

Defence Evolution: Climate Intelligence & Modern Militaries

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Abstract

Intelligence creates the foundation for successful strategic combat. Climate Intelligence is the next stage in 'Defence Evolution'; underpinning modern warfare in a climate changed world where the physical environment is at once a shaping threat, a threat multiplier, and a direct threat itself. This article provides an overview of climate intelligence and its potential applications for military engagement with the climate and security agenda. The article highlights the potential scope and methodology for additional military taskings to support data collection as well as the integration of climate intelligence capabilities across defence and beyond. Key areas of focus include widening the breadth of indicators routinely reported on, the methodology required to facilitate enhanced military taskings, as well as increasing collaboration with academic institutions in order to enhance climate security forecasting and predictive analysis.

Keywords: Intelligence, warfare, climate change, military, security

In *The Art of War*, Sun Tzu stated that foreknowledge enables “the wise sovereign and the good general to strike and conquer, and achieve things beyond the reach of ordinary men.” And so, for 2,500 years, it has been recognised that intelligence creates the foundation for successful strategy. However, in terms of success over the long term, as noted by Charles Darwin, it is not the strongest of the species that survives, nor the most intelligent, but the one most responsive to change. Defence must be appropriate and adaptive – responsive to all elements of the contemporary operating environment. Climate Intelligence is the next stage in Defence Evolution; sustaining successful strategy and operations in a climate changed world.

Numerous peer reviewed studies demonstrate that climate has changed over time, and that these changes are having profound effects on human society. By 2050, as many as 3.4 billion people will be facing catastrophic ecological threats, with the potential for up to 1.2 billion climate refugees (McAlister, 2023). In our complex and interconnected international system, global impacts are felt locally. The Institute for Economics and Peace highlights that 27 countries already “face

catastrophic ecological threats, while also having the lowest levels of societal resilience. These countries are home to 768 million people...the cyclic relationship between ecological degradation, societal resilience and conflict cannot be over-emphasised...The total population of the 40 least peaceful countries is projected to increase by 1.3 billion by 2050, representing 49.5% of the world's population. These countries also face the worst ecological threats" (The Institute for Economics and Peace 2022: 2 and 3).

Most alarming today is the speed at which these changes and threats are accelerating. Never before in human history has the climate, environment, and weather changed its characteristics so rapidly. Unpredictable cascades and tipping points with potentially catastrophic consequences for humanity, necessitate an urgent and comprehensive security response. It is imperative that defence organisations are able to understand and predict both current and future trends in order to fulfil their purposes of protecting populations, mitigating conflict, and safeguarding prosperity. This chapter will demonstrate, from a UK perspective, that Climate Intelligence supports overall Defence mission aims and objectives as articulated in the Sustainable Support Strategy (Strategic Command Defence Support 2022), the Climate Change and Sustainability Strategic Approach (Ministry of Defence, 2021a), and the Integrated Operating Concept (Ministry of Defence (2021b), as well as key international legislation such as UN Security Council Resolution 1325 (on Women, Peace, and Security) and additional UN concepts such as Human Security.

This chapter offers a number of examples of where, largely based on UK experience from personal observation, interviews with UK deployed personnel and through a study of relevant literature, Climate Intelligence through the use of deployed troops could improve or enhance understanding of local areas particularly vulnerable to climate change and therefore susceptible to tension and conflict. By developing the concept of Climate Intelligence, where the troops contribute to the understanding of the effects of climate change, the increased ability to understand the causes of conflict and other malign outcomes such as displacement, will lead to enhanced security, better prepared peace-keeping forces and improved action to tackle the security consequences of climate change. Inevitably, in a chapter that is laying out the potential opportunities for such a tool, some examples will be more realisable than others. While at this stage we do not wish to state which is more likely, inevitably within a military context, those ideas and opportunities that are within the control of the military will be easier to deliver.

3.1 Key Concerns and Causation

From the High North, through Europe, across the Sahel and the Horn of Africa, the concept of climate and security is becoming an increasingly prominent issue. As the consequences of a warming world become more obvious, with unprecedented droughts, fires, floods, and storms, the role of the military is becoming clearer. Militaries are being deployed more often to assist with climate disaster relief, both domestically and internationally. *A growing body of evidence demonstrates that extreme weather is exacerbating the drivers of conflict. Enhancing understanding of the climate-security nexus will facilitate proactive, coordinated, and sufficiently resourced adaptation to climatic changes as opposed to reactive, ad hoc responses to unanticipated events.*

3.1.1 Water

Over half the world will face water scarcity by 2025 – with some 700 million people displaced by intense water scarcity by 2030 (UNICEF, n.d.). This situation will drive disputes in the coming decades as competition over this most vital of resources increases. Evidence of this is already being seen in Somalia where inter-clan conflict over water between nomadic and semi-nomadic herding groups is being intensified by repeated cycles of drought. The human security implications for vulnerable and marginalised groups will be further exacerbated as water is increasingly weaponised and commoditised by malign actors. As well as enhancing the recruitment of terrorist organisations, ongoing water scarcity undermines the perception of state legitimacy, leading to political instability and potentially armed conflict.

Water, as a vital resource for human existence, becomes an extremely sensitive issue when changes are made to its current flows: the damming of the Mekong by China has led to significant volume reductions further downstream, which has increased geopolitical tension across the South Asian region; the Great Ethiopian Renaissance Dam, by damming the Nile, has already raised geopolitical tensions between Egypt, Sudan and Ethiopia, even before it has been completed. Similarly, the predicted melting of the Arctic Sea is already raising tensions, with both Russia and NATO increasingly militarising the region with fixed bases and deployments; China declaring itself as a near-Arctic country probably does nothing to reduce tension.

3.1.2 Food

Similarly food and its potential scarcity can have significant geopolitical implications, not least in terms of production and subsequent trade. If global heating increases by 2–2.5°C, the IPCC predicts that by 2070, large parts of the world will be unable to support food production. This will drive displacement, ferment social unrest, and undermine food security globally. This situation will also drive geopolitical repositioning as allies, competitors, and aggressors attempt to secure long-term access to food. At the local level, as with water, food has the potential to be weaponised, with access used to punish resistance within communities and expose weaknesses of government / other external agencies. ‘Violent Extremist Organisations’ (VEOs) will disrupt and divert aid distribution to gain power and control, as well as influence ‘hearts and minds’, threatening even some of the more secure governments in affected regions.

3.1.3 Energy

The transition to renewables presents security challenges in terms of maintaining adequate energy supply and creating an alternative energy infrastructure. The rare earth elements (REE) required by the renewable energy industry are most heavily concentrated in parts of the world that are controlled or (in)directly influenced by adversaries and competitors. Further, extraction creates its own environmental damage, as well as being linked to exploitative labour practices. The price volatility of commodities can create price spikes that exacerbate existing tensions in fragile states. It is also worth noting that Russia’s invasion of Ukraine vested control of major lithium, cobalt and nickel deposits. Moreover, the Russian state proxy, ‘Wagner Group,’ is dominating terrain across Africa with a view to exerting control over known deposits and mining concessions (Cohen, 2022). But even above the practicalities of moving to renewables, there are two features that make this infinitely more difficult, and potentially more geopolitically stressful than any other energy transition in the past. The first is the fact that we are, for the first time, trying to replace a fuel source – fossil fuels – not just add another. This has never been tried before (we still use the original source of fuel, wood, in many parts of the world) and will inevitably lead to winners and losers on a global scale. Those who have most to lose, whose economies depend on exporting fossil fuels, have the potential to become flashpoints of civil and political unrest. The second is the speed at which the world is trying to divest itself of fossil fuels. Compared to the introduction of fossil fuels, the most efficient fuel that exists, we are trying to replace them at a rate twice as fast as it took for oil to become entrenched as the fuel of choice. This is going to lead to extraordinary tension, and does not allow

enough time for oil producers to diversify, to find alternative sources of income, with the resultant potential downturn in their economies.

3.1.4 Migration

The UN Secretary General, António Guterres, warned of a climate-related ‘mass exodus’ of ‘biblical scale’ – forecasting over 1 billion climate migrants by 2050 (Carrington, 2022). Given how politically divisive migration is in many countries, there is the potential for strategic shock. Both traditional conflict and climate change directly result in the forced displacement of vulnerable people. Peoples displaced by traditional conflict, even if they lose most or all of their livelihood in the conflict itself, usually have a very strong desire to return ‘home’, as soon as it is safe to do so, in order to rebuild their lives in their native country. Those displaced by climate change, however, are more likely to leave only when their financial and subsistence resources have been exhausted, and will not have the ability to leave behind any of their family as surety or guarantee of the safety of their home. Further, they will more than likely have no ‘home’ that is sustainable for them to go back to. As a result, those displaced by climate change are even more vulnerable to disputes and instability instigated and exacerbated by malign actors. As such, optimal solutions need to address the drivers of migration at source. Supporting and investing in upstream capacity building and resilience programmes that reduce conflict, preserve environments, and provide sustainable economic and subsistence prospects should be prioritised. Addressing the shortfalls in the current distribution of global climate finance is central to this topic. With \$600B spent on climate finance between 2019–20, only around one-third of the global finance target was reached, and just 10% of this went towards climate adaptation. Reducing this shortfall in spending is crucial as climate adaptation will provide the resiliency needed to allow would-be migrants to remain in their places of origin and not be forcibly displaced by climatic shocks.

3.1.5 Military capacity

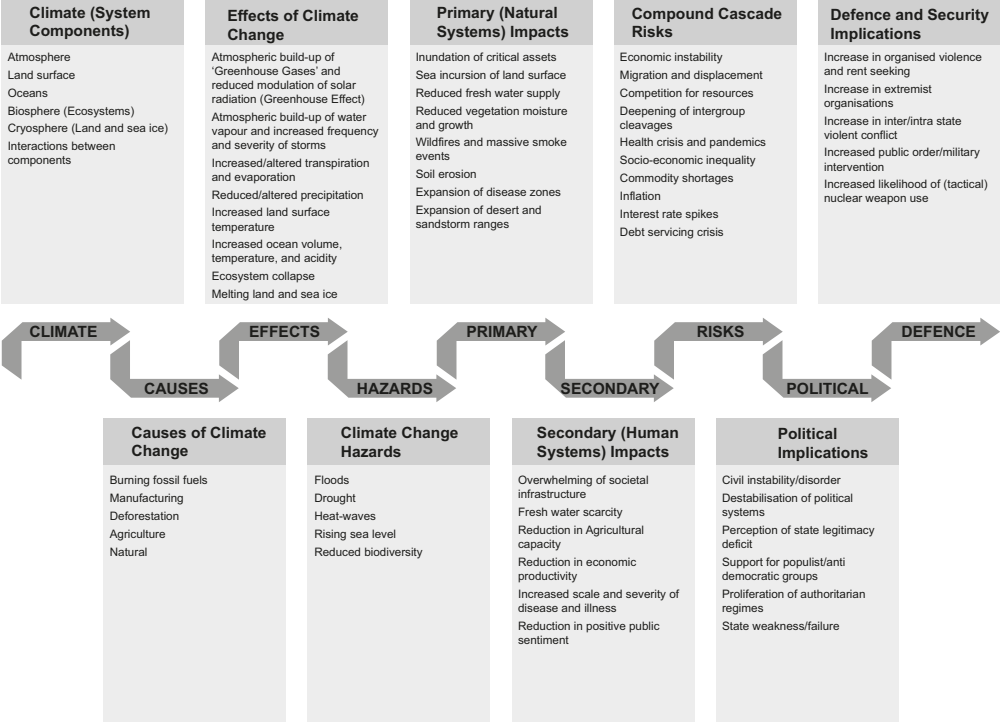
Without sufficient civilian capacity building, Humanitarian and Disaster Relief (HADR) and Military Aid to Civilian Authorities (MACA) deployments will increase (Retter et al., 2021). In response to domestic emergencies in the UK for example, in recent years the military has been mobilised to support relief efforts following floods, droughts, and disease. As global temperatures rise, climate change hazards will increase in scale, frequency and intensity. Unless civilian capabilities are enhanced, military resources are likely to become increasingly committed to assist with ‘emergency’ responses. The result potentially could be a Force less well

trained in their primary role – the protection of citizens. Militaries must not risk diminishing the pool of specialised equipment and trained personnel that provides military capability.

3.1.6 Political and security implications

As summarised in the chain of causation below, there are a number of possible non-linear pathways that lead from climate change hazards and impacts to political and security implications. The ‘compound cascade risks’ are indicative of the innumerable and complex myriad of risks that are increased and amplified by climate change.

Figure 3.1. The chain of causation for political and security implications of climate change, credit: Louise Selisny.



3.2 Climate Intelligence in Context

Designed as a tool to manage risk, Climate Intelligence has the potential to provide historic, current, and predictive information on natural (primary) and human (secondary) systems, thereby facilitating informed decision-making for climate security mitigation and adaptation. Its genesis has been driven by advances in artificial intelligence, machine learning, and the acceleration in the processing time for climate data. This synthesis has the potential to create an enhanced understanding of climate hazards and impacts, as well as their implications for security at local, national, and regional levels.

As well as supporting military operations, Climate Intelligence also provides data that can be used by academics, civil society, and policymakers to examine the interactive drivers of conflict within the context of climate change. If harnessed correctly, Climate Intelligence holds a powerful capacity to understand and thereby address tactical to strategic level climate risks. It is only with this deeper understanding that some of the world's most vulnerable communities will be able to clearly address the consequences of climate change.

In 2022, Nugee et al. outlined the potential for an enhanced UK military offering in relation to Climate Intelligence, with a focus on widening the breadth of indicators reported on, as well as increasing collaboration with academic institutions in order to enhance climate security forecasting and predictive analysis. Moreover in 2023 Erin Sikorsky outlined other areas where intelligence on climate could be usefully collected and incorporated into existing NATO intelligence programmes. These include: integrating climate and environmental change data into analysis; evaluating and developing climate security risk assessment frameworks; and refining climate security intelligence education for member nations and their intelligencers (Sikorsky, 2023). Selisny et al. (in Press) develop the concept further and incorporate collaboration with the British Army's Long Range Reconnaissance Group (LRRG) deployed to support the United Nations Multidimensional Integrated Stabilisation Mission in Mali (MINUSMA).

Military responses are often reactive, deployed to stabilise (potential) insecurity and end conflict. A full analysis of the need to transition to a hybrid 'peacebuilding methodology' is beyond the scope of this chapter; however, the necessity of adaptation to a forecasted operating environment remains central to mainstream military planning. Sustainability, operating in harsher conditions, and responding to the impacts of climate change through activities such as Humanitarian Assistance and Disaster Relief (HADR), Military Aid to Civil Authorities (MACA), and augmenting military estates are commonly cited as ways in which Defence will have to adapt.

Climate Intelligence would be an additional resource in this battle. With the intersection of parts of the world that are much more vulnerable to the effects of a

warming world, and the lack of strong governance, economy and politics, often in areas already overpopulated or under resourced, it is possible to predict broadly where climate change is likely to have the greatest humanitarian impact. And from that, it is possible to look at some form of support, in order to avoid conflict, either through bolstering governance, the economy or supporting adaptation for the authorities, who may lack the capacity to address climate-related threats.

For the UK, the 2021 UK Defence Command Paper (Ministry of Defence, 2021c) provided the foundation for this pre-emptive action and expressed an intent for the UK to become a world leader in responding to threats exacerbated by climate change. As well as setting out a strategic vision to confront climate threats, this paper also speaks of the need to build resilience to more extreme weather conditions, mitigate the impact of Defence's carbon footprint, and seize opportunities to improve sustainability. In doing so it addresses the Ministry of Defence's 'Climate Change and Sustainability Strategic Approach' which highlighted that Defence accounts for 50% of the UK central government's emissions and prescribed the identification of products, practices and behaviours that are more climate aware, environmentally sound, and work towards reducing emissions (Ministry of Defence, 2021a).

3.3 Climate Intelligence as a Military Offering

Climate change is a shaping threat and a threat multiplier, as well as a direct threat. Climate Intelligence informs the multifaceted understanding of the drivers and catalysts of climate conflict, as well as changes to operating environments. Climate Intelligence also provides the necessary nuance for understanding that climate impacts vary between groups and individuals, by gender, ethnicity, poverty, unequal social and political power, and other processes of exclusion and marginalisation. It is not covert in a traditional intelligence sense; it is about providing policymakers with decision advantages to influence events which requires access to a vast database of information.

When Land Forces deploy internationally, their reach and risk thresholds facilitate penetration beyond civilian capabilities. In collaboration with domestic and international academic institutions, Climate Intelligence sourced by military stakeholders and units could greatly enhance climate security forecasting and predictive analysis. In this context, the impact of military data collection should not be underestimated. Militaries have the capacity to maintain operational effectiveness in the fragile environments where the impacts of climate change are most acute, and they therefore offer a capability to collect data in areas inaccessible to civilian counterparts.

By exploiting this inherent reach and flexibility, the military could be in the vanguard of a more considered and holistic approach to climate security. In this

context, the military would play a vital role in enhancing the understanding of some of the world's most fragile and climate impacted communities. Given the increasing awareness of the climate-security nexus, the collection of this data can be used to identify 'targets' for necessary engagement and resources, thus mitigating the security risks posed by climate variation and change. The collection, collation, storage, and analysis of climate data would establish a baseline to facilitate coherent and ongoing analysis and the targeting of these relevant resources.

This is particularly significant because climate change increases the requirement to integrate planning across in-theatre military, police, and civilian actors. Information sharing could enhance this necessary cooperation with non-traditional bodies such as existing civilian climate databases and non-state actors such as Non-Governmental Organisations. This would create a vital link between threat analysis and decision analysis, thus maximising prospects to support stabilisation, mitigate threats, and strengthen connections between in-field activity and headquarters' deliberation.

This information flow would support serving soldiers with immediate effect and military procurement in the long term. Selisny et al. (in press) highlight specific observations that include how lack of local climate data compromised effective operational and tactical decision making, and how Climate Intelligence would develop a broader understanding of seasonal dynamics and water / food security. In addition, increased temperatures exhaust soldiers on patrol more quickly, requiring a re-evaluation of expectations for tactical level engagement in terms of distance, duration, and tasking. From personal experience it is obvious that operations in climate change-impacted environments amplify the requirement for specialist kit that is designed specifically for temperature and weather extremes.

Integrating Climate Intelligence into military intelligence collection plans is about enhancing predictive analysis and advance warning for climate risks. By default, it complements the *Global Britain in a Competitive Age: the Integrated Review of Security, Defence, Development and Foreign Policy* (Cabinet Office, 2021) and the subsequent March 2021 Command Paper's vision of a persistent and proactive global engagement that increases understanding and pre-empts threats to UK national security and economic interests (Ministry of Defence, 2021c). The paper states that the UK military must remain "persistently engaged globally" and regain a pro-active stance, in acknowledgement that the UK's "approach to warfare has evolved relatively slowly in recent years, while our adversaries have invested in equipment and forces that expose our vulnerabilities". The paper goes on to direct a focus for the UK that will see it emerging as a global leader in climate change security.

Climate Intelligence could also be used to inform wargame development and future / foresight strategic planning. The UK Ministry of Defence's 'Global Strategic

Trends: The Future Starts Today' (6th Edition) is heavily focused on "increasing environmental stress", with a dedicated thematic overview and cross-cutting geographical specifics. It considers "increasing disruption and cost of climate change" to be a 'high impact – high certainty' trend. It predicts that climate change hazards will disrupt trade, reduce biodiversity, increase migration and that, "if not handled effectively" could lead to increased tension and conflict (Ministry of Defence, 2018). Climate Intelligence could inform analyses and subsequent military doctrine by supporting reliable baseline and ongoing assessments. This will allow the military to be both readily responsive and presciently proactive.

Climate Intelligence could also be used to inform research and development. The report, 'Decarbonized Defense: The Need for Clean Military Power in the Age of Climate Change' by the International Military Council on Climate Security underscored the need for governments around the world to reduce carbon emissions within their militaries. The report highlights technological advances such as heat pumps, electric vehicles, and solar panels in bases at home and abroad, as well as the logistics of decarbonising fighter jets, tanks, and warships whilst maintaining operational readiness and national security (Expert Group of the International Military Council on Climate and Security, 2022). Within this context, Climate Intelligence could play a vital role in supporting relevant technology and military procurement.

3.4 How Could Climate Intelligence be Integrated into Mainstream Tactics, Techniques, and Procedures?

The Intergovernmental Panel on Climate Change (IPCC) provides a repository of socioeconomic information that offers a consistent framework of factors that can be applied in climate change impact assessments. The collection of this data was conducted at the macro (global – aggregate regional) level. Arguably, micro (granular – local) level research would improve information on population estimates, economic conditions, land use, water access, agricultural activity, and biodiversity. Engagement with local stakeholders and the observation of local assets would generate a useful bank of data and information.

Human Terrain Reconnaissance (HTR) requires specialist training to develop skillsets (rapport building) and mindsets (desire to understand) to enhance effectiveness. This has implications for pre-deployment training (PDT) and decisions around the selection of deployed soldiers. This PDT should include coverage of climate change threats, including how impacts become drivers of conflict at the local level. The benefits of equipping soldiers with this knowledge are twofold and mutually beneficial. First, it provides understanding of the evolving character of conflict

and warfare – an aspect that all those involved in Defence should be cognisant of. Second, by developing a holistic approach within our forces, those on the frontline and operating in global peripheries are best armed with an awareness of the data that is needed to provide insight into the role that climate change is having on the operating environment. This should include a focus on second and third order effects so that our soldiers can be part of the analytical process that considers the impact of climatic variables. Given the disproportionate role that climate-threats have on women and girls, female engagement offers significant potential to understand dimensions of the battlespace, human terrain, and the impacts of climate change on security. The training and deployment of female engagement personnel should be prioritised in climate change impacted theatres and form a core part of HTR.

Climate Intelligence could utilise sensor data collection to provide hyper-localised insights. The collation of specific environmental data over time is vital for forecasting. Drought and flood forecasting has been improved by using sub-seasonal diagnostics with high resolution topography to better understand the role of low-level jets (fast flowing ribbons of air in the atmosphere). Similarly, sub-basin scale seasonal forecasting has been enhanced where global teleconnections (relationships between geographically distant weather phenomena) have been referenced alongside surface sea temperatures.

Climate Intelligence, and by default therefore an intelligence gathering of the environmental conditions in a given area, could also support local access to water by the mapping of perennial watercourses as well as the numbers and levels of wells. It could monitor the rate of bush encroachment, scale of wildfires, and the salinity of groundwater. A focus on internal migration and rangeland mobility would also provide important data sets for resource allocation and decision-making in relation to emerging / shifting power dynamics, marginalisation, and inclusion. Such data could be used by academics, civil society, and policymakers to examine the drivers of conflict within the context of climate change, as well as equip troops to maintain peace more effectively.

In the same way, investigation into loss of livelihoods due to environmental degradation and extreme weather, as well as food insecurity and its secondary impact on social tensions, would increase and inform contextual understanding. Thus the understanding of how this impacts public sentiment and the legitimacy / strength of governance would add huge significance for managing climate-related security risks. In addition, local and regional techniques for combatting the effects of climate change could be gathered for wider use. In the context of a horizon scanning, knowledge of local capacity to adapt to wider climatic stresses becomes a core part of conflict forecasting and mitigation.

As an example, indigenous centric case studies such as those examined by Ritu Bharadwaj and Clare Shakya (2021) in their article on loss and damage, and

subsequent socio-economic insecurity, caused by climate change, are useful reference points. The distinction between the oft referenced ‘mitigation and adaption’ is that loss and damage relates to the impacts of anthropogenic climate change that exceed the capacity to mitigate or adapt. The work of Bharadwaj and Shakya brings together urgent case studies that include climate-vulnerable developing countries such as Bangladesh, Tuvalu, and Vanuatu with a view to illustrating the additional support required to achieve sustainable development.

To achieve the necessary level of granularity across socio-political themes that are atypical to routine intelligence collection, the concept of augmenting forces with genuine expertise should be considered. Just as ‘Cultural Advisors’ are embedded within military units to enhance situational awareness, attaching ‘Climate Advisors’ who could analyse local climate-impacted economic and political dynamics would increase operational effectiveness and allow Defence to offer a valued contribution to upstream conflict prevention. Minor adjustments could have a major impact. Initial briefings, for example, could be tailored to include climate impacts as part of the understanding of the operating environment from an environmental and threat perspective.

In this way, Climate Intelligence also enshrines the concept of ‘Human Security,’ as utilised by a number of Western militaries, including the UK and the US. Human Security is also used by the United Nations Intergovernmental Panel on Climate Change (IPCC) in order to integrate relevant socio-economic and development factors into climate change security considerations. The ‘Human Security Approach’ of the UN presents five fundamental principles that should steer decision making. Security considerations should be: people-centred; comprehensive; context-specific; prevention-orientated; and facilitate protection and empowerment (Adger et al., 2014). Climate Intelligence would support these key principles.

The ability of military sources to provide the ground truth, cross reference satellite imagery, and provide mapping in the absence of satellite data is invaluable. A commonly cited result of climate-related insecurity is conflict between farmers and herders over diminishing arable and pastoral land. Analysis conducted by Mercy Corps in Mali used geo-coded Armed Conflict Location and Event Data Project (ACLED) data that mapped the distribution of conflict across the country and then overlaid it with several different environmentally linked factors, including transhumance patterns. A wider network on the ground, with the skillset and reach to operate in volatile areas would greatly enhance future offerings. Military assets could add value by fact-checking satellite data to ensure that it still represents the ground truth at the time an incident takes place. Military assets could also, by default of their reach, form part of a predictive response to anticipated farmer-herder conflict and deploy to interdict groups assessed as being at risk of exhibiting violence. Filling high resolution satellite imagery gaps to enable detailed

conflict analysis would also add value. Reconnaissance units could be engaged to provide real time information on vegetation health, land use, and water source capacity. This small vignette provides a thought-provoking example of how militaries could be better utilised in climate-insecure contexts.

Military assets also have the ability to conduct human terrain mapping which could help with the identification of specific transhumance routes and forced displacement. Furthermore, through their own networks and assets they may be aware of conflict incidents that go undetected on ACLED but are logged on their own systems, such as the Tactical Ground Reporting System (TIGR) (General Dynamics, n.d.). Such data could be overlaid with other data sources to enrich climate security analysis. Such assessments could include how climate-induced scarcity escalates sectarian violence, shapes sentiment towards government, drives civil unrest, and exacerbates displacement (internal and cross-border); the economic implications of climate change on an area of operations, including issues of capital flight, re-configuration of supply and demand, health shocks, out-migration of skills and labour, and foreign food aid undermining local markets; and failure to deliver on commitments on climate change mitigation, such as the distribution of food aid and completion of water access projects, all of which significantly reduce positive sentiment towards military and government actors.

Climate change insecurity disproportionately impacts women, particularly those subject to additional vulnerabilities. Understanding the local Climate Intelligence picture would support the Women, Peace and Security (WPS) Agenda. A number of case studies highlight how climate change insecurity exacerbates 'gender-based violence' (GBV) (see Gevers, Tmusuya and Bukuluki, 2019, Castañeda Carney et al., 2020, UN Women Asia and the Pacific, 2015, UN Women, 2009, UN Women, 2016). For example, water scarcity can increase the frequency and distances women and girls travel to access water supplies. This makes them more vulnerable to sexual assault and also results in girls missing days from school or being withdrawn completely in order to assist with increasingly protracted household chores. Case studies have also highlighted examples of girls being traded for resources during times of peak scarcity, thereby increasing their vulnerability to sexual exploitation and trafficking. Girls are also married off at increasingly younger ages in order to pass the burden of provision from the parents to the husband's family.

Climate Intelligence would reinforce international commitments to the WPS Agenda and, specifically, UN Security Council Resolution 1325 and additional UN Security Council Resolutions on Women, Peace, and Security. In 2019, the UK MOD adopted the statement of policy 'Joint Service Publication 1325 Human Security in Military Operations' which formalised the implementation of the UN Security Council Resolution 1325 and additional UN Security Council Resolutions on Women, Peace, and Security. The then UK Secretary of State for Defence, Gavin Williamson,

stated that “the implementation of the UNSCR 1325 will spark a deeper analysis, broader plans, and more effective operations. By ignoring this area, or viewing it as a humanitarian agenda, we are missing the clear link between the security of an individual and an enduring stability for all...this policy is to be implemented throughout the Department of State, from the strategic planning process through to the activity we perform at the operational and tactical levels.” Again, Climate Intelligence could be used to operationalise policy and political commitments.

Climate Intelligence could also be used to support and inform context-sensitive decision making regarding infrastructural investment into renewables, for example, geothermal, solar, and wind. It could also be used to support infrastructure resourcing and decision making in relation to sustainable military estates (Deloitte, n.d.) and Forward Operating Bases (Jivnani & Kang, 2021).

3.5 The Essential Element: Strength in Unity

In order to develop military understanding of the complex and nonlinear relationship between climate change and conflict, it is important that Climate Intelligence is not siloed from wider government and scientific expertise. Climate change will continue to compromise both military and civil capacity unless new forms of integration across military, humanitarian, development, and climate change intervention are established. Climate security requires collaboration with government departments beyond Defence, as well as with international allies and civil society stakeholders in order to produce effective and coherent responses. Climate Intelligence would build foundations, pillars, and networks for this necessary integration and collaboration. In this context in the UK, the optimal structure is one that amplifies the 2018 National Security and Capability Review’s Fusion Doctrine, as well as the vision of the Integrated Review to genuinely integrate and interface UK national assets, thereby allowing climate security to be tackled collaboratively.

Arguably, this vision should be grander and drive national defence organisations to coordinate with international organisations such as the United Nations Environment Programme’s *Strata* platform that seeks to ‘democratize environmental and climate security intelligence by making analytical capacity available to practitioners and policy-makers’. *Strata* works by overlaying environmental and climate indicators, socio-economic indicators, and indicators related to conflict and crisis, in order to identify potential conflict flashpoints. As with other early warning platforms, its utility is based on the quality and strength of its components; Climate Intelligence offers a valuable input. Another potential partner is the International Organization for Migration’s Transhumance Tracking Tool (TTT) which monitors transhumance routes and provides early warning of potential conflicts that may

arise due to food and water insecurity or the movement of rival groups into contested territories.

Similarly, NATO is set to continue its ambitious programme of climate security deliverables, with enhanced climate impact assessments, forecasting, and exercises. The UK has much to offer the Alliance with direct contributions to the NATO work strands of Allied Command Transformation (ACT), Emerging Security Challenges Division (ESCD), and the Climate and Security Centre of Excellence (CASCOE).

Sharing Climate Intelligence would enhance this international offering and would enhance the (in)direct benefit to national interests at home and abroad. Collaboration with such platforms, and sharing of intelligence amongst wider databases would also strengthen the (inter)national policy decisions made to strengthen our collective defence against climate insecurity.

In order to better understand the drivers of climate conflict, reinforcing this kind of positive engagement with civil actors, including academia and Non-Governmental Organisations, is essential. As well as Climate Intelligence, militaries could share broader climate security best practice, insights and innovations. Experts would be able to constructively challenge prospective responses, as well as steer in terms of focus. Specialists could also assist in the development of relevant curricula and exercises that could be disseminated through military academies, units, and workshops. Sharing information and insights as widely as possible would ensure that resources are utilised effectively. Such collaboration would create a strong foundation for strategic horizon scanning and risk mapping, thereby forming a central part of climate change adaptation within the military and across government.

3.6 Conclusion

The crucible of climate change has forged an inextricable link between environmental hazards and modern warfare. For example, currently, 26 out of the 54 African countries which are highly vulnerable to climate change are considered fragile or extremely fragile. Out of the ten most vulnerable countries to climate change, eight are in Africa, and six are currently facing armed conflict. Climate and environmental change are never the sole causes of conflict and migration; instead, they interact in complex and context-dependent ways. However, people living in conflict-prone settings are highly vulnerable to climate change¹. Whilst accepting that climate change is rarely the sole cause of conflict – the intersections are far more numerous than that – Climate Intelligence is the next stage of Defence Evolution, an effective and conflict-sensitive adaptation that enables strategic planning and enhances tactical responses. Climate Intelligence also sets the foundation for constructive

collaboration across the academic, humanitarian, and corporate sectors; and across the defence, diplomacy and development organs of state. With minor adjustments, it is our view that the UK military has the opportunity to take the lead in developing this offering. This offering would enhance both civilian and military capabilities, thereby strengthening our collective climate defence and security.

Notes

- ¹ State and Trends in Adaptation Report 2022. <https://gca.org/reports/sta22/>

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