UNSC to operate effectively and address global security⁵⁵. However, the UNSC is also uniquely positioned to



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address and adapt to this threat now, before cascading impacts undermine our common agenda.

About E3G

E3G is an independent climate change think tank accelerating the transition to a climate-safe world. E3G builds cross-sectoral coalitions to achieve carefully defined outcomes, chosen for their capacity to leverage change. E3G works closely with like-minded partners in government, politics, business, civil society, science, the media, public interest foundations and elsewhere.

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Country	Source
Greece	<ul style="list-style-type: none"> Reuters (2021) Greeks urged to use less power as worst heatwave in decades tests grid
Iran	<ul style="list-style-type: none"> Washington Post (2021) Power outages cripple parts of the Middle East amid record heat waves and rising unrest United States Institute of Peace (2021) Iran Suffers Twin Power & Water Crises
Iraq	<ul style="list-style-type: none"> Washington Post (2021) Power outages cripple parts of the Middle East amid record heat waves and rising unrest
Lebanon	<ul style="list-style-type: none"> Washington Post (2021) Power outages cripple parts of the Middle East amid record heat waves and rising unrest Human Rights Watch (2020) Lebanon in the Dark
Algeria	<ul style="list-style-type: none"> Agenzia Nazionale Stampa Associata (2012) Heatwave: Algeria, power outages cause riots
Bahrain	<ul style="list-style-type: none"> Gulf News (2021) Bahrain company denies blame for power blackout
Egypt	<ul style="list-style-type: none"> BBC (2021) Egypt heatwave leaves 61 people dead
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Jordan	<ul style="list-style-type: none"> Jordan News (2021) Heat wave expected to test electrical grid
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Libya	<ul style="list-style-type: none"> Middle East Eye (2017) Libya afflicted by power cuts amid deadly heatwave Libya analysis (2021) Electricity blackouts worsen as heatwaves continue and gas supply disrupted
Morocco	<ul style="list-style-type: none"> The electricity hub (2021) MOROCCO: Heatwave Causes Increase in Consumption
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Saudi Arabia	<ul style="list-style-type: none"> The Electricity Forum (2010) Record heat causing Saudi power outage
Syria	<ul style="list-style-type: none"> China Global Television Network (2021) Syria Power Crisis: Electricity shortages rise amid heatwave



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Tunisia	<ul style="list-style-type: none">• Tunisie Numerique (2019) Tunisia-Heat wave cuts power in Medenine
Yemen	<ul style="list-style-type: none">• Reuters (2021) Temperature rising in south Yemen as rivalries fuel power shortage
Turkey	<ul style="list-style-type: none">• Euronews (2021) Turkey wildfires continue to rage as thermal power plant 'threatened'

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