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## **A Tale of Two Puzzles: Accounting for military and climate change expenditures**

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This research paper is based on ORG's presentation at the side event 'After the Flood: Environment and Security in the Spotlight<sup>1</sup>' organised by the United Nations Environment Programme's Geneva Science-Policy Platform at the 2018 Munich Security Conference, with the support of UNEP and Climate Policy Initiative (CPI).

### **Executive Summary**

- Different risks stemming from a changing climate are quantifiable to different degrees. A holistic assessment would appropriately view the potential impact of climate change as being of a similar order of magnitude to a major war.
- Global expenditures on mitigating and adapting to climate change are, however, far lower than military spending, by a ratio of nearly 12 to 1 in 2016. However, this overall picture masks significant variation in climate expenditures on the part of different states. As all states are operating from essentially the same evidence base, this is difficult to explain.
- The aggregate global imbalance is likely due to an over-reliance on a scientific frame of analysis, to which non-quantifiable risk is illegible. This kind of risk characterises most conventional security concerns and is the primary focus of defence planners, who adopt the "1% principle" in their analysis, i.e. the impacts of certain risks are so catastrophic, that even a 1% chance of their occurring necessitates a comprehensive response. This is for all practical purposes identical with the "precautionary principle" employed by environmentalists.
- Integrating climate change as a core policy area for defence planners, allowing their analytical viewpoint and the additional diverse tools they commonly employ to assess non-quantifiable security threats, should therefore be a priority for policy-makers, as part of the "Responsibility to Prepare" agenda.
- Explaining the variation in climate expenditures is more difficult. It may be attributable to the integration of different analytical viewpoints (1% / precautionary principle) into the policy-making process. It may also be related to different instruments used by states to assess public investment decisions as well as differing mechanisms for financing that investment. More research is required in this area.
- A crucial first step is to agree a common international definition of climate finance, as well as an intergovernmental agreement to regularly report their commitments according to this definition. It will be impossible to gauge accurately whether the level of international investment is sufficient to achieve the targets set by the Paris Agreement unless these basic measures are implemented.

## Introduction

Climate change arguably poses a challenge to the UK's national security that is at least equal to that posed by a major interstate conflict. There is an enormous discrepancy, however, between the UK Government's military expenditures and its direct outlays on climate change mitigation and adaptation, both at home and abroad. In this the UK is not unusual; in 2016 the global ratio of government spending on defence versus climate change was nearly 12 to 1. There are significant outliers, however, including Germany and China. There are therefore two puzzles here. The first is why there exists this *general* disparity between defence and climate change spending when the risks posed by climate change and major interstate conflict are broadly similar in key respects? Secondly, why are certain states responding radically differently in terms of resource allocation to the threat of climate change, despite the fact that they are operating from essentially an identical evidence base?

## Quantifying climate change risk

How big a risk is posed by climate change? Many people would consider this to be a strange question. In particular, environmental advocates and campaigners argue that the existential threat to the human race posed by a changing climate is self-evident. As discussed at length by the meteorologist Prof Mike Hulme, what we believe can never solely be based on science, but is inextricably wedded to our analytical viewpoint, and other subjective concerns, including what we value. Policy-makers invariably approach the problem from a scientific perspective, with calls for ever more precise "proof" and an unassailable "evidence base" before action can be taken. Concerning a changing climate, it is therefore crucially important to understand at the outset what the science says and does not say, the questions that science can meaningfully answer but concerning which there is still debate, and the questions that

are important but to which science can only currently offer limited insight.

"Science" in this sense represents the conclusions of the Intergovernmental Panel on Climate Change, the apex international body responsible for producing definitive reports on the science of a changing climate. Its Fifth Assessment Report (AR5), released in 2014, drew on the expertise of over 800 lead authors and cited 9,200 peer reviewed scientific articles. According to AR5, an increase in heavy precipitation events and sea-level rise is likely from the early 21<sup>st</sup> century (2016–2035) and then to continue, an increase in the intensity and duration of drought on a regional to global scale is likely from 2081. A limitation here is the difficulty of making projections at a global scale, and more fine-grained analysis is called for at local and regional scales.

The UK has its own independent statutory body, the Committee on Climate Change, that fulfils precisely this function at the national scale. Its 2017 risk assessment notes that the threats posed to the UK by climate change include the viability of entire communities due to flooding, a two-thirds increase in the annual number of heatwave-induced deaths from the current figure of 2000, and the proportion of cropland rated as the "best and most versatile" could collapse from 38% to 9% by the 2050s in higher warming scenarios.

This is where science largely stops claiming to make definitive judgements, or at least represent such judgements as the consensus. At this point, we might well agree with Prof Hulme that climate change represents a major global problem, but that comparisons with major interstate conflict are overblown. However, there are other attendant risks arising from a changing climate where the physical science base does not permit either firm, or indeed any, conclusions, but nonetheless do exist and are non-trivial. The first set of such risks concerns extreme non-linear physical impacts, including the potential collapse of

the Greenland and Antarctica ice-sheets, mass methane release from the Arctic and the slowing or collapse of the Atlantic conveyor. Although modelling approaches applied to such phenomena are improving,

Other security risks even harder to quantify confidently emerge from the way these global physical changes will interact with complex and fragile human systems. These include the global food and energy supply chains, the sustainability of the world's insurance industry, the potential for an upsurge in political unrest and armed conflict, the sustainability of the nuclear non-proliferation regime, and the impact on inter-state relations and intergovernmental bodies and processes<sup>2</sup>. It is these wider impacts, how they might interact and the related potential for compound and cascading risks that scientists, for the time being, are reluctant to pass definitive judgement on because of their unquantifiable nature. Collectively they comprise a non-quantifiable, non-trivial, probability of catastrophe (*pace* Prof Hulme). What is crucial to understand is that the vast majority of traditional security threats, including the risk of major interstate conflict, share exactly these broad characteristics, and yet the public policy response to these two issues, at least as far as resource allocation is concerned, is markedly different.

### **Military spending versus Climate Finance, 2015/2016**

Comparable figures for defence spending are readily available from the authoritative dataset published annually by the Stockholm International Peace Research Institute

permitting firmer conclusions, it remains to be seen if they will be included in the IPCC's next assessment report, due in 2022, thus representing the "consensus".

(SIPRI). In contrast, no such dataset exists for climate finance, nor even an agreed international definition of what constitutes climate finance. The most widely recognised dataset is that published annually by Climate Policy Initiative (CPI), disaggregating between private and public channels and funding source, based on a thorough analysis of project-level finance. CPI's definition of climate finance *excludes* "policy-induced revenues such as those generated by feed-in tariffs and carbon credits," because "these revenue support mechanisms pay back investment costs, so including them would constitute double counting."<sup>3</sup> CPI also excludes Research and Development expenditures.

According to CPI's analysis, in 2016 total sovereign expenditures on climate change, including mitigation, adaptation and dual-benefits, both international and domestic, amounted to \$141 billion, compared with military expenditures of \$1.66 trillion<sup>4</sup>. On average, the expenditure of national governments on climate change amounted to 8.5% of what they spent on defence, a ratio of 11.76: 1.

Turning to national level expenditures, we decided to look at the G7 and China. CPI were able to provide detailed disaggregated country-level data concerning international climate finance by the G7<sup>5</sup>, which is presented in Table 1 (below).

**Table 1: 2016 International Climate Finance versus Military Expenditures for the G7**

Country	International Climate Finance (US\$M)	Military Expenditure (US\$M)	International Climate Finance as percentage of Military Expenditure
Canada	230	15,157	1.5
France	4,097	55,745	7.3
Germany	9,117	41,067	22.2
Italy	249	27,934	0.9
Japan	8,466	46,126	18.3
United Kingdom	1,495	48,253	3.1
United States	1,244	611,186	0.2

The first issue of note here is that in absolute terms these figures are generally low and lend support to concerns that the Global North will not achieve its commitment to provide \$100 billion of climate finance assistance annually by 2020, a key plank of the Copenhagen climate talks in 2009<sup>6</sup>. Secondly, these outlays on preventative action represent overwhelmingly better value for money than a securitised approach that might seek to address the symptoms of a changing climate in the form of increasing conflict across the Global South. Finally, there are intriguingly high levels of variation between countries like Germany, Japan and

France, compared with Italy and the United States.

Turning to overall climate expenditures, including domestic outlays, the data becomes even patchier. Attempts to assess country level climate change expenditures have been made by the Institute for Policy Studies<sup>7</sup>, focusing on the US and China for 2016. The Canadian Government provides annual statements of domestic climate change expenditures, to which we have added their 2016 international contribution. These figures are presented below in table 2, compared with military expenditures.

**Table 2: Overall Climate Change versus Military Expenditures for selected countries, 2016**

Country	Climate Change Expenditure	Military Expenditure	Climate Change Expenditure as a percentage of Military Expenditure
Canada	1,180	15,157	7.8
China	29,310	215,176	13.6
United States	19,680	611,186	3.2

The situation for the **United Kingdom** vividly illustrates the problems stemming from a lack of agreed definitions concerning climate finance, and the lack of regularly published figures. The only comprehensive data on domestic outlays comes from a study by the Committee on Climate Change from 2015<sup>8</sup>. The CCC puts this figure at £6.4 billion. Converting this to dollars at 2015 exchange rates, and adding 2015 international expenditures from CPI, gives a grand total of \$12.7 billion, equivalent to 23% of 2015 military expenditures (\$53.9 billion). However, UK spending is highly dependent on precisely those indirect mechanisms that CPI's methodology discounts, with the Renewable Obligation alone accounting for £3.1 billion. Once these indirect mechanisms are removed, the figure for "new spending" is actually closer to \$3.6 billion, or 6.6% of military outlays.

Finally, the overall picture gains even sharper definition when we examine the data we have for Germany. Although Germany's aggregate figures are not available, its principal national development bank, Kreditanstalt für Wiederaufbau (KfW) has just begun to publish annual reports. In 2016 KfW alone made \$35.3 billion<sup>9</sup> of climate finance available for both domestic and international projects, according to CPI's accounting methodology. This sum alone is equivalent to 86% of Germany's 2016 military budget (\$41.1 billion). Thus, regardless of methodology, the picture remains consistent: overall climate expenditures are far lower than military spending, with significant and unexplained variation between states operating from an identical evidence base.

### **Different analytical frameworks: the Defence Planner, the Scientist and the Environmentalist**

A key reason for the general variation is that the risks emerging from a changing climate have not been approached from the analytical standpoint of a defence planner. As discussed by Nick Mabey<sup>10</sup>, whereas

scientists typically focus on probabilities that lie within a 95% confidence interval, defence planners are obliged to focus on probabilities that, while being statistically unlikely, would have a potentially catastrophic impact (eg. a major interstate conflict). Advice to policy makers concerning such eventualities typically suggest that resource allocation should be governed by the principle that even a 1% chance of such probabilities occurring is unacceptable. One irony noted by Dr Leila Urekenova at the UNEP side event on Environmental Security at the 2018 Munich Security Conference is that this "1% doctrine" is for all practical purposes identical to the "precautionary principle" invoked by environmentalists.

The business of analysing statistically improbable events is carried out by defence planners using a wider variety of tools than those typically employed by scientists. Key examples include scenario planning and wargaming, where unlikely "what-if" contingencies are played out, and the outcomes incorporated into advice to policy-makers. The effective application of such additional and complementary tools in tandem with the latest scientific evidence has the potential to significantly improve the clarity of policy advice to decision-makers. Defence planners are also accustomed to forcefully making the case for significant public investments in the presence of uncertainty and are also well positioned to argue for the positive case for the transition to a low-carbon economy on the basis of ancillary benefits, including growing the national hi-tech industrial base and the security benefits of energy self-sufficiency. This may be of crucial importance where obstacles to these investments include national attitudes to the role of the state and the public sector in the economy.

### Different attitudes to investment decisions and mechanisms

This is not to argue that the variation between states captured in the figures above, particularly Germany, can be automatically accounted for by the more effective integration of the climate change policy area in national security decision-making. There are a number of different potential factors at play, not least the very different culture in Germany concerning the role of the state in the economy, vis-à-vis the UK and US for example. As discussed above, a major proportion of climate finance, both domestic and international, is delivered via Germany's state investment bank KfW, which has no counterpart in the UK. The UK's Green Investment Bank, even before it was privatised in 2017, had a capitalisation of £2 billion compared with KfW's assets of €507 billion (about £447 billion).

Interestingly, German policy-making on this issue appears to follow the precautionary principle<sup>11</sup>, placing the analytical onus on the worst-case scenario, rather than probabilities lying within the 95% confidence interval. Another factor may be Germany's high import dependency to meet its domestic energy demand (60% against a European average of 50% and the UK's 35%). German policy-makers may also have a more optimistic view of the positive economic impact of investing in renewable energy. Finally, on a technical point, German investment decisions may be driven by a different approach to discounting.

Discounting<sup>12</sup> is applied to major investment decisions and represents the difference in value delivered today compared with the future. This entails three considerations. Pure time preference reflects the desirability of benefits now compared with the future. The

second is opportunity cost, in the sense that money expended now in a way that immediately reaps dividends represents a more effective investment than where the pay-off is potentially decades in the future. The third consideration assumes continuing overall economic growth, with the corollary that a dollar in today's money will be worth less in the future. Such judgements often use market interest rates as a proxy and are at least partially subjective, depending on how net benefits of a given project are quantified. This was highlighted in the lengthy debates surrounding the UK's 2008 Stern Review on the Economics of Climate Change.

Stern used a low discount rate (1.4%) to reflect his concern that the well-being of future generations should be treated equally with our own, and scepticism that economic growth would continue in a roughly linear fashion in an era of a changing climate. This was criticised by a number of economists at the time, but subsequent studies have suggested that even this level of discounting was too high. There are some signs that these considerations have begun to impact UK policy on discounting, so that while the Treasury's "Green Book" lists a Social Time Preference Discount Rate of 3.5% (Table 3 below depicts the effect of discounting on a nominal sum of £1000), official supplementary guidance was released in 2008. This was intended to apply to situations where "the effects under examination are very long term (in excess of 50 years) and which involve very substantial and, for practical purposes, irreversible wealth transfers between generations." This applies a lower and incrementally decreasing discount rate beyond the 30 year mark, depicted in Table 4 below. This reduces the "pure social time preference" component to zero, for ethical considerations.

**Table 3: Standard Discount Rate According to the UK Treasury's Green Book<sup>13</sup>**

Year	0	1	2	3	4	5	6	7	8	9	10
Value	1000	966	934	902	871	842	814	786	759	734	709

**Table 4: Revised Green Book Long Term Discount Rates<sup>14</sup>**

Period of Years	0 - 30	31 - 75	76 - 125	126 - 200	201 - 300	301+
<b>Standard Rate as per Green Book</b>	3.50%	3.00%	2.50%	2.00%	1.50%	1.00%
<b>Reduced Rate where "Pure STP" = 0</b>	3.00%	2.57%	2.14%	1.71%	1.29%	0.86%

Whether this alternative discount rate is being applied effectively, and whether it goes far enough remain open questions. One line of inquiry that should be pursued is how different states, particularly Germany, apply discounting to climate change projects and whether this has an impact on resource allocations. Finally, while discounting is applied to individual projects within the UK's Ministry of Defence, the overall budget, how much to spend on the military, is not subject to such processes. This is a political and largely arbitrary judgement guided by, among other factors, the NATO target figure of 2% of GDP.

### Conclusions and recommendations

Nick Mabey's recommendation in 2007 that security actors and defence planners have a crucial role to play in assessing the risks posed by a changing climate remains salient today. In his words: "There is no way security policy can avoid incorporating these impacts if it is to remain effective in protecting vital national interests.<sup>15</sup>" This agenda has recently been reinvigorated by various civil society organisations, spearheaded by the Centre for Climate and Security, rechristened as the "Responsibility to Prepare". This calls for the "routinisation, integration, institutionalisation and elevation of climate change within security institutions at international, regional and national levels."

A key first step in this process should be an agreed international definition of climate finance that countries regularly report against. Until there is more transparency on climate finance flows, it will be impossible to reliably gauge whether the scale of global effort is sufficient to ensure that the Paris targets are met and thus better assess the risk of catastrophe.

From the data we have it is clear that different states are making radically different decisions concerning investments in mitigating and adapting to a changing climate based on an identical evidence base. Whatever the reasons for this, the role of the security sector is clear. By bringing their own analytical perspective and distinctive toolbox to bear on climate change as a security threat, defence planners can effectively convey the scale of the potential threat to policy makers in a way that few if any other constituencies are able to and make the case for radical action, even if that requires the state to adopt an active role in the economy that has long been out of vogue in certain contexts. It is this renewed sense of purpose, focus and urgency that is so required if the UK and other states are to act effectively to prevent the non-trivial, non-quantifiable risk of catastrophe posed by a changing climate.

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