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Armed Forces and Climate Change

Adaptation and Resilience in the Face of a Threat Multiplier

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This Food for Thought paper is a document that gives an initial reflection on the theme. The content is not reflecting the positions of the member states but consists of elements that can initiate and feed the discussions and analyses in the domain of the theme. All our studies are available on www.finabel.org

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INTRODUCTION

Climate change, driven by human industrial emissions is increasing, for example the rate of global warming has accelerated over the past 35 years (NASA, 2020) and with it, the likelihood of climate related security issues. In 2006 researchers predicted that “changes in climate not only affect average temperatures but also extreme temperatures, increasing the likelihood of weather-related natural disasters” (NASA, 2005; Van Aalst, 2006). As such climate change has become a priority on European policy agendas, the subject has also drawn the attention of the European defence and security sectors (EDA, 2019a; European Commission, 2019).

Armed forces across Europe are increasingly including climate matters in their agendas since their priorities are based on their readiness, operations, and strategy to ensure their nation's security. Climate change poses both direct and indirect risks for European military forces, including increased migration, growing instability in critical regions,

possibility for alarming transformations in sensitive geopolitical areas such as the Arctic, and natural disasters on the continent. European militaries need to consider options for further cooperation considering such challenges. Most threats presented by climate change are not confined to national borders, which provides a unique opportunity for advancing the current collaborative defence and security structures. This illustrates the necessity for armed forces to integrate climate change into their conceptualisation of contemporary European defence strategies. This study reflects on the impact of climate change on European armed forces. It seeks to detect how climate change influences existing defence patterns, and how the challenges posed by climate change can become milestones for further European interoperability. The paper is structured in three sections. Firstly, it explains how challenges like natural disasters, migration and geopolitical risks influence current European defence



postures. Secondly, it provides an overview of European armed forces' current structure, capabilities, and challenges when it comes to facing these potential climate change risks.

Finally, the paper prepares the ground for discussing the prospects for further European interoperability by presenting various policy recommendations.

HOW CLIMATE CHANGE AFFECTS CONTINGENCY PLANNING

Climate change presents a wide range of risks to Europe, which significantly influence European countries' capabilities and defence planning. This section focuses on three aspects of particular interest for regional defence cooperation, highlighted by the 2018 European Parliament resolution on climate diplomacy (European Parliament, 2018).

Natural Disasters



With the intensifying effects of climate change, EU militaries and other security or response entities will be required to operate in more challenging circumstances. Environmental vulnerabilities could affect military operational readiness: for example, extreme weather situations may compromise installations and mission-related activities. After Hurricane Michael struck the coast of Florida in October 2018, Tyndall Air Force Base took nearly a month to return

to normal operating status (Silliman, 2019). Similarly, the US Marine Corps' Mountain Warfare Training Center in California had to evacuate due to wildfires in 2018 (*ibid.*). Such examples illustrate the need for adapting current military strategies to extreme weather phenomena.

Another key area of concern is emergency preparedness, as natural disasters put stress on crisis management resources. These resources are critical to alleviate suffering in post-disaster scenarios. The military may be involved in various tasks, such as protecting populations, reducing damage and costs, ensuring continuous provision of humanitarian assistance, and reconstructing infrastructure (see Gemenne et al., 2019: 22). Meanwhile, the extensive damage wrought by Hurricane Katrina on New Orleans catalysed awareness among civilian and military leaders of the stress placed on command-and-control systems (Rattod *in* Wombwell, 2009: 200). The hurricane signalled the need to continually update doctrines to realistically delineate structures and responsibilities during a variety of emergency response scenarios (*Ibid.*, 196). The impacts that natural disasters can generate are also closely intertwined with core areas of environmental health security including air quality, water quality, food safety, waste and sanitation, radiation, and toxicity (Ratnapradipa et al., 2012). In other

words, as weather conditions worsen and the likelihood of natural disasters increase, entire public health systems may be put in jeopardy. After the Fukushima nuclear disaster in 2011, caused by an earthquake and a tsunami, concerns about nuclear accidents in Europe had a renewed sense of urgency (Funabashi & Kitazawa, 2012: 9; Faure et al., 2019: 13). In terms of nuclear preparedness, one cannot rule out nuclear catastrophes occurring on European territory due to extreme weather phenomena. The European Commission and other authorities have, therefore conducted reviews of nuclear emergency preparedness in European countries (Faure et al., 2019: 37). However, as Faure has noted, nuclear crisis plans do not always precisely highlight “cross-border nature” of a nuclear crisis.

Furthermore, Faure concludes that said plans have only been carried out “to a limited extent” (Faure et al., 2019: 13). In a nuclear accident scenario where military forces from multiple countries are managing the crisis, international coordination between the forces is necessary. Nevertheless, as the US-Japan military cooperation during the Fukushima incident demonstrates, multinational operations face interoperability challenges if the participating countries have different approaches to crisis management (Sasakawa Peace Foundation, 2012: 43). Europe is very much concerned with such a possibility: the French nuclear plant of Chooz is on the Belgian border; the Tihange plant is not far from Germany either.

Climate change and disasters are also a part of NATO’s agenda. This threat has been studied by – but not limited to – Balkan states, where cross-border natural disasters such as earthquakes and floods occur frequently (van den Homberg, 2016: 11). In 2016, the NATO Crisis Management

and Disaster Response Centre of Excellence held an event on the implications of climate change on military activities in the Balkan region, with military officials from seventeen countries in attendance (Nikolov & Veeravalli, 2017). The conference issued a set of twenty-six recommendations, pushing for the inclusion of climate change in the political agenda, improving command and control mechanisms, and generally enhancing regional cooperation.

Migration



In 2018, the World Bank warned that by 2050, more than 140 million people could be forced to migrate within their home country because of climate change (World Bank, 2018). Climate change can be a direct catalyst for migration and increase migration indirectly by contributing to humanitarian crises and conflicts, especially in fragile states (Podesta, 2019; McLeman, 2017: 105). Various studies point to the link between climate change and conflict (e.g., Swain, 1996; Salehyan, 2005; Buhaug & Urdal, 2013). Climate change acts as a threat multiplier, accentuating the risk of conflict through, for example, hindering agriculture and forcing people to migrate (Buhaug & Urdal, 2013; IMF, 2016: 18).

The increased number of migrants and refugees from the Middle East and Africa, especially

in 2015, strained several European countries. They struggled to manage the flow of people at their borders. These displacements, more specifically in neighbouring countries “will cause stress on receiving communities, which might themselves suffer under resource stress, and, thus, eventually lead to new security problems through increased competition” for these resources (Swain A. et al., 2011, p. 21). Migration often first occurs in the form of internal displacements, and afterwards become a cross-border issue as migrants and refugees settling in neighbouring countries. Schubert (2007: 3) estimates that even cross-border environmental migration “will mainly take the form of south-south migration”. However, Europe should also expect climate change to generate “migratory pressures” at its borders.

Meanwhile, Beuret and Bettini (2016: 11) have asserted that climate-related migration is presented as an unprecedented global security threat. Consequently, one can argue that climate migration has been “securitised” or articulated as an existential threat (see Buzan & Hansen, 2010: 212–215; Metzler & Lorensen, 2017: 52). This process itself can affect European countries’ domestic and foreign policies and stability. It fosters anti-migrant discourse and shifts attention away from the causes of migration, such as climate change and natural disasters (Beuret & Bettini, 2016: 19). The consequences of these new issues on European military actors will be addressed in the following sections.

Climate Change and Geopolitics

Even though “climate change” itself was not mentioned in the foundations of geopolitics laid out by Mackinder at the start of the 20th century, environmental

resources and conditions were still present in his theory. According to Mackinder, in typical realist fashion, most major wars in history “are the outcome, direct or indirect, of the unequal growth of nations, [due to] the uneven distribution of fertility and strategic opportunity upon the face of the globe” (Mackinder, 1919: 1–3). Given that “fertility” is affected by various environmental factors, and climatic factors also influence how easily states can extract, transform, and transport their natural resources, climate change can be expected to have major geopolitical implications. This is especially the case in low-income countries in the Global South who rely on agriculture and are thus severely affected by climate change (IMF, 2016). In turn, through affecting the availability and use of natural resources, climate change may influence, in the words of Spykman (1944: 5), “the economic structure of the state and thus, indirectly but unmistakably, its foreign policy”.

Countries facing environmental change and at the same time potential or severe instability may become even more precarious due to the abovementioned ‘threat multiplier’ effect of climate change. States sharing borders in an environmentally unstable region “generally have a high potential for conflict with regard to disputes over natural resources, cross-



border migration and other typical interstate conflict issues” (Schubert, 2007: 38). However, according to Homer-Dixon – an early analyst of the effects of climate change on conflict - climate change will rarely cause inter-state wars. It is more likely to generate ethnic clashes caused by migration; social cleavages caused by environmental scarcity; civil strife caused by environmental scarcity, which in turns influences economic activity and state responses (Homer-Dixon *in* Haldén 2007: 49). Examples of this lie in the Horn of Africa (Eritrea, Ethiopia, Somalia, and Sudan), and in Nigeria, where water has been “both a means and an objective of war” (Burnell & King, 2017: 70).

From these examples and previous reasoning, we can infer that conflicts will be most intense in unstable regional areas intensely affected by climate change. However, consequences of these conflicts can be measured globally – notably through migration to neighbouring countries and the spread of conflicts. States that are preoccupied with the effects that climate change and migration have on geopolitics should thus focus on their foreign policy in these regions, to alleviate the burden of regional countries and prevent further escalation on a global scale. This can be done through humanitarian assistance, financial, agricultural, infrastructural assistance. Some states condone military intervention

carried out under the ‘responsibility to protect’ as a means of participating in disaster relief, peacekeeping, or simply upholding international security (Vilmer, 2012). However, such an interventionist perspective postulates that states have a moral responsibility to intervene to prevent and mitigate suffering. However, ‘responsibility to protect’, is an argument often dismissed by detractors as naive and idealist (for a discussion of humanitarian interventionism, see Fassin & Pandolfi, 2010; Jeangène Vilmer, 2008). Countries wanting to engage in humanitarian intervention abroad must be wary of its internal political consequences. As Lauren McFalls puts it, a humanitarian government established in such times may sometimes evolve “into a dictatorship above and beyond the discussion, debates, and contestations of ordinary politics” (McFalls, 2010: 228). As the involvement of the military in Disaster Relief Aid becomes unavoidable, humanitarian organisations and armed forces must institute good practices on engagement with one another. This will ensure maximum effectiveness in crisis scenarios to “limit the risks of military involvement and maximize the potential benefits to disaster survivors” (Kanti, 2019: 81). The Red Cross and Red Crescent Movement have already instituted their own good practices (see Hoffman & Hudson, 2009).

LAND FORCES’ READINESS TO FACE THE CONSEQUENCES OF CLIMATE CHANGE

No single actor has the necessary resources to face a disaster response mission on its



own, whether it occurs domestically or abroad. Whenever such a situation arises, governmental, intergovernmental, and non-governmental actors and organisations form a complex nebulous web of humanitarian actors. To clarify this notion, various authors have theorised the concept of the *international humanitarian system*. Taylor et al. (2012: 8) define the concept as the “network of national and international provider agencies, donors and host-government authorities that are functionally connected in the humanitarian endeavour, and that share common overarching goals, norms and principles”. Actors within this system range from non-governmental organisations to government agencies, but they also include militaries which often participate in disaster response (*ibid.*). The international humanitarian system can be divided into two categories: actors whose core goals pertain to humanitarian matters, and non-core actors such as militaries who may participate but are not fundamentally built for humanitarian goals (Taylor, 2012: 8-9). Nevertheless, as stated before, militaries frequently provide resources and assets to humanitarian operations (Kanti, 2019). This includes providing material, building critical infrastructure, as well as repairs and maintenance. This chapter aims to determine how ready European countries’ land forces are for the consequences that climate change has for security and global health issues they will be concerned with.

Current plans, structures and capabilities

When examining the phenomenon of disaster response, one must bear in mind that cross-border disasters are a serious possibility. Soon, states will face four types of ecological risks

and threats to security. Firstly, they will have to deal with territorial disputes triggered by claims or use of renewable and non-renewable natural resources. Secondly, they will be involved in the management of migration caused by complex ecological upheavals. Thirdly, they will have to deal with the spread of disease (Cho, 2014). Finally, they will face the collapse of social structures and internal societal unrest. As Lim & Blazes explain, the dawn of the 21st century has placed global health – formerly considered as either a charitable concern or a matter of quarantine and border inspection – under a new light. Promoting health on the national and international scale has become a foreign policy concern. The issue of global health must thus be considered as both a domestic and foreign policy factor. Domestically, it helps create cohesion, coordination, and good relations between states. Abroad, health remains a particularly important soft power tool in “developing world settings where poor health and other fragile elements of human security might abet the growth of violent extremism” (Lim & Blazes, 2017). In the event of a cross-border natural disaster two scenarios might unfold: military forces from one state will relinquish responsibility to military forces of another state. If not, forces will be compelled coordinate with one another with the explicit permission from the host country. Crucial to both scenarios is the relations that these countries have developed. The coordination scenario presupposes that bordering states already have a certain level of cooperation and interoperability. Because of their regular interactions, European countries are in a good position to coordinate their military forces’ actions in a natural disaster. Moreover, global health is frequently considered a politically neutral issue, which

facilitates the creation of partnerships (Lim & Blazes, 2017). These “partnering activities can be a way to actively promote security sector reform, contributing to developing peace and preventing conflict. The US military, for example, explicitly uses medical partnership activities to shape environments and reduce the threat of future instability and violence” (Michaud et al., 2019: 278). Similarly, coherent international partnerships must include health as a factor in their operations.

What form would these partnerships take? To be concise, we shall focus on the existing coordination structures that include militaries or their representatives. We will thus exclude the Global Humanitarian Platform (which brings together NGOs, the Red Cross, the Red Crescent Movement, and the United Nations) as well as the 2015–2030 Sendai Framework for Disaster Management. One must look towards NATO and PESCO (Permanent Structured Cooperation) initiatives and potential bilateral agreements on military cooperation in the event of a disaster. As stated by Michaud et al. (2019: 282), “there is now recognition that global public health is enhanced when there is earlier, consistent communication with military counterparts during normal conditions as well as during a crisis”. While PESCO’s new initiative regarding disaster relief is still in development, it shows promise.

One example is NATO’s Crisis Management and Disaster Response Centre of Excellence (CMDR CoE), which represents a first step in the military cooperation direction, although its scope is limited. Indeed, its mandate does not allow it to intervene against all the threats faced by member states, be it in external operations or issues stemming from mass migration. European countries had the



opportunity to exchange in Climate Change at the “NATO Advanced Research Workshop on Implications of Climate Change and Disasters on Military Activities: Building Resiliency and Mitigating Vulnerability in the Balkan Region” that was discussed earlier. As Marc van den Homberg stated, strong regional cooperation is needed in the Balkans because natural disasters are often cross-border due to the geographic particularities of the area (2016: 11). Such insights have reinforced the need to develop interoperability skills and the need to follow a regional strategy and cooperation with the EU and the United Nations. (Stoykov, 2013: 63) As of February 2020, we have not found a single established mechanism of international military cooperation regarding climate change.

Challenges, Setbacks, and Future Possibilities

Existing guidelines and recommendations regarding military engagement in global health and coordination with civilian organisations are often lacking (Michaud, 2019). The UN’s “last resort” Oslo mechanism is the only feeble guideline regarding military engagement. It states that military forces may respond to the call of a foreign country as a last resort after all other resources have been used (United Nations Office for the Coordination of

Humanitarian Affairs, 2020). While cross-border disaster relief is often conducted on an ad hoc basis, consistent, prospective, and coherent coordination has not been pursued until recently. Even though “the EU has sought to enhance its early warning systems to help predict future crises and conflicts” (Youngs, 2014: 13) through cooperation between agencies, there is still little effort between conducted by EU member states themselves. Youngs shows that efforts regarding the reconfiguration of armed forces to prepare for climate security threats has been stagnant and sluggish (*Ibid.*, p. 14). Although they are specifically targeted towards the Western Balkans. The findings and recommendations of the CMDR CoE can serve as a starting point for EU member states (Nikolov & Veeravalli, 2016, p. 143–157).

PESCO’s future Military Disaster Relief Capability Package, which is in development, is presented as “a multi-national specialist military package for the assistance to EU and other states. This can be deployed within both EU-led and non-EU-led operations. The new EU capability plan will manage various emergencies ranging from natural disasters



to civil emergencies such as pandemics. The project aims to include establishing a new EU Disaster Relief Training Centre of Excellence, and ultimately a Disaster Relief Deployable Headquarters” (Permanent Structured Cooperation, 2020). It is currently being developed under Italy’s supervision and has the support of Greece, Serbia, Spain, and Austria (Permanent Structured Cooperation, *ibid.*). The question of whether and how the EU’s Centre of Excellence will collaborate with NATO remains unanswered. In the end, the EU should aim towards a more rigorous research approach concerning the effect of global climate change on the military domain. It should also try to elaborate the measures required to tackle these effects (Youngs, 2019: 15).

HOW CLIMATE CHANGE CAN LEAD TO FURTHER EUROPEAN INTEROPERABILITY

This chapter will discuss how climate change can foster interoperability between European land forces. In this chapter, we discuss further collaboration, as well as the norms that structure joint defence and security activities. We will describe how climate change, as a crisis, hosts potential for tighter future

defence bonds.

New Technologies

Climate change has produced incentives to look further towards sustainable technologies. In every crisis lies opportunities. The

development of such technologies shows that defence can take climate change into account by favouring sustainable technologies and augmenting their capabilities. One example is the French Army's investment in the Stratobus airship, a hybrid design sitting between a drone and a satellite, which is powered by solar energy. Orbiting the Earth in the stratosphere, Stratobus will serve surveillance functions, such as border patrolling, and detection of pirate vessels and coastal erosion (Thales Press Release, 2020). The increased regional control facilitated by Stratobus can contribute to interoperability as a counter to the negative implications of climate change. Such projects can provide information to different Member States' armed forces, thereby supporting multilateral action between European forces.

Climate change has drawn attention to the environmental sustainability of military equipment. For example, Arden Moore of Louisiana Tech University has noted the environmental effects of unmanned aerial vehicles (UAVs) being discarded in remote areas after use and has raised the prospect of developing recyclable rather than single-use equipment (Coe, 2019). Given the crucial importance of UAVs in contemporary military operations, the potential of eco-friendly drones could create new interdependencies in the European defence market, since European countries tend to follow a similar green agenda in the defence sector (EDA, 2012; 2016). New technologies such as UAVs and the Stratobus have been conceptualised as decisive strategies against climate change, due to their regional surveillance potential and possible sustainable energy consumption.

Multilateral attempts to integrate biosensors on drones at an operational, training, or research level will become the new norm

in Europe. Furthermore, natural disasters within Europe can trigger European-level cooperation, as evidenced by the 2018 Swedish forest fires during which the European Civil Protection Mechanism was activated. Firefighting resources from various European countries were deployed to extinguish the fires (European Commission, 2018). The experience from the wildfires is an example of how climate change can lead to the development of interoperability structures. At present, this enables civilian organisations to assist other EU member states but could be extended to military personnel to foster interoperability and enhance response capabilities in non-combat scenarios.

The potential introduction of Unmanned Combat Vehicles (UCV) into European military forces holds similar advantages. Such technological projects illustrate the growth of reliance on electricity in warfighting technology and the increasing importance of batteries in military equipment. For example, QinetiQ (2020) asserts that electric combat vehicles can support armed forces by meeting their emissions targets.

Changes will occur even in conventional combat vehicles since the discussion on sustainability affects land forces' reform in their prospective structural planning. For example, in 2019, the British Ministry of Defence stated its objective to launch a prototype of an electric combat vehicle, aiming to establish it as the compass for the coming "green" tanks (Nichols, 2019). The greening of military equipment can create synergies in the European defence equipment market and strengthen cooperation between European countries, as various countries are exploring the same agenda, facing the same implications, and may learn from each other. The trend toward unmanned electric vehicles



in modern warfare can also serve as a force-protection measure not only because the vehicle itself is unmanned, but also because operations will require fewer troops to expose themselves to danger in operating fuel convoys.

The development of new, greener military technologies bears potential for European countries cooperating on joint projects. As military forces in various European countries face the same agenda, cooperation can advance the sustainability of European land forces while allowing for cost-savings. Indeed, joint development and procurement partnerships allow for economies of scale. New military technologies can become an inclusive variable since their development will allow European land forces to exchange ideas. Suppose interoperability is to be made one of the core characteristics of these developments. In that case, it would allow for a strengthening of EU-wide military partnerships by integrating new military technologies in their combat structure.

Energy security

The discussion on uninterrupted and affordable availability of energy resources is rapidly expanding in various security sectors. Combating climate change on the European

level brings the energy security discourse in the foreground of priorities since the EU is on track to meet the 20% emissions reduction target for 2020 (European Commission, 2020). This change in energy consumption forces states to rethink their energy strategies and lower their dependence on countries with whom diplomatic links are thin and who are prone to instability. EU Member States' armed forces are one of the largest energy consumers among other governmental actors. The crucial role of energy in the operational structure has prompted discussion on this topic (EDA, 2016). Energy consumption thus influences the structure of defence budgets, while potential energy supply problems can have a drastic impact on military effectiveness. This makes energy security a crucial topic, both linked to climate change and security.

The European Defence Agency's Renewable Energy Sources and Technologies Working Group met for the first time in Vienna in March 2019, bringing together experts to discuss topics including 'energy management for energy efficiency', the inclusion of renewable structures, and the establishment of safe energy infrastructures (EDA, 2019b). The group discussed findings and projects on hydrogen fuel cells, self-sufficient military bases, technology feasibility assessments, energy performance contracting, and energy storage.

The questions addressed in the first meeting of the Working Group have significant implications for the future of European defence. Energy security as a whole - particularly operations, training programs, and sustaining practices of European armed forces is linked to secure energy access. Especially as the EU is dependent on imports of fossil fuels and the climate

change agenda has influenced member states' budget priorities, saving energy, and the costs thereof are crucial for armed forces. For example, Finland proposed financial cuts in the European Commission's request for a multi-year budget of 1.134 trillion euros to 1.087 trillion euros, asking for a reduction of European Defence funding (Euractiv, 2020). The discussion on renewable energies in the armed forces can offer practical proposals to these challenges, combining European defence requirements with the momentum for addressing climate change.

Since at least 2016, the European Defence Agency has argued that using renewable energy in military vehicles can reduce fuel consumption and financial burdens (EDA, 2016). Moreover, renewable technologies could help promote European forces' energy independence, and potential surplus energy produced by the forces could be sold for a profit. Using renewable energy, land forces could become more autonomous regarding their needs for heating and hot water. According to the EDA (2016), incentivising and developing renewable energy infrastructures can stimulate collaboration on sustainable energy projects in the defence sector.

After the Ukraine crisis and the annexation of Crimea, the discussion on the necessity for European independence from Russian natural gas gained currency. One reaction to this has been the diversification of Europe's energy sources: for example, a 2020 agreement between Cyprus, Greece and Israel seeks to diversify Europe's gas supplies (Michalopoulos, 2020). In another example, several European companies are interested in drilling activities in the Eastern Mediterranean. A French-Italian cooperation initiative plans to begin drilling activity by the end of 2020 or early



2021 (Nedos, 2019). Europe's shared need for energy security can promote cooperation between European military forces. Both the EU and NATO have recognised that energy projects are exposed to a variety of threats, such as accidents and natural disasters, but also military and terrorist attacks (European Commission, 2017; Grubliauskas & Rühle, 2018). Hence, European armed forces should be ready to operate together in possibly dangerous scenarios to protect energy infrastructures and minimise the threat to citizens and the environment.

Climate Change: Integration Opportunities Hidden in the Crisis

As a cross-border phenomenon, climate change can promote integrative dynamics in the European military sector. There is a broad consensus in Europe regarding sustainability targets; moreover, since climate change represents a holistic threat to European security, these circumstances provide a unique opportunity for collaboration. For instance, the annual damages from floods could be "as high as €1 trillion per year, affecting over 3.5 million people", leading to a decline in agricultural yields (Bergamaschi, 2019). Furthermore, the increased danger of forest fires and the future water scarcity constitute pan-European concerns (*Ibid*). Besides, concerns about the potential increase of

migration due to climate change (European Commission, 2015; Manieri, 2020) brings new responsibilities to European defence actors.

EU Member States can work together to envision the implications of climate change in operational scenarios. Climate change is likely to be a decisive variable in the altering of geopolitical relations. For instance, challenges in sensitive regions, such as the Arctic or the Middle East, can trigger more multilateral defence planning and training exercises in case of emergency. Melting icebergs in the Arctic can increase tensions between external players, such as Russia, and European Arctic states. At the same time, climate change can affect water and energy security in the Middle East, changing the region's security environment. Collaborative training based on possible scenarios can promote interoperability which will be needed in the world of tomorrow. The necessity for concrete energy diplomacy comes from two factors. The first is the need for a more autonomous energy policy, especially concerning the EU-Russia relations. The second is the fact

that numerous energy suppliers are located in politically unstable regions (Iran in the Middle East, Venezuela in Latin America and Nigeria in Africa) (Arent, D. J., Arndt, C., Miller, M., Tarp, F., & Zinaman, O, 2017).

According to the Institute European Environmental Policy (IEEP), around 40% of internal conflicts since 1990 were connected to natural resources (IEEP, 2018). European defence planning cannot ignore these potential future risks. Through working interdependently on establishing resource security, European armed forces can allow for appropriate water provisioning and food security structures. As Lt. Col. Vincenzo Mauro noted in 2016: "We strongly believe in European defence cooperation, especially in energy and environment-related domains where we all have similar problems. So, why not explore common solutions together?" (EDA, 2016). In sum, climate change challenges can be considered opportunities for European cooperation in the military sector, since they transcend national borders, affecting broader regional complexes and demanding multilateral action.

RECOMMENDATIONS

As one means to respond to climate change challenges, this paper has highlighted investment in new technologies. Not only can new technology provide a more secure operational plan for observing and controlling risks such as natural disasters. In the ideal case, it can also



strengthen the cohesion of the European defence equipment market through joint investment and lead to increased use of renewable energy. By diversifying the energy supply of European military forces, renewable energy would reduce the forces' exposure to political and financial instability in the areas supplying fossil fuels to Europe.

Besides the improvement of material capabilities, an emphasis on training conditions could develop European interoperability. Field conditions are changing due to climate change, with for example high temperature and humidity, storms and dust becoming more common. This, in turn, requires the Research & Development (R&D) and other branches to test equipment and capabilities in new conditions. Joint training at an EU level would allow member states to share lessons learnt and best practices for capabilities and training and improve interoperability and efficiency by confronting the land forces with various situations. To take one example, climate change makes arid and hot conditions more widespread, and it is known that a soldier needs about eight litres of water per day in the desert (Horn & Spencer, 2012: 133). For example, the lessons learnt from the EUFOR (European Union Military Operation), EUCAP (European Union Capacity Building) and EUTM (European Union Training Mission) missions in several

African countries could be used to develop and establish European-wide standards.

No such specific adaptation training is currently organised within a European framework, especially at the soldier level. The most immediate way to address this deficiency would be to share best practices and adapt and improve education and training at every hierarchy level. For instance, the European Security and Defence College (ESDC) could organise continuous courses and workshops specifically on climate change's implications in the European military sector. In 2017 and 2018, the ESDC already organised several courses on Disaster Relief, Climate Change and Defence & Security, Critical Infrastructures Protection and Migration Crisis and Borders Management (European Commission, 2017). These courses could be integrated into every EU Member States' armed forces' education, which would boost interoperability, migration management, crisis management, and humanitarian assistance. A European framework for training armed forces to respond to climate change's consequences could be a decisive step towards a stronger and more integrated European defence structure. The recommendations highlighted by Michaud et al. in their article (2019: 282) are of relevance and should be used as a basis for further reflection.

CONCLUSION & SUMMARY

This paper has explored the challenges that climate change presents to European military forces, analysed the current structures and potential for improvement, and discussed

how climate change can be a lever for further European interoperability. As challenges posed by climate change, the paper presented geopolitical tensions, increased migration,

and natural disasters. It observed that new technologies, Europe's shared need for energy security, and the cross-border nature of climate change could drive deeper European cooperation.

We reviewed the influence that climate change has on natural disasters, migration, and geopolitics first. We argued that extreme weather conditions could test armed forces' resilience both on operations and during training. Armed forces must be prepared to support civilian actors in responding to disasters and assist in international disaster response structures with other participating armed forces. Besides disasters and extreme weather, climate change is expected to lead to millions more climate migrants by 2050. Climate change can be a direct reason for migration, more importantly, it is a contributing factor to armed conflicts which in turn, cause migration. With the new challenges in migration management, armed forces should be prepared to participate. Overall, climate change will contribute to instability in the regions most affected by it, it will affect the geopolitical environment within which Europe finds itself.

In the second part, we discussed the readiness of land forces to face the consequences of climate change. We asserted that no single actor holds the essential resources to face a disaster response mission on its own. Instead, all actors, including the military, are part of the international humanitarian system. As disaster response is not core military mission, armed forces are among the 'non-core actors' in this system; nonetheless, militaries often participate in disaster response. We found that the EU has tried to develop its early warning systems to help predict future emergencies and strife by means of agency-to-agency coordination. Despite these efforts,



substantial and organised initiatives are lacking, both at the EU and Member States levels.

In the third part, we discussed how climate change could provide interoperability opportunities between European land forces. We highlighted that cutting-edge technologies, such as UAVs and the Stratobus, have been conceptualised as decisive strategies against climate change thanks to their regional control potential, and their possibility of being powered by renewable energy. Moreover, we observed that armed forces have an imperative to improve their energy efficiency, which provides room for joint investment. More broadly, energy security is a shared concern for European countries, promoting a need to jointly protect energy infrastructures. As a global problem, climate change represents a holistic and cross-border threat to European security, which provides a backdrop for cooperation.

Climate change is altering contemporary security realities, presenting challenges for European land forces regarding future missions, operations, and training. Being prepared to respond to climate change events is a matter of both national and European

security. The military forces should invest in interactive structures, strengthen their capabilities for efficient reactions, and ensure their operational efficiency in future challenging circumstances.

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