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# Climate Change and Degradation of Natural Resources: Implications for the Military

Military organisations increasingly recognise that the security dimensions of climate change and natural resource degradation have implications for the way they plan and operate their activities. Based on policy documents, literature and a panel discussion held at the *Planetary Security Conference (PSC) 2019*, this paper first highlights various examples of ways in which climate change and natural resources are related to security. This is followed by a brief overview of measures to address climate change undertaken or planned by ministries of defence from various countries. The authors conclude with recommendations on how the military could address the security dimensions of climate change and natural resource stress in a way that would increase operational effectiveness while leading the way towards resource-efficient societies.

## Introduction

The security dimension of climate change is receiving increasing attention. Climate change is recognised by the EU, the UN and many other institutions as a so-called ‘threat multiplier’. In addition, the UN Security Council has recognised climate change as a root cause of conflict in specific regions and countries, for example Lake Chad, West Africa and Somalia. In this paper we discuss the role of the military in relation to climate security in the broadest sense, also taking into account the ways in which climate change affects natural resources. We do this by outlining the mechanisms through which climate change and natural resources influence security, and the implications for the military. We then describe a number of measures that could be put in place to deal with those security issues.

## Mechanisms

### Increased frequency and severity of extreme weather events

In 2018 alone, there were numerous climate change-related extreme weather events such as floods, storm surges and hurricanes, leading to massive loss of life, property and livelihoods. Cyclone Idai, which recently devastated large parts of Mozambique, Zimbabwe and Malawi, has been named as one of the worst disasters in southern Africa. The Netherlands has also experienced this with Hurricane Irma in the Caribbean (St Maarten), while France has territory across the globe facing similar threats. The same applies to New Zealand and Australia in the Pacific region.

## Sea level rise and other changes in the landscape

Ten percent of the world's population live in low-lying areas less than ten metres above sea level. Many of these areas are at risk of flooding. Based on a global mean sea level rise of 25-123cm by 2100, 0.2 to 4.6 percent of the global population is expected to experience flooding events annually. Expected annual losses as a consequence of these events are 0.3-9.3 percent of global GDP.<sup>1</sup> Clearly, this has serious implications for low-lying countries, such as The Netherlands and Bangladesh. Depending on the location, these include adaptation costs, soil salinisation and displacement of the population. Water from melting glaciers can also create problems for people living downstream. The glaciers of the Himalayas, predicted to have melted by two-thirds by 2100 in a 'business as usual' scenario, can lead to flooding of glacial lakes and major rivers such as the Ganges and Indus.<sup>2</sup>

## Changed availability of natural resources

The growing world population is exerting more and more pressure on natural resources. In some instances, climate change exacerbates this situation by rendering ecosystems less resilient, thus reducing their ability to recover from degradation caused by human activity. Coupled with changing weather patterns and temperatures, which by themselves can diminish natural resources, this leads to changes in availability of natural resources such as water, fertile soil, timber, etc.

For example, the abovementioned Himalayan glaciers are critical sources of water for about 250 million people who live in the mountains. Another 1.65 billion people living in the valleys below are also dependent on it. Rising temperatures will cause not

only floods but also water scarcity for local populations.

In a recent report by the Australian Senate Committee on Foreign Affairs, Defence and Trade References,<sup>3</sup> it was noted that 'Australia's naval assets may take on a larger maritime security role, including managing activities in the Southern Ocean and Antarctica such as illegal fishing "due to climate change-induced fisheries migration".' This links into a potential intensification of conflicts in the South China Sea because of maritime disputes about diminishing resources.<sup>4</sup>

Natural resources and ecosystems can also sustain and prolong a conflict. In Afghanistan, the Taliban used opium poppy to finance its activities. Because diseases and pest insects were severely affecting other crops, farmers did not have a financially viable alternative to growing poppy. But with the help from the International Security Assistance Force (ISAF) on pest management, farmers in the district of Chora restored their almond (a cash crop) orchards. This helped them regain resilience and made them less susceptible to the Taliban. However, a warmer climate stimulates rapid pest development<sup>5,6</sup> and can alter the range of pests and diseases, damaging crops that previously would not have been affected by such infestations or outbreaks.<sup>7</sup>

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1 Hinkel, J. et al. (2013) 'Coastal flood damage and adaptation costs under 21st century sea-level rise', PNAS 4 March 2014, 111 (9) 3292-3297.

2 P. Wester, Mishra, A., Mukherji, A. and Shrestha, A.B. (eds) (2019) *The Hindu Kush Himalaya Assessment – Mountains, Climate Change, Sustainability and People*, Springer Nature Switzerland AG, Cham.

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3 Commonwealth of Australia Foreign Affairs, Defence and Trade Committee (2018) [Implications of climate change for Australia's national security](#) (accessed 22-05-2019).

4 <https://www.sbs.com.au/news/exclusive-climate-change-warning-for-australia-s-military> (accessed 29-03-2019).

5 Kocmánková et al. (2009) 'Impact of Climate Change on the Occurrence and Activity of Harmful Organisms', *Plant Protect. Sci.* Vol. 45, 2009, Special Issue: S48-S52.

6 Andrew, N.A. and Hill, S.J. (2017) 'Effects of climate change on insect pest management', in: Coll, M. and Wajnberg E., *Environmental Pest Management: Challenges for Agronomists, Ecologist, Economist and Policymakers*, 2017. Wiley and Sons Ltd. Chapter 9, pp. 197-223.

7 Doosti, A.A. and Sherzad, M.H. (2015) *Climate change and governance in Afghanistan*. The National Environmental Protection Agency, NEPA.

Conflicts can also (unintentionally) harm the natural environment, through destruction, pollution and chemical tactics – for example, scorched earth tactics, over-utilisation and fragmentation, possibly resulting in socio-ecological changes.<sup>8,9</sup> At the same time, conflicts can have positive impacts on the environment – for example, if people are kept out of an area nature can thrive, or if armed forces actively manage land and water, natural resources might be restored.<sup>10</sup> A prime example is the Korean Demilitarized Zone, which has been left alone since 1953 and now hosts a large number of endangered species.<sup>11</sup>

### Shift in geopolitical dynamics

Climate change is leading to the creation of new sea routes through Arctic areas, which results in new geopolitical interests in minerals, fishing and gas resources, with accompanying tensions. For Scandinavian countries and Russia, but also for allied NATO countries, the melting ice creates new vulnerabilities. The US Department of Defense recently announced that Arctic sea ice is receding by about 13 percent per decade, and announced its strategy to step up its cold-weather expertise in order to defend ‘America’s first line of defence’.<sup>12</sup>

In addition, in the quest to mitigate climate change, many countries agreed to the 2018 Paris climate agreement. This has accelerated an already ongoing energy transition from fossil fuels to renewables, and shifted power and resource dynamics globally, notably for oil-producing countries.

## Implications of climate change for the military

Military leaders are increasingly recognising the effect of climate change on international security. ‘Climate change has a security dimension,’ stated the Chief of Defence of the Netherlands, General Tom Middendorp (ret.) in the 2016 and 2019 Planetary Security Conferences. The role of the military in relation to climate security needs to be analysed in the context of the armed forces’ core functions. Taking the core tasks of the armed forces of The Netherlands as a benchmark, these include: 1) protecting national territory, and that of allies, against hostilities; 2) improving (international) law and order and stability; and 3) supporting civil authorities in their efforts to react to crises and disasters. All the various aspects of climate change show that the core tasks of the military are all directly affected. Climate change has implications for defence policy regarding planning and procurement, and on the way operations are executed. Figure 1 outlines the implications of climate change for military organisations, based on the four mechanisms explained above.

### Responding to increased demands for humanitarian assistance and disaster response

In the event of floods, cyclones or similar extreme weather events, the military is often called upon to fulfil its role in crisis and disaster response. The military has unique capabilities to very quickly deploy the necessary equipment and personnel. However, the ministries of defence and armed forces of several countries recognise<sup>13</sup> that they lack the means of repeating these exercises more frequently than at present, let alone in different locations at the same time. Climate predictions show, however, that demand for humanitarian assistance and disaster response (HADR) is likely to increase in the future, with armed forces having to assist in national, overseas and international territories. For example, New

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8 <https://www.unhcr.org/protection/environment/3b039f3c4/refugees-environment.html>

9 Machlis, G.E. and Hanson, T. (2008) ‘Warfare Ecology’, *Bioscience*. Vol 58-8, pp. 729-736.

10 Wit, P. and Noome, D.A. (2016) *Winning the environment. The ecosystem approach and its value for military operations*, IUCN Commission on Ecosystem Management, Gland, Switzerland.

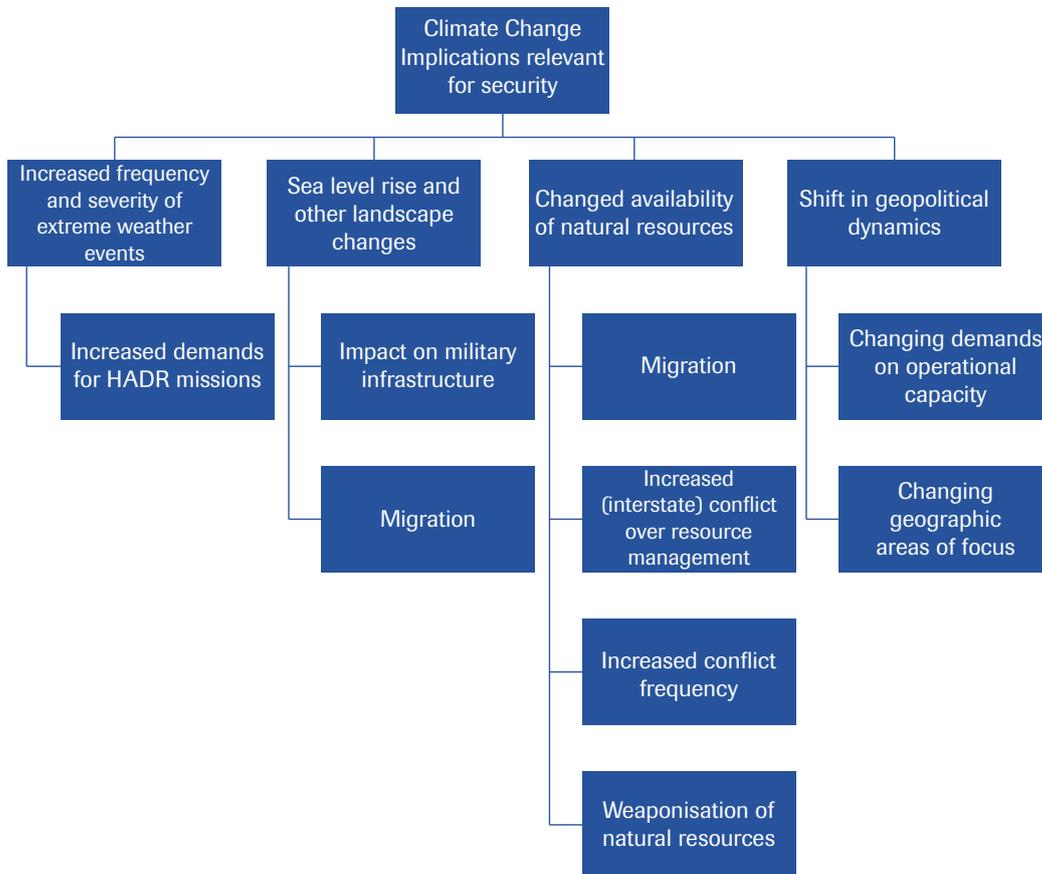
11 <http://edition.cnn.com/2003/WORLD/asiapcf/east/08/22/korea.bio.dmz/>

12 <https://www.defensenews.com/news/your-military/2019/05/06/northcom-arctic-now-americas-first-line-of-defense/>

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13 Discussed during the Planetary Security Conference 2019 with military representatives from New Zealand, France, Finland and The Netherlands.

**Figure 1 Climate change implications**



*HADR: humanitarian assistance and disaster response*

Zealand indicates a shift in the location of fisheries to rougher territorial waters, as climate change leads fish stocks to move, resulting in a rise in demand for search and rescue operations.<sup>14</sup> The Indian Ministry of Defence (MoD) recognises that ‘Armed Forces will have to play a major role in Humanitarian Assistance and Disaster Relief (HADR), civilian support, and Aid to Civil Authorities.’<sup>15</sup>

‘The Caribbean opened the eyes of the capitals that humanitarian assistance puts pressure on the Ministry of Defence,’ the French representative mentioned during the Planetary Security Conference of 2019.

Being prepared for concurrent events is increasingly important and requires decisions on policies and planning from ministries of defence about deployment frequencies, level of preparedness, and resource allocation. For example, increasing numbers of HADR missions could magnify the need for engineering capabilities and liaison staff.

**Impact on military infrastructure**

As well as weather events, sea level rise also has direct implications for military organisations. The Netherlands, for example, faces direct future threats from climate change at national level: sea level rise, extreme weather, and land subsidence

14 Jane Neilson during PSC 2019.

15 Kumar, A. (2017) *Seminar report. Impact of climate change on military operations: an appraisal*, Centre for Land Warfare Studies, New Delhi, 8.

increase flood risk. The United Kingdom,<sup>16</sup> United States<sup>17</sup> and Australia<sup>18</sup> are set to move their naval bases and low-lying airstrips to higher ground, while France also recognises the vulnerabilities of its infrastructure.<sup>19</sup> The US has identified national threats as a result of recurrent flooding, drought, desertification, wildfires and thawing of the permafrost.<sup>20</sup> Heat has been demonstrated to affect training days and can affect mental wellbeing in the US and Australia.<sup>21</sup>

### Migration

Many countries perceive migration as a security threat, due to increased resource competition and its potentially heavy toll on national government capacity (HADR activities, for instance). Worldwide, Bangladesh is probably the most notable example of a country where climate change can lead to mass migration. The 2013 *Global Security Defence Index on Climate Change* indicates that sea level rise has the potential

to displace 30 to 50 million people from that country's coastal areas by 2050.<sup>22</sup>

The tasks of the armed forces in migration include creating freedom of movement for refugees and ensuring a secure environment by, among other things, collecting intelligence and providing protection. Mass migration has implications for armed forces at operational level, as 'associated problems of re-location in populous areas can be difficult, leading to operational consequences'.<sup>23</sup> An expressed consequence for defence planning and acquisition is the need to have 'better dual use equipment like boats, bridges, hospital ships, earth moving equipment, and medical facilities'.<sup>24</sup>

### Increased (interstate) conflict over resource management

Around the world we are seeing rising tensions between states due to natural resource management conflicts when the use of resources on one side of a border affects the livelihoods of people on the other side. In Egypt, for example, there are long-standing conflicts over Nile River water, and Iraq is facing continuous water shortages due to diminishing flows from the Euphrates and Tigris rivers.<sup>25</sup> Also, changing precipitation patterns might alter regional access to resources such as drinking water or fodder for livestock. If these natural resources cross national borders, they may become a source of conflict between these countries, which could mean a shifting of focus areas for the military.

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16 <https://www.americansecurityproject.org/british-military-bases-and-climate-change/>, accessed 29-03-2019.

17 Office of the Under Secretary of Defense for Acquisition and Sustainment 2019. Report on Effects of a Changing Climate to the Department of Defense, Department of Defense United States of America, <https://assets.documentcloud.org/documents/5689153/DoD-Final-Climate-Report.pdf>, accessed 29-03-2019.

18 Foreign Affairs, Defence and Trade References Committee (2018) *Implications of climate change for Australia's national security*. The Senate, Canberra, Australia, [http://www.aph.gov.au/senate\\_fadt](http://www.aph.gov.au/senate_fadt), accessed 29-03-2019.

19 Regaud, N., Largemain, M. and Chardon, J. (2018) *Defence and climate: France is committed*, Direction générale des relations internationales et de la stratégie, Ministère des Armées, DICO.

20 Office of the Under Secretary of Defense for Acquisition and Sustainment (2019) *Report on Effects of a Changing Climate to the Department of Defense*, Department of Defense United States of America.

21 Foreign Affairs, Defence and Trade References Committee (2018) *Implications of climate change for Australia's national security*. The Senate, Canberra, Australia, [http://www.aph.gov.au/senate\\_fadt](http://www.aph.gov.au/senate_fadt), accessed 29-03-2019.

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22 Holland, A. and Vagg, X. (2013) *The Global Security Defence Index on Climate Change: Preliminary Results*, American Security project, <https://www.americansecurityproject.org/ASP%20Reports/Ref%200121%20-20Global%20Security%20Defence%20Index%20P-Results.pdf>, accessed 29-03-2019.

23 Kumar, A. (2017) *Seminar report. Impact of climate change on military operations: an appraisal*, Centre for Land Warfare Studies, New Delhi, 12.

24 Ibid. p. 15.

25 Von Lossow, T. (2018) *More than infrastructures: water challenges in Iraq*. Planetary Security Initiative Policy Brief.

Another potential driver for such a shift is energy transformation and its effect on geopolitics. Countries producing fossil fuels, notably Russia, the Middle East and North Africa, are expected to face increasing challenges, as in general more than a quarter of their GDP is based on fossil fuel exports. Failure to prepare the economies of these countries will therefore have a severely destabilising effect.<sup>26</sup>

### Increased conflict frequency

Research indicates that climate change impacts such as rising temperatures and extreme rainfall, and their consequences for natural resources, will lead to more frequent conflicts.<sup>27</sup> This has implications, including a greater requirement for effective early warning systems, planning capabilities, larger budget allocations or prioritisation, and, on the part of governments adapted ambition levels.

### Weaponisation of natural resources

Opposing forces that gain control over natural resources can use them as a weapon. For example, the (so-called) Islamic State (IS) used water as a weapon against local populations by ensuring there was too much or too little water, or that water was of a poor quality. In this way IS tried to either break resistance and gain support from the population, or drive it out.<sup>28</sup> It also used water in attacking opposing forces, such as in April 2014, when it closed the Falluja Dam floodgates and the retained water flooded large areas upstream, submerging Iraqi government facilities on the banks.<sup>29</sup> Similarly, for 18 months IS tried to capture the Haditha Dam in Iraq. Baghdad relies on both the Mosul and Haditha Dam for nearly

all its water supply and the dams provide around three-quarters of Iraq's electricity. Despite the heavy besieging by IS, the Iraqi forces and Kurdish Peshmerga fighters protected the Haditha Dam successfully, assisted by US air support.<sup>30</sup> Climate change and new dams planned for hydropower pose new threats to the flow of water through the rivers in Iraq and adds to tensions between different groups in Iraqi society. In conclusion, natural resources can have a strategic military function that is expected to gain in importance as natural resources become more scarce.

### Changing demands on operational capacity and geographic areas of focus

With increased activity in the Arctic region, where melting ice opens up new sea lanes, and oil and gas exploration in an area of contested borders, naval vessels and submarines must be able to move through ice. The extremely hot and dusty environment of Mali caused a rapid degradation of military equipment. Changing demands and geographical focus areas call for extra-robust military equipment that can withstand climatic conditions and changing demands.

At operational level, local climatic conditions directly affect military operations, for example when there is an insufficient supply of water. Logistical lines are vulnerable, and therefore many defence ministries strive to become less dependent on fossil fuels, particularly diesel.

### Measures and activities

Despite the apparent implications of climate change, the military in many countries is still contemplating what role it should play. One reason for this is a perceived lack of urgency regarding climate change risk, as it is a non-traditional risk and considered to be relevant

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26 IRENA (2019) *A New World. The Geopolitics of the Energy Transformation*.

27 Hsiang, M., Burke, M. and Miguel, E. (2013) 'Quantifying the Influence of Climate on Human Conflict', *Science* Vol. 341, Issue 6151.

28 Lossow, T. van (2016) 'Water as Weapon: IS on the Euphrates and Tigris', *SWP comments*, no. 3, pp. 1-8.

29 Ibid. p. 2.

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30 Lossow, T. van (2016) 'Water as Weapon: IS on the Euphrates and Tigris', *SWP comments*, no. 3.

mainly for some future time,<sup>31</sup> even though environment-related risks account for three of the top five risks by likelihood and four by impact, according to the World Economic Forum.<sup>32</sup>

### Understanding the potentially changing root causes of conflict

In line with the above, in general, the relationship between climate (change) or natural resources and security is not often included in the training curriculum for military personnel, and the natural environment is not (a standard) part of operational doctrines. These doctrines specify analysis of the operational conditions following the political, military, economy, social, infrastructure and information (PMESII) environment to gain situational awareness and understanding for the mission. The natural environment is notably absent and therefore lacks military attention. One reason might be that until recently both military and non-military actors typically perceived climate change as a subject for environmentalists rather than for hard security actors,<sup>33,34</sup> even though NATO has been working on environmental protection policies since the 1970s.<sup>35</sup>

To gain thorough situational awareness and understanding for resolving conflict, the military needs to understand the root causes of conflict. As Jim Mattis, former general and US Secretary of Defence stated, 'Climate change is impacting stability in areas of the world where our troops are operating today. It is appropriate for the Combatant Commands to incorporate drivers of instability that impact the security environment in their areas into their planning.'<sup>36</sup> To do this, a good understanding of the various ways in which the natural environment can play a role in conflict is needed.

NATO doctrine also requires use of a holistic, integrated approach to work on recovery for peace, security and rule of law. This comes from a realisation that the root causes of conflicts and fragile states are various, and no simple solutions exist.<sup>37</sup> The EU has a risk analysis format to start the integrated approach, looking at structural factors and indicators that frequently correlate with conflict risk.<sup>38</sup> Environment and climate change are among these factors. However, international governmental organisations (IGOs) need to work on effective responses to climate security challenges.<sup>39</sup>

Within the military, experts on various topics advise military staff. A special adviser on environment (which would be called an 'envad') could ensure that after a conflict has ended, stakeholders incorporate the management of natural resources into security sector reform and peace

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31 Causevic, A. (2016) 'Facing an Unpredictable Threat: Is NATO Ideally Placed to Manage Climate Change as a Non-Traditional Threat Multiplier?', *Connections*, Vol. 16, No. 2 (Spring 2017), pp. 59-80.

32 World Economic Forum (2019) *World Risks report 2019*, World Economic Forum, [http://reports.weforum.org/global-risks-2019/?doing\\_wp\\_cron=1551342507.7337551116943359375000](http://reports.weforum.org/global-risks-2019/?doing_wp_cron=1551342507.7337551116943359375000), accessed 28 February 2019.

33 <https://www.nato.int/docu/review/2011/Climate-Action/Uniform-Green/EN/index.htm>, accessed 29-03-2019.

34 In the NATO Civil Military Cooperation Center of Excellence course participants receive an educational booklet (Wit, P. and Noome, D.A., 2016, *Winning the environment. The ecosystem approach and its value for military operations*, IUCN Commission on Ecosystem Management, Gland, Switzerland), although it is not being explained.

35 Kettunen, M., Noome, D., Nyman, J. and Kingham, R.A. (2018) 'Reinforcing the Environmental Dimensions of the European Foreign and Security Policy', Institute for European Environmental Policy, Brussels.

36 Revkin, A. (2017) 'Trump's defence chief cites climate change as national security Challenge', *Science*, 14 March 2017, <https://www.sciencemag.org/news/2017/03/trump-s-defense-chief-cites-climate-change-national-security-challenge>, accessed 27-5-19.

37 NATO Standardization Office (2017) *NATO standard AJP-01 Allied Joint Doctrine*

38 Wood, N. (2018) Presentation at the symposium 'Climate security: so what?', The Hague, The Netherlands.

39 Dellmuth et al. (2018) 'Intergovernmental organizations and climate security: advancing the research agenda', *WIREs Clim Change*, 9: Jan/Feb 2018.

agreements, in order to achieve a sustainable peace. The armed forces can, for example, deploy reserve officers with expertise in the subject who often operate in the field of civil-military cooperation (CIMIC).

### **Mitigation of greenhouse gas emissions: efforts to reduce the carbon footprint**

Military organisations are increasingly asked to reduce their carbon footprint in pursuance of overall efforts to reduce emissions from their activities at home in line with the Paris Agreement on Climate Change. In addition, armed forces are asked to limit their impact on the mission environment – its so-called ‘resource footprint’, thereby preventing harm to the livelihoods of the civilian population they intend to protect.<sup>40</sup> As government departments which, in many countries, have the capacity and resources to innovate, ministries of defence can send a very strong message to other stakeholders by taking the lead.

During the 2019 Planetary Security Conference, participants from France, New Zealand, Finland, the US and The Netherlands discussed different approaches and experiences in addressing climate change in military organisations. The French Ministry of Defence published a policy paper entitled *Defence and climate: France is committed*, with the slogan: ‘Understanding, Anticipating and Adapting’. Regarding mitigation of the ‘green defence’, France favours the use of eco-design for military equipment to limit environmental impact. An example is the electric propulsion and hybrid architecture for the multi-mission frigate. Infrastructure must be optimised: the new ministry headquarters has the largest solar power roof in Paris and uses geothermal water.<sup>41</sup> A similar effort is made in Finland, where the Ministry of Defence has set a number of indicators to reduce its carbon footprint.

The US government has an elaborate list of resources on the nexus of climate change and security.<sup>42</sup> As early as 2007, a start was made on exchanging fossil fuels for alternative energy, and US military use of oil fell by 20 percent between 2007 and 2015, although this was also due to a decline in combat operations. The number of renewable energy projects tripled between 2011 and 2015, and total renewable power generated by Department of Defense sites almost doubled in this period.<sup>43</sup> Nevertheless, there is still huge potential to take further steps, as the US Department of Defense is still one of the largest consumers of fuel on the planet and the second largest owner of land and property in the US.

The Netherlands Ministry of Defence committed itself to reduce dependence on fossil fuels, not only to contribute to greenhouse gas reductions, but mainly to reduce battle-related risks in the supply chain of fossil fuels. Mitigation measures in the ‘operational energy strategy’ are mainly focused on fossil fuels, and make no reference to the relationship between climate change and security. Mitigation measures on Dutch territory are the construction of large solar panel sites and the electrification of company cars. Currently, a new strategy is being written. With regard to mission areas, both logistic experts and engineers are experimenting to lessen the impact of a mission on natural resources, among other things by recycling water and reducing waste.

In Finland, the Finnish Defence Force, as any other government department, is expected to meet certain emission reduction goals, while safeguarding operational capacity. One of their main focus points is energy security. As part of climate change adaptation, the Finnish Defence Force is working on energy efficiency and attempting to rely on domestic (renewable) energy sources where possible.

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40 <https://www.unenvironment.org/explore-topics/disasters-conflicts/what-we-do/preparedness-and-response/greening-blue-helmets>

41 Regaud, N., Largemain, M., Chardon, J. (2018) *Defence and climate: France is committed*, Direction générale des relations internationales et de la stratégie, Ministère des Armées, DICOd.

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42 For an overview see [www.climateandsecurity.org](http://www.climateandsecurity.org).

43 <https://www.reuters.com/article/us-usa-military-green-energy-insight/u-s-military-marches-forward-on-green-energy-despite-trump-idUSKBN1683BL>, accessed 10-03-2019.

### Adaptation: how to assess the security risks of climate impacts

New Zealand's Ministry of Defence carried out an extensive assessment on climate change and security, which resulted in a policy paper with recommendations on how to adapt to climate change. Policy pointers include: greening defence activities; researching the impact of climate change on military operations; begin planning for concurrent operational requirements; and work on building resilience in the Pacific. French MoD adaptation measures include promoting dialogue between actors, developing and deepening regional cooperation, and initiating a long-term research programme dedicated to climate change issues in terms of security and defence.<sup>44</sup> The US Department of Defense has written a number of publications on the need to adapt to climate change, such as the 2014 *Climate Change Adaptation Roadmap*. And the Defense Department is working on the adaptation of many bases and surrounding areas that are threatened by sea level rise.

The Netherlands Ministry of Defence has not published an adaptation strategy, but is increasing its cooperation with civil security forces and governmental organisations to prepare for natural disasters on its mainland. During the Planetary Security Conference, a representative from the Caribbean explained that they are preparing for more hurricanes. Armed forces support in civil-military cooperation should improve deployment of military support, as is indicated inter alia in the draft Plan of Action on Resilience in the Caribbean region that was developed under the lead of the Caribbean Disaster Emergency Management Agency (CDEMA) during a regional Planetary Security Conference in December 2018.

### Early warning and risk analysis

In addition to thinking about how to decarbonise and adapt military equipment and operations in a changing climate, the military also relies on early warning and risk analysis, which increasingly aims to take account of climate-related security risks. An example is the recent foresight analysis undertaken by the UK Ministry of Defence.<sup>45</sup> However, much of the analysis has not been made public, as information about where conflict risk is on the rise is highly sensitive and disclosing it might, in some cases, exacerbate sensitive dynamics on the ground. From publicly available information on efforts to combine climate vulnerability data with conflict risk indices,<sup>46</sup> we know that several methodological challenges hinder an adequate inclusion of climate change into early warning. These include: a) conflict risks often being available at country level, while climate change impacts can differ across regions; b) longer time horizons of climate change come with higher uncertainty ranges on the impact; c) differences between extreme weather events (e.g., floods, hurricanes) and slow-onset events (e.g., gradual temperature rise that reduces food, water and land resources); and d) the relationship between climate change and other factors increasing conflict risk, such as high prices of staple food. To address such issues, data analysis must be supplemented with politically informed analysis from local diplomats, conflict analysts and intelligence services to gain a more complete picture of the situation on the ground.

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44 Regaud, N., Largemain, M., Chardon, J. (2018) *Defence and climate: France is committed*, Direction générale des relations internationales et de la stratégie, Ministère des Armées, DICOd.

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45 <https://www.planetarysecurityinitiative.org/index.php/news/uk-ministry-defence-identifies-climate-change-and-resource-use-among-highest-risks-defence-and>, accessed 29-03-2019.

46 For example the Water, Peace and Security initiative, <https://www.un-ihp.org/news/water-peace-and-security-partnership>.

## Recommendations

In order to increase the military's overall contribution to climate security, we would suggest to Ministries of Defence the following avenues to pursue:

1. Mainstream climate change in military doctrines and in mission statements. For example, start with extending the PMESII analysis framework used by NATO to include the factor 'environment'. Recognise that it is a framework in which one not only needs to answer the 'what' question, but also the 'why' question to gain a holistic understanding.
2. Develop a long-term strategy for dealing with rising numbers of HADR missions; focus on prioritisation, flexibility and durability of equipment, and operational capacity.
3. Raise awareness and improve understanding of the impacts of climate change at every level of military organisations. To achieve this, develop and incorporate climate security and environmental awareness in the basic training of all personnel. International expert groups such as GMACCC<sup>47</sup> can play a role in the development of such material.
4. To recognise and understand the root causes of conflict related to climate change, and to advise on effective measures, the military needs experts on these subjects. We therefore recommend the introduction of environmental assessment teams or environmental advisers ('envads'), tasked with participating in all phases of missions. Reserve officers with expertise in various domains (in the Netherlands in the 1 Civil Military Interaction Command) can be used for this purpose. Examples are biologists and hydrologists to undertake ecosystem assessments, and others for advice on agriculture, infrastructure, animal health, governance, etc.
5. Mainstream climate change mitigation activities such as CO<sub>2</sub> reduction and implement the circular economy within the organisation.
6. Increase collaboration with civilian, diplomatic and institutional partners that have early warning systems (e.g., the EU) – for example, on the relationship between water shortage and conflict or on extreme weather event warnings.
7. Foster exchanges and cooperation between military organisations to share experience and best practice in addressing climate change and collaborating on HADR missions. At European level, research programmes are being developed, but structural attention to the issue in, for instance, the EU and NATO staff is lacking.

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<sup>47</sup> [Global Military Advisory Council on Climate Change](#)

## About the Planetary Security Initiative

The Planetary Security Initiative aims to help increase awareness, to deepen knowledge, and to develop and promote policies and good practice guidance to help governments, the private sector and international institutions better secure peace and cooperation in times of climate change and global environmental challenges. The Initiative was launched by the Netherlands Ministry of Foreign Affairs in 2015 and is currently operated by a consortium of leading think tanks headed by the Clingendael Institute.

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