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The case for integrating a Climate Security approach into the National Security Strategy

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Executive Summary

The argument that a changing climate poses a threat to national and global security is not new. Following a flurry of activity and research on the issue in 2007 – 2009, however, interest has waned. Although climate change is referenced repeatedly in the United Kingdom’s (UK) National Security Strategy (NSS) and Strategic Defence and Security Review (SDSR), there is insufficient detail addressing the full range of security implications of a changing climate for stated Government strategic objectives. Generally, discussions of “climate security” tend to focus on its role as a “risk multiplier” in strategically important regions abroad and/or its physical effects on military infrastructure and tasking implications.

A more comprehensive treatment would include:

1. The direct physical threat to the UK mainland and Overseas Territories:
 - Excess deaths and productivity losses from heatwaves;
 - Vulnerability to flooding and extreme weather events;
 - Drought and water deficits;
 - Risks to farmland and fisheries;
 - New pests and diseases.
2. The indirect threat to the UK mainland and Overseas Territories:
 - Risks of food price spikes from a fragile global agricultural system;
 - Similar vulnerabilities in trade and energy supply chains;
 - Physical threat to overseas assets and UK international investment in general;
 - Increasing costs to the UK insurance industry;
 - Challenges to the insurance industry’s ability to effectively manage risk in general.
3. New and multiplying risks in strategically important regions of the world:
 - The “risk multiplier” effect of a changing climate on conflict is now supported by an emerging scientific consensus;
 - This risk is compounded by second order issues based on existing adaptation and mitigation policies, e.g. REDD and large-scale land purchases in Global South;
 - It is further complicated by the increasing mobility of people, both in response to a changing climate and adaptation and mitigation policies;
 - Risks of increasing inter-state conflict, not necessarily violent stemming from climatic changes, e.g. The Arctic and river management in South and East Asia.

4. An existential challenge to the global nuclear non-proliferation regime:

- A nuclear renaissance is currently underway as Global South countries seek emission-free energy security;
- The scale is vast, promising the spread of nuclear expertise, material and infrastructure across dozens of different regulatory regimes that poses severe challenges to nuclear material tracking, verification, monitoring and safety standards;
- The acquisition of civilian nuclear programmes for avowedly peaceful purposes will introduce further diplomatic and strategic tensions into the international system.

5. A major challenge to security priorities, planning and capabilities:

- Increasing requirements for UK forces:
 - humanitarian and disaster relief operations at home and abroad;
 - evacuation of UK citizens in response to natural disasters and political instability;
 - peacekeeping operations in regions facing increasing instability and, potentially, “environmental enforcement”;
- Direct physical threat to strategic defence assets from extreme weather events and sea level rise.

6. A significant challenge to UK allies and alliances, and the ‘rules-based international order’:

- Direct and indirect impacts of a changing climate, and mitigation and adaptation strategies will be felt by every country in the international system
- Cleavages during climate negotiations between Global North and South are replicated in institutions such as the UN Security Council, G20 and the Commonwealth
- As impacts increase in severity, the rules-based international order will face increasing strain, possibly to breaking point
- UK obligations to allies in responding to severe climate-induced impacts are unclear;
- Potential for emergence of “climate coercion” and “eco-terrorism”.

Recommendations

With these threats, risks and challenges in mind, there is an urgent requirement that:

1. A rigorous and comprehensive risk management exercise is undertaken across the UK Foreign Policy, International Development, Defence and Security architecture that responds adequately to them;
2. The results of this exercise inform the creation of a properly funded strategy to address these risks as an integral part of the National Security Strategy and Strategic Defence and Security Review process.

1.) Introduction – Climate Security: the threat with no enemy

“When I first entered the field of climate change policy research, a little over two decades ago, I was warned by a former deputy administrator of the US Environmental Protection Agency that I was wasting my time because ‘climate change will never be a major policy issue...the science is too uncertain, the impacts are too far in the future, and there is no readily identifiable villain.’”

- Steve Rayner, James Martin Professor of Science and Civilisation, University of Oxford, 2009¹

The scientific consensus on climate change was largely settled when Prof Rayner wrote those words, and has since further solidified. The Intergovernmental Panel on Climate Change released its latest report in 2014 (AR5). The conclusions are clear:

“Human influence on the climate system is clear; the more we disrupt our climate the more we risk severe, pervasive and irreversible impacts.²”

Specific trends associated with the warming climate include a higher incidence of heat waves, heavy precipitation events and droughts (particularly in West Africa and the Mediterranean) and some likelihood of increases in tropical cyclone activity, and warming oceans³. Finally, the latest estimates from the IPCC are that sea levels will rise by between 28cm and 98cm by the end of the century⁴. Although these effects will be uneven across different regions, this is a global phenomenon that will impact every square inch of the planet’s surface.

That such a trend has repercussions on national and global security might seem obvious, and the period 2007 – 2009 did see a high tempo of academic and policy debate on the subject, as well as political action.⁵ Led by then United Nations Secretary General Ban Ki-moon⁶ and UK Foreign Secretary Margaret Beckett⁷, the issue was debated for the first time at the UN Security Council, following UK lobbying.⁸ Nick Mabey, Chief

Executive of the climate change think tank E3G, observed that 2007 was “the year that the security implications of climate change started to be taken seriously” and what once appeared radical had become the norm⁹.

Today, with few exceptions¹⁰, this interest has dwindled in the UK. Discussion, debate and planning for climate security does not constitute “the norm”. Climate security represents an abandoned consensus. The reasons are unclear; the bureaucratic silos that dominate climate change work and the resilient perception of the issue as a solely environmental concern are probably partially to blame. The fact that Climate Change still lacks a “readily identifiable villain” likely captures the real problem. The truism that it comprises a “non-traditional” security threat does not do justice to the problem. The complexity of the relationship between observed and projected changes in the Earth system on the one hand, and human systems, including states, international alliances, financial flows and energy and food supplies on the other, are simply illegible to the modern foreign policy toolkit.

These dynamics cannot be negotiated with, balanced, deterred or contained. Détente is impossible and sanctions inapplicable. They cannot be bombed, invaded, or otherwise neutralised; they have no networks that can be infiltrated, disrupted or arrested. And yet, a changing climate remains a challenge to global security an order of magnitude at least equal to that posed by international terrorism. For all the significance of the Paris Agreement and its stated target to maintain global temperature rises to no more than 1.5°C, even the full implementation of current commitments under the agreement would still lead to an estimated 2.7°C rise. “Even in this scenario the uncertain sensitivity of the climate to greenhouse gases mean there would remain at least a small chance of 4°C of more of warming by 2100¹¹”.

The UK’s National Security Strategy and Strategic Defence and Security Review sets

out the Government three central objectives for UK security policy:

- Objective 1: “Protect our People”, including the UK territory, citizens abroad and Overseas Territories¹².
- Objective 2, “Project our global influence”, includes a commitment to strategic alliances like NATO and partners in the EU and the Commonwealth. It also includes our ongoing commitment to a “rules-based international order” including the UN, the G20 and the nuclear non-proliferation regime and the need to “build stability overseas”¹³.
- Objective 3, “Promote our Prosperity”, emphasises the importance of global trade and investment as well as emerging economies including China, India and Brazil to the UK’s economic security¹⁴.

This paper will demonstrate how a changing climate poses severe challenges to the Government’s ability to meet any of these objectives. As a corollary, until and unless a robust risk assessment is made and appropriate mechanisms and resources put in place to meet these challenges, the National Security Strategy is likely to fail, repeatedly, in the near and mid-term. To do this, it draws on the extensive literature that

has been produced on the subject, including the Government’s own reports, scientific assessments from international and national statutory bodies and peer-reviewed articles published in scientific and security policy journals.

The three most comprehensive sources are the UK Climate Change Risk Assessment’s Evidence Report of 2017, the UK Government’s Foresight Report of 2011,¹⁵ and Nick Mabey’s extensive treatment published by RUSI in 2008. This paper synthesises and updates the key findings, incorporating the latest policy and scientific contributions, and directly frames them in the context of currently stated UK Government security objectives. It includes the direct threats to the UK Mainland, often omitted in these discussions, as well as indirect and international impacts. It attempts to move away from the dominant manner in which climate security continues to be framed, i.e. as a “risk multiplier” in regions of strategic importance, and as a challenge to defence planning and infrastructure. These are crucial points, but only represent a partial picture of the ways a changing climate will affect the UK and global security in the coming decades

2.) The direct physical threat to the UK Mainland and Overseas Territories

The key source for the physical threat posed to the UK Mainland is the latest UK Climate Change Risk Assessment¹⁶, informed by a comprehensive evidence report compiled by the Committee on Climate Change (CCC).¹⁷ This document deals comprehensively with the domestic risks, grouped into five key areas:

- Flood risks to communities, infrastructure and businesses: damages already average £1 billion a year¹⁸ and these costs are set to increase. In extreme cases, the viability of entire communities will be affected¹⁹.
- The impact of high temperatures on health and productivity: 2000 people in the UK die every year from heat-related conditions and this is expected to rise by two-thirds by the 2020s.
- Rising temperatures will also hit productivity; high temperatures during the 2003 European heat wave are estimated to have reduced UK manufacturing output by £400 – 500 million²⁰.
 - The Europe-wide toll for the 2003 heatwave was over 30,000 excess deaths and an estimated 13 billion euros in damages²¹.
- Water deficits: even conservative scenarios envisage severe deficits in the water supply in the future, potentially of an order of 5 – 16% of total water demand by 2050²².
- Risks to farmland and fisheries: under a high climate change scenario, the proportion of high quality arable land in England and Wales is projected to decrease from 38% to 9% by mid-century. “Crop production in areas of eastern England and Scotland could become unviable²³”. Ocean acidification and rising sea temperatures pose a major threat to the UK’s fisheries.
- New pests and diseases: higher temperatures may lead to an invasion of the Asian tiger mosquito, a vector for

dengue fever and the Zika and Chikungunya viruses, as well as the further spread of Lyme disease across the UK. “Small changes in climactic conditions...may result in dramatic changes in parasitic nematodes in livestock.²⁴”

Warmer winters are expected to result in a greater abundance of insect pests.

The CCC emphasises that “Even if global temperature increases are limited to 2°C or less, there are projected to be high magnitude impacts for the UK²⁵”.

Analysis addressing the impacts on the Overseas Territories is far more fragmented, with a plethora of government reports, including the 2012 White Paper, as well as evaluations from the consultancy IMC Worldwide. A distillation of this literature suggests the following general risks:

- The Overseas Territories are home to ecological systems identified by the IPCC as amongst the “most vulnerable” to Climate Change. They are also mainly small islands which increases their vulnerability further.²⁶ They are “virtually certain to experience the most severe impacts.²⁷”
- Owing to “poorly developed infrastructure, and limited funds, human resources and skills,²⁸” their capacity to mitigate and adapt to Climate Change is limited: they are not only among those territories most vulnerable to Climate Change, but also among the least well placed to manage its effects.
- Many of them are also highly dependent on tourism exports for their economic viability which is inextricably linked to the sustainable management of their environments²⁹.
- A sample of territory-specific risks includes:

- St Helena: an ongoing decline in rainfall will increase water stress, undermining attempts to expand the tourist industry and, potentially “will have implications for the entire island and the viability of the population.³⁰”
- The Falkland Islands: fishing constitutes half of the Falklands GDP and over a quarter of government revenue. This is threatened by changing climatic conditions; since the 1990s catches have fallen and revenues have halved³¹.
- Anguilla and the British Virgin Islands (BVI): high vulnerability to flooding and extreme weather events. In 1999 Anguilla was hit by Hurricane Lenny, resulting in flooding in the Capital and

other inland areas, with some hotels closing for a year³². BVI experienced 11 major flood events between 2003 and 2011, with damages ranging from \$10 to \$40 million³³.

Anguilla, BVI, Turks and Caicos, and Bermuda: all of these islands are vulnerable to coral bleaching, where rising sea temperatures reduce coral reproduction and growth rates and increase mortality risk. Coral-based ecosystems are central to local livelihoods, including fisheries and tourism: the exploitation of coral ecosystems comprises 12% of Bermuda’s GDP³⁴.

3.) The indirect threat to UK Mainland and Overseas Territories

The CCC's latest report includes a welcome expansion of its focus to the non-domestic threats posed by a changing climate. Only the risks to international food production and trade make it into the UK Climate Risk Assessment's "top six" areas of concern³⁵. The evidence report underlines how:

- The UK imports 40% of its food and this supply chain is subject to increasing shocks due to extreme weather events in food exporting areas around the world.
- Long term patterns of agricultural production are likely to shift, which requires adequate planning.
- This will be compounded by constraints to domestic agricultural production³⁶.

In addition to this, the CCC's technical chapter 7, "International Dimensions", goes into considerably more depth³⁷. Chatham House's recent report on "Global Chokepoints" makes important points about further likely constraints on commodity supply chains³⁸. Finally, a comprehensive treatment by PriceWaterhouseCoopers addresses the significant risks to UK trade and investment, including the insurance industry.

The **global food system** is fragile and subject to systemic risks arising from:

- The fact that all countries rely on trade with others to supply basic needs, while food production is concentrated in a few crucial nodal countries in the global system,³⁹ vulnerable to extreme weather events.
- The vulnerability of fourteen global "chokepoints", including maritime corridors (Suez Canal, Malacca Straits), key ports (Black Sea Ports) and inland transport hubs (Brazil's inland road network),⁴⁰ to extreme weather events, political unrest and interstate tensions poses significant threats to the food supply chain.

- "Several trade chokepoints...are....in regions where intra- or interstate tensions are escalating...the Suez Canal, the straits of Bab al-Mandab and Hormuz, the Turkish Straits, the Black Sea Ports and the Strait of Malacca.⁴¹"
- This is likely to be exacerbated by political decisions taken by food exporters that further reduce the availability of food during periods of price volatility.
- In 2007–2008, a period of high food price volatility, 25 developing countries out of a sample of 81 surveyed by the FAO banned exports or increased export taxes. "Export restrictions by major food producers led to strong destabilising effects on international markets, exacerbating volatility and leading to further price increases.⁴²"
- In 2010, Russia was hit by its worst drought in a hundred years, affecting one-quarter of its sown wheat fields⁴³. In response, the government instituted a wheat export ban that lasted into 2011.

These vulnerabilities also extend to the **energy supply chain and traded goods**:

- In 2015 the UK imported 38% of its energy, of which:
 - 8.4% (natural gas) came from Qatar;
 - 11.9% (oil) came from the OPEC countries;
 - 2.8% (coal) came from Colombia;
 - 10% (oil, coal, petroleum products) came from Russia⁴⁴.
- With UK dependence on energy imports likely to increase into the mid-2020s, extreme weather events and political instability will pose threats to UK energy supplies, potentially reducing their availability and/or triggering price fluctuations⁴⁵.
- Disruption caused by extreme weather events could lead to reduced availability of imports and price spikes across a number of commodities in a similar fashion to food

negatively impacting UK businesses, with clothing and apparel being the product group most at threat⁴⁶.

UK international investment, and the insurance industry specifically, face major risks:

- In 2015, the UK held nearly £12 trillion of assets overseas⁴⁷. Only a small proportion of these assets need be damaged or devalued for losses to be significant in absolute terms. PwC estimate that these losses are currently in the region of “tens of billions of dollars annually.”⁴⁸
- The Economist Intelligence Unit estimates climate change induced losses to the global stock of manageable assets of \$4.2 trillion by the year 2100, roughly equivalent to the GDP of Japan. In 5°C and 6°C scenarios, projected losses increase to \$7 and \$13.8 trillion respectively,⁴⁹ this in a conservative scenario.
- The UK Insurance Industry, the third largest in the world and the largest in Europe, manages £1.3 trillion of investments, and has significant exposure to these risks⁵⁰.

The industry is highly exposed to claims arising from natural disasters occurring overseas.

- 2011 is the costliest year on record, with \$370 billion total economic losses and \$116 billion⁵¹ insured losses respectively.
- In 2011 Lloyds of London reported \$2.2 billion losses for the Thailand floods alone.
- 2016’s \$175 billion total and \$54 billion insured losses still represent a four year high⁵² as well as a continuation of a steady trend of higher annual losses from such events.
- Lloyds’ total losses in 2016 were \$2.7 billion, the fifth highest since 2000 and above average, mainly attributable to Hurricane Matthew in the US and the Fort McMurray Wildfire in Canada⁵³. The latter

constituted the highest insured losses ever recorded in Canada and the second costliest wildfire on record⁵⁴.

The industry is also facing an existential challenge in that the increasing costs of larger and more numerous claims is rendering it incapable of fulfilling its systemic function as “society’s risk manager.”⁵⁵

- This is encapsulated in the emergence of an annual “protection gap” of \$100 billion per annum, up from \$23 billion in the 1980s where the scale of losses has quintupled over the same time period⁵⁶.
- As this protection gap increases, the result will be to leave “individuals, firms and, ‘the insurer of last resort,’ governments” bearing the economic losses from natural catastrophes.
- This will particularly impact already economically marginalised populations, and developing economies where insurance penetration is still only partial⁵⁷.

There is scant specific information on how these indirect risks relate to the Overseas Territories. By inference they are, if anything, even more vulnerable, being “acutely vulnerable to shifts in the global economy, regulatory regimes and commodity prices⁵⁸” and reliant on imports of fossil fuels for their energy security.⁵⁹ Many of the territories import much of their food, as well as luxury goods for the hotels supporting the tourist trade.

A singular challenge emerging from the Overseas Territories, however, comprises the **environmental-diplomatic liabilities** associated with their idiosyncratic form of governance combined with the challenges of sustainable development, as highlighted by the Environmental Audit Committee’s 2014 inquiry into the Overseas Territories. Specifically:

- The Overseas Territories contain 90% of the biodiversity “found within the UK and Overseas Territories combined.”⁶⁰

- This formulation has been criticised by the Environmental Audit Committee as obscuring the UK's legal responsibilities as the Sovereign Power, and that "90% of the biodiversity for which the UK is responsible" would be more accurate⁶¹.
- The UK signed the UN Convention on Biological Diversity (CBD) in 1992 and ratified it in 1994, yet there is a lack of clarity concerning how and even if this applies to the Overseas Territories.
 - By 2014, "no UKOT completed the necessary preparations to join the CBD,⁶²" and the Convention had been nominally extended to only four Overseas Territories⁶³.
 - The Environmental Audit committee recommended the immediate extension of the CBD to all uninhabited Overseas Territories and the creation of a timetable for its extension to the remaining inhabited Overseas Territories⁶⁴.
 - In the UK's 2015 submission to the CBD, the number of Overseas Territories included had not been expanded⁶⁵.
- Overseas Territories' planning laws and land-use policies are weak, with insufficiently robust environmental impact assessment procedures. This has already resulted in environmental damage caused by unrestricted and inappropriate development plans, including in the Cayman Islands⁶⁶.
- Environmental funding remains inadequate, despite increased resources from Defra and the Darwin Plus scheme⁶⁷.
 - Governance issues plague attempts to address any of these issues. The Overseas Territories' self-governing status is largely preventing the UK government from meeting its international obligations.
 - The UK Government has used a combination of hard and soft power concerning financial matters in the Overseas Territories, but has so far not done so regarding environmental issues⁶⁸.
 - This is compounded by bureaucratic tensions within the UK Civil Service, chiefly between the FCO and Defra⁶⁹.
 - The result, quite apart from the implications unrestricted development might have on the Overseas Territories' own economic base in the form of ecosystem-dependent tourism, etc, is that they collectively comprise a substantial international diplomatic and ecological liability.
 - This may increasingly articulate with extant territorial disputes, including Argentina (Falkland Islands), Argentina/Chile (British Antarctic Territory)⁷⁰, Spain (Gibraltar), and Mauritius (British Indian Ocean Territory - Chagos Archipelago⁷¹).
 - As climate change impacts increase globally, and biodiversity continues to decline, this may also interact with heightened "green diplomatic" tensions discussed more fully below.

4.) New and multiplying risks in strategically important regions of the world

The literature concerning climate change's role as a "threat multiplier" is diverse and contentious. While think tanks have been asserting that drought has facilitated conflict in the Sahel and Syria for some time⁷², the scientific community has been more circumspect in the face of doubtful statistical evidence⁷³. Recently, however, a new consensus has begun to emerge that there is a **strong and substantive statistical relationship between climatic conditions and conflict**:

- Dr N.K. Kim of the University of Nebraska-Lincoln has demonstrated that short term economic shocks caused by extraordinary rainfall and temperature changes across 142 countries for the period 1960–2005 strongly increase the chances of an attempted coup⁷⁴.
- A similar study focusing on Africa 1990–2008 again found a strong and substantive statistical relationship between extremes of rainfall and social conflict⁷⁵.
- Based on a rigorous meta-analysis of 56 studies on the issue, Carleton et al conclude:
 - "Findings from quantitative research in economics, political science and other social science disciplines employing modern econometric techniques and data...indicate a robust link between climatological factors and a range of conflict outcomes in diverse settings throughout the world.⁷⁶"
- This is not to suggest that climate change is the sole or even determining factor in any single conflict. However, to paraphrase an analogy by Cane et al, the fact that not all traffic accidents involve drunk drivers, and not all drunk drivers have traffic accidents, does not invalidate the relationship between traffic accidents and drunk driving⁷⁷.

Case study literature also suggests that war carries with it severe environmental consequences. Deforestation and the

destruction of other ecosystems has historically been used as a direct mechanism of counterinsurgency (COIN). Examples include:

- Turkey's operations against the PKK (1993- 1994), where forests were burned down as part of a "field domination" strategy, to deny PKK guerrillas safe havens in small rural villages.⁷⁸
- Bangladesh's conflict with the Indigenous Peoples of the Chittagong Hill Tracts region (1975–1997), where deforestation facilitated the creation of military infrastructure, including military camps and roads, and the importation of Bengali settlers from the plains.⁷⁹
- Saddam Hussein's destruction of the Shatt al-Arab marshlands (1990)⁸⁰.

Deforestation can also play an indirect role in funding armed groups and COIN operations, as in the case of the Khmer Rouge (1995)⁸¹ and Myanmar (1988)⁸² respectively.

The changing climate has also introduced second-order risks involving **established and emerging mitigation and adaptation strategies** concerning conservation and food security. This analysis is necessarily based on case study literature. Problems include:

- The implementation of the Reducing Emissions from Deforestation and forest Degradation (REDD) mechanism, which provides financial incentives to countries to prevent deforestation and promote reforestation across the global south.
 - There is evidence of significant "leakage", whereby environmental damage is simply displaced to other locations in a participating country. As of 2012, estimates range from 10 to 90%⁸³.
 - More importantly, there is evidence that such projects result in the displacement of forest dwelling populations, or agrarian populations whose cultivable land is then used for

afforestation projects. This “Green Grabbing⁸⁴.” disproportionately impact already marginalised communities, including Indigenous Peoples⁸⁵

- “Green militarisation” and the growing synergies between Protected Area Conservation and Counterinsurgency (COIN). Key case studies include Guatemala ⁸⁶ and the Democratic Republic of Congo (DRC)⁸⁷.
- The growing trend of substantial land acquisitions, particularly in Africa, leading to additional displacement of marginalised populations, additional deforestation and adding further constraints to food production for local subsistence needs across the continent.⁸⁸
 - These changes can have additional, substantive and unforeseen impacts. Experts at the Institute of Development Studies argue forcefully that the Ebola outbreak of 2013-2014 had its origins in the widescale ecological and political-economic changes that have seen the conversion of forests to oil palm plantations in West Africa⁸⁹.
- Increasing potential use of hydropower and its impact through inflaming or generating interstate water disputes and displacing populations.⁹⁰
- The potential adverse impact of an influx on funding for climate adaptation on conflict regions, fragile states and ongoing peace building efforts.
 - As argued by Smith and Vivekananda, adaptation and mitigation strategies need to be “conflict sensitive”, avoiding aggravating existing intergroup tensions at all costs.
 - Equally, peacebuilding needs to be “climate proof”, adequately anticipating climate-induced changes and their impacts within the local context⁹¹.

Extreme weather impacts also have the potential to create **temporary or quasi-permanent “ungoverned spaces”**:

- The Peten region of Guatemala has become a safe haven for criminal cartels fleeing from successful law enforcement

operations in Mexico and Colombia. Floods in 2008 effectively cut the region off from government security forces⁹².

- The 2010 Pakistan floods posed severe challenges to the government, with insurgent groups filling the void providing humanitarian relief to affected populations. This secured popular sympathy, to the detriment of the government⁹³.

Finally, climate change may **increase the risks of conventional inter-State conflict**, though this possibility is necessarily more speculative. Troubling potential dynamics include:

- Heightened tensions between the US, Denmark⁹⁴, Canada, Russia and Norway around the Arctic circle where:
 - 30% and 13% of the world’s undiscovered natural gas and oil are located, according to recent estimates.
 - The retreating ice cap is opening up new sea routes, both the Northwest passage and the sea route along Russia’s northern shores, which are of potential strategic importance⁹⁵.
 - As US Coastguard Rear-Admiral Daniel Abel put it to Rolling Stone: “imagine if you have the Panama Canal and Saudi Arabia’s worth of energy show up at the same place.⁹⁶”
- The Tibetan Plateau, where rapid warming is melting glaciers that feed all of Asia’s main rivers, including the Indus, Ganges, Brahmaputra, Mekong, Salween, Yellow and Yangtze.
 - Collectively, these rivers provide water for 25% of the world’s population⁹⁷.
 - Although some sources view the chance of “water wars” breaking out as unlikely, ⁹⁸ it is impossible to scientifically exclude the possibility.
 - When studies focus on the way rivers are shared between states, for example in cases of an upstream / downstream configuration, there is an increased risk of conflict⁹⁹.

- Increasing tensions around water will inevitably feed in to other extant diplomatic disputes. Examples in Asia include territorial conflicts between India, Pakistan and China, and Indo-

Bangladesh tensions over illegal immigration from the latter to the former¹⁰⁰.

5.) An existential threat to the global nuclear non-proliferation regime

Several authorities have been warning for some time¹⁰¹ that a “nuclear renaissance” may be the logical and adverse consequence of the quest for energy security without resort to fossil fuels, particularly for rapidly industrialising countries in Asia. Today this development is a reality, with profound implications for the global non-proliferation regime, and geopolitics in general. Christine Parthemore at the Center for Climate and Security has provided a rare survey of the key issues¹⁰², analysing “Intended Nationally Determined Contributions” (INDCs) submitted by countries as part of negotiations leading to the Paris summit. The INDCs map out the projected mix of energy sources countries plan to use in the future¹⁰³, and reflect what steps they will take to mitigate carbon emissions. Parthemore makes the following points:

- The scale of the emerging nuclear renaissance is enormous.
 - China has 21 nuclear power reactors under construction, and more planned, aiming to nearly triple nuclear energy production, from 58 GWe projected for 2021, to 150 GWe by 2030, which would make it the “world’s top nuclear energy supplier by 2030.¹⁰⁴”
 - Other countries taking concrete steps to establish and expand nuclear power generation include Bangladesh, Belarus, India, Jordan, Kazakhstan, Poland, Saudi Arabia, Turkey, UAE and Vietnam. Another 32 countries are at least considering an expanded civil nuclear programme “as a serious policy option.¹⁰⁵”
- This expansion in certain countries has an overt military dimension.
 - India is investing in “fast breeder” reactors that can be used to produce plutonium PU239¹⁰⁶ which can then be reprocessed and used to produce nuclear weapons.
 - China is planning on building floating power stations to increase electricity availability in disputed South China Sea territories.
 - Saudi Arabia’s nuclear plans are entirely omitted from its INDC submission, while being explicitly linked to the Iran nuclear agreement in 2015¹⁰⁷.
- This renaissance poses a major challenge to existing international norms and frameworks governing nuclear safety, security and proliferation.
 - The expansion of nuclear expertise and materials across numerous and potentially weak regulatory regimes has substantial implications for nuclear materials tracking, verification and monitoring, with the potential theft of nuclear material a major concern.
 - The huge expansion of nuclear infrastructure in regions of the world that are more vulnerable to natural disasters and at greater risk from terrorist and other non-state actors targeting critical infrastructure is a development of potentially huge consequence¹⁰⁸.

It cannot be assumed that any country’s pursuit of civil nuclear power will be regarded as benign by its neighbours, and this is another dynamic that will become increasingly important, both in its own right, and in conjunction with other climate-change related geopolitical factors in the coming decades (see 4. above).

6.) An unprecedented challenge to UK defence and security priorities, planning and capabilities

Both first and second order impacts of a changing climate are already leading to a rising number of people “on the move” across the world. In 2016, 24.2 million people were displaced by natural disasters, and another 6.9 million through conflict, according to the Internal Displacement Monitoring Centre¹⁰⁹. Weather-related disasters continue to account for the vast majority of disaster-induced displacements, 195.7 million out of a total of 227.6 million in the period 2008 – 2016. While the effects of these increasing movements of people are unlikely to substantively impact the UK directly, it is likely there will be **three main indirect effects**:

- A higher number of natural disasters of increasing severity will result in higher humanitarian demands on development resources, potentially at the expense of funding for long term resilience building ¹¹⁰. This will be further compounded by larger numbers of potentially permanently or semi-permanently displaced people forced to live in camps or who may simply become “trapped” in areas of high climate vulnerability without the resources to move¹¹¹.
 - There may be a rise in domestic political tensions, after a similar fashion to those seen at the height of the Mediterranean refugee crisis, between those UK domestic constituencies advocating for a higher level of in migration to the UK on humanitarian grounds, and those opposed.
 - Diaspora communities with strong links to those locales most affected by a changing climate may come to play an increasingly assertive role in these debates.
 - Demands for enhanced and more militarised approaches to border security may gain momentum, with implications for both resources, and UK diplomatic strategies when addressing migrant crises¹¹².
 - Displaced populations may increase political instability in the regions to which they migrate, as this dynamic interacts with existing tensions over resource scarcity, access to public services and ethnic and religious exclusion¹¹³.
- There are significant **implications for current UK military tasking and resourcing**. As noted by UK Rear Admiral Morisetti, speaking at a joint ECIU – Chatham House event in December 2016, the effects of a changing climate “will require more deployment of UK military, be it in conflict prevention and resolution, helping others to build capacity, or in responding to more frequent humanitarian disasters. ¹¹⁴” This will inevitably impact current UK Defence Planning Assumptions (DPAs),¹¹⁵ with increasing calls on the UK Armed Forces to perform the following tasks:¹¹⁶
- Assist the emergency services and civil authorities in response to the increasing number of extreme weather events in the UK, as occurred during the 2007 floods¹¹⁷.
 - Increased demand on the Hydrographic, Geographic and Meteorological Services for forecasting extreme events as well as assessing geographical, oceanic, hydrological and topographical changes that might affect operational planning¹¹⁸.
 - Deployments in peace-keeping and stabilisation roles.
 - Increased requirements for timely strategic military intelligence gathering on vulnerable populations, high risk regions, existing and new indicators of potential humanitarian crisis, political unrest and violent conflict.
 - In a global context where over 5.5 million British citizens live overseas permanently and another 500,000 reside abroad for part of the year and an estimated 112 countries have a UK citizen population of over 1000:

- Humanitarian assistance and disaster relief in response to extreme weather events, and evacuation of British civilians in response to the above, as well as episodes of political instability¹¹⁹.
- This will also result in increased demands on FCO consular services.
- There is also scope for a new mission requirement: climate change mitigation and adaptation enforcement.
 - One example of this kind of contingency in practice is Brazil where, since 2012, a specialist environmental security force has been deployed, backed by the conventional army and the federal police, to combat illegal deforestation in the Amazon¹²⁰.
 - It may become important for international missions of this kind to be implemented, potentially under a UN mandate and the UK Armed Forces may be called upon to contribute troops and equipment as an extension of its existing peacekeeping and resilience capacity building mandate¹²¹. This is explored in more depth in in 7.) below.
- The UK government's decisions concerning all of the policy questions above may have domestic political repercussions similar to those posed by increased levels of global displacement migration. This is particularly true of military intervention, but also prioritising certain calls on humanitarian funds over others in a context of limited resources. This may lead to an increase in the regularity and severity of domestic protest, resulting in disruption for UK government services and businesses, and a greater strain on police forces and the judiciary¹²².

While increasing the operational requirements for the UK armed forces, a changing climate will simultaneously pose serious challenges to their operational readiness, including the **physical threat to strategic defence infrastructure**. A prominent example in the American media is the Norfolk

Naval Yard in Virginia where, in the late 1990s, ship-to-shore electrical and other utility cables started becoming regularly immersed in seawater at high tide because the piers they ran under were built without considering sea level rise. A former base commander told Rolling Stone: "it was not a nuisance problem...sea level rise was interfering with combat readiness for the Atlantic Fleet.¹²³" In the UK context there is overlap here with the Overseas Territories, already at high risk as discussed above. Selected examples include:

- Sovereign Base Areas of Akrotiri and Dhekelia, Cyprus: "increased temperatures and droughts may compromise the...sustainability of the Cyprus Sovereign Base Areas ¹²⁴ " The SBAs import their energy and water from Cyprus. There are frequent power shortages, most often occurring in the summer months. Sea level rise may affect Defence infrastructure at RAF Akrotiri¹²⁵.
- Ascension Island: hosts UK and US military bases and a GCHQ listening post¹²⁶. Rising sea levels, increased ocean swell and more severe weather events could increasingly impede operations¹²⁷.
- Diego Garcia in the British Indian Ocean Territory: hosts a US installation that is a base for one third of their Afloat Prepositioning Force, long range bombers, tactical aircraft and submarines and surface combatants¹²⁸. With most areas less than two meters above sea level, the island faces significant risks of increased flooding and potential inundation¹²⁹.
- The UK Maritime Component Command: established in 2014 in Bahrain, a country with "acute vulnerability to climate-change induced sea-level rise (SLR)¹³⁰".

A changing climate will also pose additional **constraints on operational military capabilities**:

- UK forces are likely to be deployed in more challenging environmental conditions, including "higher temperatures and water scarcity and a decreasing reliance on

fossil fuels.¹³¹” In a context of probable higher operational tempos (discussed above), this has implications for equipment readiness and procurement and training requirements.

- The UK Ministry of Defence committed in 2010 to integrate Climate Change into the capability planning and procurement process, but it is unclear to what extent this has been implemented¹³².

- Extreme weather events in close geographic proximity to extant deployments may impose costs and additional strain on such deployments. The 2010 Pakistan floods saw four cargo planes and 19 helicopters diverted from US forces in Afghanistan to assist the humanitarian effort. US military supply lines through Pakistan were also hindered.¹³³

7.) The direct and indirect threat to UK allies and alliances, and the ‘rules-based international order’

One of the most dangerous potential results of the changing climate may well be the erosion or collapse of the very international institutions for collective action that are necessary to comprehensively address the phenomenon. Fundamentally, the central cleavage in the geopolitical aspects of climate change, that between the industrialised and industrialising nations, is likely to deepen, with other divisions opening up along other lines, potentially relating to those disputes over water and emerging nuclear programmes discussed above. Other concrete issues include:

- The likely increase of strategic tensions over control of fossil fuel energy supplies for as long as the transition to low carbon economies in the Global North lasts.
 - This is particularly salient to Sino-American relations and represents a hazard in itself.
 - In addition to the direct and increasing competition for resources, it filters down to other areas of geopolitical dispute, where Chinese co-operation with hydrocarbon exporters like Iran, Sudan, Angola and Myanmar is interpreted by the US as intentional strategic movement to undermine its influence and the international human rights regime.
 - This dynamic is also corrosive to the required levels of international co-operation to address the changing climate at the global level¹³⁴.
- The increasing assertiveness of small island nations likely to face literal “state death” in the face of sea level rise. Commonwealth members in this category include Tuvalu, Kiribati and the Maldives. They and others have “explicitly reserved the right to take climate change to international bodies outside the UNFCC.”¹³⁵
- The emergence of tensions over new and shifting maritime borders in the face of sea level rise.
 - Territorial waters, Exclusive Economic Zones and Fisheries are all demarcated according to a nation’s land at low tide. Sea level rises will erode these boundaries, potentially leading to the emergence of new maritime border disputes and the intensification of existing cases¹³⁶. Bangladesh-India, Spratly Islands,¹³⁷ and US-Cuba¹³⁸ are mentioned in the literature as particular hotspots.
- Disputes over the management of global fisheries, in a global context of warming oceans, depleted fish stocks and the dependence of about 1 billion people, mainly in the Global South, on fish as their primary source of animal protein¹³⁹.
 - Movement of fish stocks will place significant strain on existing fishing agreements, potentially to the point of collapse.
 - There may be a rise in illegal fishing and new tensions between subsistence fishers, who will not be able to follow the moving fish stocks, and commercial fishers.
 - This may escalate into wider diplomatic disputes, particularly in regions, such as Asia and West Africa, where there are already significant tensions attending the aggressive practices of European, East Asian and Russian commercial fleets.¹⁴⁰
- Demands on resources for mitigation and adaptation efforts, both nationally and as part of international climate finance obligations, may be met to the detriment of other international systems and institutions for managing trans-border issues including, *inter alia*, counterproliferation, drug smuggling and people trafficking.¹⁴¹
- The increasing temptation by states to “defect” from collective efforts through

forging bilateral agreements, for example exchanging direct aid assistance for control over food and energy resources¹⁴².

- The potential emergence of “climate coercion” as a significant geopolitical dynamic.
 - “Coercion” in this sense spans a range of policy options from diplomatic pressure, climate “conditionality”, withholding aid or other benefits to states unless it pursues action on mitigation, through to armed interventions discussed above.
 - Such action would potentially already have some support from existing international law.
- The preamble to the UN Framework Convention on Climate Change notes that States have “the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.¹⁴³”
- The UN Security Council arguably already has the authority to sanction coercive measures to compel States to address climate change in the interests of international security¹⁴⁴.
- Island states made explicit declarations to the effect that their accession to Rio in “no way constitute[s] a renunciation of any rights under international law concerning state responsibility for the adverse effects of climate change.¹⁴⁵”
- Gilley and Kinsella argue “the systematic failure by states to curb excessive emissions...is likely to violate a peremptory norm of international law.¹⁴⁶”

These issues pose potentially existential questions for many international institutions, including:

- The UN system’s ability to manage competing demands and claims may be overwhelmed¹⁴⁷. Resolving cases often takes years, resulting in the risk that interested actors to take precipitate action to establish de facto outcomes.

- The cohesion of other key institutions where there are pronounced dividing lines between industrialised and industrialising countries could also degrade, including:
 - The UN Security Council
 - The Commonwealth
 - The G20
- The continuing relevance of NATO in a changing climate is uncertain, particularly in view of current policy differences on either side of the Atlantic concerning the Paris Agreement.
 - Although the potential exists for NATO to evolve into an important forum for strategic thinking and “international dialogue about the ... security implications of climate change¹⁴⁸” this is dependent on the differing agendas of member states, to some extent replicating divergent focuses on eastern and southern “fronts”.
 - As the effects of a changing climate escalate, with increasing extreme weather events, civil unrest and violent conflict, the alliance is likely to face strong differences of opinion internally concerning how to respond, that replicate and amplify existing disagreements over “out of area” deployments.
 - This may result in NATO’s strategic paralysis, or in the worst case the disintegration of the alliance as different groups of countries opt for different security strategies in the face of climate change impacts.
 - Finally, while a narrow reading of the North Atlantic Charter would suggest there are no formal obligations to respond to a member state facing a major humanitarian crisis as opposed to a direct attack by a hostile power, it is unclear whether this would be a practical response in the event, both for moral reasons and the credibility of the alliance.

Climate change-induced stress in the international system may facilitate the rise of new international actors, including civil society groups with powerful domestic

constituencies, and potentially also new forms of extremism.

- The MST, a grassroots mass movement is already extremely influential in Brazilian politics, and it has played a crucial role in the establishment of La Via Campesina, a Transnational Agrarian Movement that is increasingly assertive in various international fora.¹⁴⁹
- Radical mobilisation has already occurred in response to international and national policy discussions on the changing climate, including a large array of different actors, and this will only increase as the

international tensions around these issues intensify.

- While the majority of these movements will be benign, with even the more militant following Greenpeace's commitment to peaceful direct action, the development of more extreme groups, and potentially eco-terrorism, cannot be ruled out.
- It can be expected that climate change dynamics will be exploited by existing extremist groups to legitimise violence against targets in the Global North¹⁵⁰.

8.) Recommendations

The effects of a changing climate will kill and injure UK citizens at home and abroad and will destroy property and infrastructure in the UK mainland and Overseas Territories. They increase the likelihood of severe food shocks impacting the UK mainland and Overseas Territories, and pose risks to energy security and trade supply chains. They pose a physical threat to UK trade and investment, eroding economic security. They will undermine the stability of key strategic areas of the world vital to UK interests, contributing to a rise in humanitarian disasters, civil unrest and intrastate conflict. Simultaneously, they will pose severe challenges to the very instruments we count on to manage the global system peacefully. Institutions from the insurance industry to the UN Security Council will face significant challenges to cohesion and relevance arising from a changing climate. The defence and security establishment will face both unparalleled demands on resources for every kind of mission from humanitarian relief through to peacekeeping and stabilisation, while at the same time facing climate change-related challenges to its operational capabilities, including the direct physical threat to strategic defence assets.

If the UK Government's objectives are to protect its people, project its influence and promote British prosperity; if life, wealth and the maintenance of the international rules-based order are the cornerstones of national security, then a changing climate must be more comprehensively addressed as an existential, global threat to that security.

Although there are several welcome references to climate change in the 2015 National Security Strategy and Strategic Defence Review, concrete responses to the threat in its various forms are lacking. The Government has a "responsibility to prepare ¹⁵¹". As argued by Nick Mabey: "Security sector actors ... must be part of the solution ... [This] means communicating the security implications and costs of uncontrolled and extreme climate change to political leaders and the public. Unless achieving climate security is seen as a vital and existential national interest, it will be too easy to delay action.¹⁵²"

It is therefore an urgent requirement that:

- 1.) A rigorous and comprehensive risk management exercise is undertaken across the UK Foreign Policy, International Development, Defence and Security architecture that responds adequately to the full implications of a changing climate. One potential framework for such an approach, together with a thorough rationale, has been prepared by E3G¹⁵³.
- 2.) The results of this exercise inform the creation of a properly funded strategy to address these risks as an integral part of the National Security Strategy and Strategic Defence and Security Review process, currently in its preliminary stages.

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