



Why should the Norwegian Armed Forces care about climate change?

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Takeaways

- Climate change is a “threat multiplier” due to its ability to amplify existing security challenges and threats. It is likely to affect the military as an institution and organization, including installations and equipment, as well as operations and the character of warfare. Hence, it is an all-encompassing threat factor that needs to be taken into account in long-term security projections and defense planning.
- Climate change may also be a direct threat to the military itself, as the moral justification and room of operability in the public sphere may shrink if other ministries, official bodies and areas of politics are forced to cut back due to climate change.
- Among the broad spectrum of aspects climate change is likely to affect is aircraft performance due to rising temperatures, potentially cause a necessary move of military bases in exposed geographical locations, as well as open up a new area of great power rivalry in the Arctic due to accelerated rate of climate change and the melting of sea ice.
- There are basic knowledge gaps regarding how climate change will affect the Norwegian Armed Forces, including in international operations, as well as how climate change will affect security cooperation and security alliances such as NATO, which requires further research.

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Climate simulations published in May 2020 predict that the Arctic will be “practically sea-ice free” for the first time before September 2050, a mere thirty years away.¹ How could this climate change prediction affect Norwegian security and defense?

In both the April and October 2020 drafts of the Norwegian Armed Forces Long Term Plan for 2021-2024, climate change is one of many key long-term trends that may influence Norwegian security and defense ability.² This is the first time the international and national security and defense implications of climate change have been included in the Long Term Plan for the Norwegian Armed Forces, and it is an indication of the rising importance of climate change implications in security and defense discourse. This article examines why the Norwegian Armed Forces should care about climate change. First, it considers and explains the concept of climate change as a “threat multiplier” in the full spectrum of security challenges and threats. Second, it examines areas of interest pertaining to climate change and its impact on security that is relevant to the Norwegian Armed Forces: (1) the military as an institution, (2) military installations and equipment, (3) armed conflict, (4) Arctic security, and (5) NATO. Finally, it identifies key potential impacts of climate change on the Norwegian Armed Forces in international operations, and other knowledge gaps that should be further investigated.

Climate change as a “threat multiplier”
There is a wide array of research areas in the academic literature on climate change and

security implications, and researchers often include the idea of the threat multiplier.³ Climate change is described as a threat multiplier *due to its ability to amplify instability in unstable regions and adding tension in more stable regions*.⁴ Climate change is not seen as something that will necessarily create new security problems, but rather intensify existing insecurity.⁵ Also, the Norwegian Armed Forces Long Term Plan recognizes this concept and includes the characterization of climate change as a threat multiplier, and states that it may both cause and worsen conflicts due to “drought, desertification, melting ice and rising sea levels, flooding and storms, in addition to scarce access to natural resources such as water and earth”.⁶

The term threat multiplier is useful because it becomes a shorthand for the numerous possible consequences of climate change. The concept embraces the uncertainty inherent to predicting the future of climate change. There is “robust evidence, high agreement” according to the Intergovernmental Panel on Climate Change (IPCC) report that “[h]uman security will be progressively threatened as the climate changes”.⁷ There are variations of medium evidence, medium to high agreement surrounding claims that climate change will impact many factors.⁸ This includes migration flows, factors increasing risk of violent conflict within states, leading to new challenges and shaping conditions of security and national

¹ Notz et al, 2020: 1

² Forsvarsdepartementet, 2020a: 11, 39-40; Forsvarsdepartementet, 2020b: 11, 42

³ Examples include: Causevic, 2017: 60; Alex & Estève, 2018: 98; Werrell & Femia, 2016: 221; Brzoska, 2012: 44; Brock et al., 2020: 12

⁴ Werrell & Femia, 2016: 221; Mazo, 2010: 32

⁵ CNA Corporation, 2007: 6

⁶ Forsvarsdepartementet, 2020b: 42, author’s own translation if not stated otherwise.

⁷ Agder et al., 2014: 758

⁸ Agder et al., 2014: 758

security policies.⁹ Potential climate change impacts on military bases include “recurrent flooding”, “drought”, “desertification”, “wildfires”, and “thawing permafrost”.¹⁰ These impacts are both current and future dangers to base operability.¹¹

There is also a risk that the effect of climate change on conflicts or instability is being “downgraded or ignored out of a mistaken belief that environmental causes somehow absolve individuals and governments from responsibility of their actions”.¹² Designating climate change as a threat multiplier helps to indicate the severity of the climate change challenge in a security and defense context, and its potential role in exacerbating instability. For instance, Ban Ki-moon, the former secretary general of the United Nations, wrote in *The Washington Post*: “Amid the diverse social and political causes, the Darfur conflict began as an ecological crisis, arising at least in part from climate change”, partly attributing the conflict to climate change effects.¹³ His assessment referred to research results of anthropologist Alex De Waal who examined the Darfur conflict in the 1980s.¹⁴

However, there are arguments against using the concept of “threat multiplier” in order to describe the potential security effects of climate change, as it is seen as simplistic by some. Alex De Waal, considered one of the foremost experts on Sudan and the Horn of Africa¹⁵ refuted that the conflict in Darfur was due to climate change, and wrote:

Ban Ki-moon’s linking of climate change and the Darfur crisis is simplistic. Climate change causes livelihood change, which in turn causes disputes. Social institutions can handle these conflicts and settle them in a non-violent manner – it is mismanagement

and militarization that cause war and massacre.¹⁶

There is a “danger of assuming a simplistic, deterministic connection” between environmental events and effects, and conflict and security issues.¹⁷ There is a middle ground, and the threat multiplier concept opens for this. Unfortunately, there is little discussion around the term itself, beyond stating in various ways that climate change is a threat multiplier.¹⁸

Some discussion has been raised by Joshua Busby and Nina von Uexkull, who argued in 2018 that it is not helpful to categorize climate change as a threat multiplier unless “we know the characteristics that make countries more likely to experience instability”.¹⁹ They find that three factors make a country especially vulnerable to climate change: (1) “high level of dependence on agriculture”, (2) a recent history of conflict”, and (3) “discriminatory political institutions”.²⁰ Busby advocates in 2020 identifying a set of “commonly understood risk factors” in order to advance the conversation and develop better interventions.²¹

The criticism of the term is valid. However, the concept was only introduced in the 2020 Long Term Plan for the Norwegian Armed Forces for the first time. The slow adoption of the concept into policy and consideration arguably demonstrates its continued need as a tool of understanding why climate change is relevant to security and defense. This Insight will continually refer back to climate change as a threat multiplier while considering the variety of climate change implications that may affect the Norwegian Armed Forces. The first such implication, is the impact it might have on the military organization itself.

⁹ Agder et al., 2014: 758

¹⁰ United States Department of Defense (DoD), 2019: 5-7

¹¹ DoD, 2019: 5-7

¹² Mazo, 2010: 35

¹³ Ban, 2007

¹⁴ Mazo, 2010: 34

¹⁵ Tufts University, 2020

¹⁶ De Waal, 2007

¹⁷ Mazo, 2010: 35

¹⁸ Guy et al., 2020a: 8. See also page 12, 23, 24, 33, 48, 75, 80, 123, 137, 139, 145. Several are related to countries’ acknowledgement of climate change as a threat multiplier.

¹⁹ Busby & von Uexkull, 2018

²⁰ Busby & von Uexkull, 2018

²¹ Busby, 2020

Climate change and the military as an institution

Rickard Söder at the Stockholm International Peace Research Institute, the Climate Change and Risk Programme, explores the impact climate change may have on the military as an organization.²² He asks whether variations of securitization of climate change impacts the armed forces' structure and practices and argues that this is the case.²³ He bases his analysis of both militaries on annual reports (2001-2018) on the militaries' operations and initiatives.²⁴ Söder uses subsets of securitization when analyzing the Norwegian and Swedish Armed Forces. These subsets are called *threatification* and *riskification*. Threatification is when an existential risk is considered more concrete, the object in danger (for instance the state) is more clearly defined, and the time horizon of threat is imminent.²⁵ Riskification does not have a clearly defined enemy, and the object at risk and its time horizon is less defined than in threatification.²⁶ Simply put, threatification is a process of seeing something as a danger that is more defined, and riskification is also a process of seeing something as a risk, but the risk is vague both in enemy and time.

These are thoroughly explained, as he argues that climate change underwent a process of *threatification* in Norway, and a process of *riskification* in Sweden. Söder does not find much change in the Norwegian Armed Forces before and after threatification of climate change in the period between 2001 and 2018, besides more activity in Northern Norway.²⁷ He also finds that they are still mostly affected by the "extensive reorganization initiated in the early 2000s".²⁸ In Sweden, however, he found that there was a change from "a reaction defense heavily involved in international operations" to an "encompassing defense

emphasizing the national context" before and after riskification.²⁹

This change enables the Swedish Armed Forces to address broader security issues, which is how the process of riskification represents climate change. Official defense reports repeatedly state that security matters are "cross-sectional and erratic", requiring a defense that can handle a multitude of challenges.³⁰ This approach acknowledges the potential of climate change as a threat multiplier. The process of threatification in Norway however, did not reorient the Norwegian military organization towards the wider security implications of climate change. Söder finds that after threatification, the Norwegian Armed forces emphasized flexibility, fast response, and specialized competences, following the extensive reorganization of the early 2000s.³¹ Söder published his thesis in Spring 2019, and his findings therefore do not reflect that the 2020 Long Term Plan for Norway's military acknowledges climate change as a threat multiplier and a future security implication.

Climate change may also be a direct threat to the military itself, as the moral justification and room of operability in the public sphere may shrink if other ministries and areas of politics are forced to cut back due to climate change.³² Especially if cuts to other sectors are made to justify emissions from the military's operations. The military as an institution could in the future face pressure threatening its very legitimacy if it does not make efforts to emit less. In October 2019, a smattering of press attention from *Dagsavisen*, then *Klassekampen*, surrounded the increased emissions of the new F-35 fighter jets that are replacing the fleet of F-16 fighters.³³ The Norwegian Ministry of Defense reasoned that most training would happen in simulators, and that the calculations connected to fuel usage are uncertain.³⁴

²² Söder, 2019: 2; Sipri, 2020

²³ Söder, 2019: 7

²⁴ Söder, 2019: 22, 30

²⁵ Söder, 2019: 12

²⁶ Söder, 2019: 12

²⁷ Söder, 2019: 39

²⁸ Söder, 2019: 39

²⁹ Söder, 2019: 47

³⁰ Söder, 2019: 47

³¹ Söder, 2019: 39

³² Brzoska, 2015: 178

³³ Peck, 2019; Klassekampen, 2019

³⁴ Sandberg, 2019

In 2015 Professor Michael Brzoska conceptualized potential generalized military futures based on security policy and defense planning documents from 38 countries. These military futures show different directions of evolution for the military as an institution in a world besieged by climate change. A “leaner” military is considered as one of six possible “military futures” that may arise due to climate change.³⁵ A leaner military future means a potential decrease in defense spending on the military due to climate change prioritizations.³⁶ It could also imply that carrying out national security and defense policies could be split between different civilian actors as well as through the military.³⁷

The other futures are envisioned as a “greener” military, where the military prioritizes cutting emissions; as climate change “victims” (destruction of installations and equipment due to climate change impacts such as a rising sea level). He also predicts futures such as armed “rescuers”, where the military will increasingly act as natural disaster management; armed “humanitarians” with more capacity for intervening in low-level violence brought on by climate change implications, and climate “warriors”, with more emphasis on fighting in wars brought on by climate change implications.³⁸ It has also been argued that the only reason various militaries are engaging with climate change as a threat or a risk is because they want to bolster military spending, or to be legitimized by “the militarization of climate change”.³⁹

In 2012, Brzoska addressed the attitudes of the militaries of China, Russia, the UK and the US to climate change. He found that besides preparing for the potential consequences of climate change in the Arctic, the Russian military was not engaging with the issue of climate change.⁴⁰ The Arctic is warming at double the global rate since the 1980s,

resulting in unprecedented sea ice loss.⁴¹ Norway, and other Arctic states such as Russia and the United States will be greatly affected by such implications as sea ice losses, completely changing the frame of reference for future security.

The UK and US militaries also started efforts to cut energy use and greenhouse gas emissions, whereas the then low domestic energy prices mean Russia had not publicly addressed the climate change implications of emissions at the time.⁴² Russia has committed to low goals under the Paris Agreement, pledging to keep CO2 emissions lower than 70% of their level in 1990, and the military has not been specifically mentioned.⁴³ The US is studying the effect of rising sea levels on coastal installations, something the Chinese and UK militaries also are doing, due to the risk of damaging their ability to conduct military operations.⁴⁴ The hard-core effects of climate change installations and equipment will be further explored in the next part.

Climate change and military installations and equipment

Dangers to military installations and equipment due to climate change and the problem of improving installation resiliency have been frequently raised as a growing problem for the military around the world. In January 2016, the U.S. Department of Defense (DoD) issued a directive assigning responsibilities on many levels to incorporate “climate considerations into planning for infrastructure and operations”.⁴⁵ In January 2017, the problem was also voiced by the Naval Facilities Engineering Command.⁴⁶ Among other issues, the 2017 report updated criteria for facilities (UFCs) in order to prepare for climate implications. In the report “Report on Effects of a Changing Climate to the Department of Defense”, published by the U.S. Department of Defense in January 2019, a

³⁵ Brzoska, 2015: 177

³⁶ Brzoska, 2015: 179

³⁷ Brzoska, 2015: 179

³⁸ Brzoska, 2015: 179

³⁹ Gilbert, 2012: 1-4

⁴⁰ Brzoska, 2012: 49-50

⁴¹ Agder et al., 2014: 776

⁴² Brzoska, 2012: 46-49

⁴³ Paramonova, 2020

⁴⁴ Brzoska, 2012: 46-48, 51

⁴⁵ DoD, 2019: 3

⁴⁶ DoD, 2019: 2

concern was raised for the impact of climate change on installations and the need for their adaptation and increasing resilience.⁴⁷ In August 2020, The U.S. Army released a 200+ page climate resilience handbook as climate will impact “installations, operational plans and overall missions”.⁴⁸ In September 2020, the Secretary of the U.S. Army released a new policy to address threats by the changing climate and extreme weather to U.S. army installations.⁴⁹

Furthermore, climate change could amplify current natural dangers to military bases. The DoD highlights how climate change multiplies the threat of coastal flooding, where the sea level changes can magnify “the impacts of storm surge” and may eventually “result in permanent inundation of property”.⁵⁰ Such hard-core implications to military installations is also highlighted in the Norwegian Long Term Plan of October 2020, which states that the military’s infrastructure, materials and logistics can be impacted by “rising sea levels, flooding, surface or urban runoff,⁵¹ strong winds, avalanches and landslides.⁵² It further states that climate change needs to be an object of consideration in the planning of installations, equipment, trainings and operations.⁵³ These implications are recognized by the Norwegian Ministry of Defense in the Long Term Plan, yet the assessment is rather general in nature and appears to lack an examination of specific problems and implications of climate change on installations and equipment.

One example of such specific research is an exploration of the possible consequences of climate change on U.S. military aircrafts, many of which the Norwegian Armed Forces use.⁵⁴ A model developed by retired Air Force Colonel Mary McRae translates “future climate projections” into Density Altitude (DA)

measurements, which can be used to predict “specific changes in aircraft performance influenced by heat and humidity”.⁵⁵ Density Altitude, which can predict aircraft performance, is influenced by air temperature and dew point,⁵⁶ which are projected to rise due to “anthropogenic climate change”.⁵⁷ McRae notes that “the consequences of high DA can be catastrophic to aircraft performance”, which is why assessing the full spectrum of impacts on Density Altitude is vital.⁵⁸ Hot, humid air, an increase in which is predicted as a consequence of anthropogenic climate change, causes the air to be less dense, which means “less available power for fixed and rotary wing aircraft[s]”.⁵⁹ An increase in higher Density Altitude in the future, without change to equipment and aircrafts, could result in a lesser transportation capacity in order to tackle a more difficult operational environment caused by climate change.⁶⁰ Such a finding shows how specific climate change as a threat multiplier can get.

Climate change as a cause of armed conflict

Climate change can also multiply the threat and intensify reasons for armed conflict. The IPCC defines armed conflicts as those that “involve more than 25 battle-related deaths in a year” in the fifth assessment report of the IPCC.⁶¹ This includes interstate, intrastate involving governments, non-state conflicts without direct government involvement, and one-sided conflicts “involving organized violence against civilians”.⁶²

The research focusing on modern day climate change and conflict uses climate variability and more specifically rainfall or temperature variability as representative measures for impacts that may occur more long term due to climate change.⁶³ An overview from 2017 finds that an increasing share of “quantitative

⁴⁷ DoD, 2019: 4-10

⁴⁸ Pinson et al., 2020: i

⁴⁹ Secretary of the Army, 2020: 2

⁵⁰ DoD, 2019: 4-10

⁵¹ Hard surfaces that do not allow water to trickle through the soil create urban or surface runoff.

⁵² Forsvarsdepartementet, 2020b: 42

⁵³ Forsvarsdepartementet, 2020b: 125

⁵⁴ Forsvaret, 2016; Forsvaret, 2017

⁵⁵ Furtek, 2019: 1

⁵⁶ “the atmospheric temperature (...) below which water droplets begin to condense and dew can form” (Lexico, 2020).

⁵⁷ Villanova University, 2019

⁵⁸ Villanova University, 2019

⁵⁹ Furtek, 2019: 2

⁶⁰ Furtek, 2019: 2

⁶¹ Adger et al., 2014: 771

⁶² Adger et al., 2014: 771

⁶³ Adger et al., 2014: 771



studies find a link between weather anomalies and violence for some forms of violence, but the directions are not always consistent, and the mechanisms are not satisfactorily understood”.⁶⁴ The threat multiplier concept therefore provides a commonality for these debates. The fifth IPCC assessment report, states in 2014 that “collectively the research does not conclude that there is a strong positive relationship between warming and armed conflict”.⁶⁵ The IPCC report also concludes in the chapter devoted to human security that there is “high scientific agreement” that increased rivalry over shared resources is unlikely to “lead directly to warfare between states”.⁶⁶

However, a more recent review of the literature in *Nature magazine*, includes 14 experienced and oft-cited authors in the field.⁶⁷ They “agree that climate has affected organized armed conflict within countries”. Other drivers, such as low socioeconomic development, and low state capabilities are more important to conflict, and the causal mechanisms between climate and conflict remains uncertain.⁶⁸ The uncertainty of the causal mechanisms between climate and conflict indicate that more research is necessary and shows the continued benefit of conceptualizing climate change as a threat multiplier. Future development of such conflicts could impact the Norwegian military commitments, both due to the conflict itself, and as help to our most important allies.⁶⁹

Impact of climate change on Arctic security

The reduction of the Arctic icecap is among major topics raised in the debate on security implications of climate change, both internationally and in Norway. As Professor Rolf Tamnes notes, “the earliest and most intense climactic changes are being experienced in the Arctic region”.⁷⁰ Indeed, it might be one of the first areas where climate

change will act as a threat multiplier for Norway.⁷¹

In terms of actual physical changes to the Arctic, a Norwegian Defence Research Establishment (FFI) report lists four changes: (1) polar ice melting, (2) sea level rise, (3) change in ocean currents, and (4) permafrost thaw and coastal erosion, leading to a more accessible Arctic.⁷² This development has several security implications: energy security implications due to the easier access to petroleum and gas reserves; increased shipping; increased military presence; and increased commercial fishing activity.⁷³ However, due to the cooperation between the Arctic states in the Arctic Council, it currently serves as the forum for hashing out disputes on “resource competition, new transportation practices, and boundary disputes”, and there is little chance of trouble.⁷⁴ This does not mean that climate change and its effect on these issues will not challenge the Arctic states.

The melting of the ice also presents an opportunity for an economic development for all Arctic states, as well as to “stimulate various actors to define and articulate their interests and policies” in the region.⁷⁵ Russia will continue to be an actor in the Arctic that needs to be taken into account, due to its coverage of “nearly half of the latitudinal circle”, the High North’s continuing presence in Russian strategic thinking and defense policy, and the large Russian Arctic petroleum and resource stores, and planned commercial activity.⁷⁶

There are three issues that have featured historically in Norway’s Arctic/High North policy. The first is managing the relationship with Russia (and formerly the USSR), the second is exercising authority over Svalbard as per the Svalbard Treaty of 1920, which is an issue that also deals with Russia.⁷⁷ The third

⁶⁴ Theisen, 2017: 210

⁶⁵ Agder et al., 2014: 772

⁶⁶ Agder et al., 2014: 772

⁶⁷ Including Agder, one of the lead authors of the “Human Security” chapter in the 2014 IPCC report.

⁶⁸ Mach et al., 2019: 193

⁶⁹ Mach et al., 2019: 197

⁷⁰ Tamnes, 2011: 47

⁷¹ Tamnes, 2011: 47

⁷² Åtland, 2010: 24-28

⁷³ Agder et al., 2014: 776; Tamnes, 2011: 47; Åtland, 2010: 30-42

⁷⁴ Agder, 2014: 772; Tamnes, 2011: 47

⁷⁵ Zysk, 2011: 98

⁷⁶ Zysk, 2011: 85

⁷⁷ Tamnes, 2011: 56-57

is looking after Norway's economic interests in the marine resources (both fishing and oil/gas).⁷⁸ All Arctic countries have an interest in the resources contained within, and it is clear that there are issues mentioned above that may cause friction. However, according to Professor Olav Schram Stokke, international institutions concerning the ocean and environmental governance have "raised security in the Arctic" and made the international order there stable by giving a forum for problem-solving.⁷⁹

Assistant Professor Rebecca Pincus highlights the strategic opportunities of the Arctic for both China and Russia due to climate change effects: the solution to the Malacca dilemma (fewer chokepoints along the shipping route) for the former, and great power status and economic power ambition for the latter.⁸⁰ The interest in these strategic opportunities is reflected in China being granted permanent observer status by the Arctic council in 2013.⁸¹ Increasing great power competition will therefore doubtlessly be affected by climate change, and in turn affect Norway. This could also affect NATO's relationship to the Arctic, and NATO in general.

Climate change and NATO

There is not as much research on NATO and climate change, as there is on some of the other topics, and the field could definitely be expanded. A security threat assessment of climate change for Europe and Russia finds that alliances that underlie security institutions may be threatened by "rising ethno-nationalist sentiments and migration waves" in a near term scenario, with a warming of 1-2 degrees Celsius.⁸² There is also little research on how climate change can impact international security cooperation, such as NATO, or even the UN.

One of the few who has written about NATO and climate change, researcher Amar Causevic, assesses NATO's perception of climate change as a security issue. There are variations

from member state to member state in the assessment of how "climate change-induced threats affect the socio-economic and political security of nation states".⁸³ Causevic, like many other experts on the climate-security nexus, defines climate change as a "non-traditional threat" that is capable of "multiplying and aggravating already existing problems(...) as well as generating fertile ground for future security threats".⁸⁴ He states that NATO first considered "environmental challenges" as potential threats to security in 1969, yet has only engaged with environmental and climate concerns in terms of environmental protection through the Environmental Protection Working Group (EPWG), and the Specialist Team on Energy Efficiency and Environmental Protection (STEEEP).⁸⁵

NATO's Strategic Concept entitled "Active Engagement, Modern Defence" was published in 2010. It sets out their long-term view of NATO as an organization, and the security environment NATO would face. In it, NATO recognizes climate change as one of many aspects of the future security environment, and as something that will "further shape the future security environment in areas of concern to NATO and have the potential to significantly affect NATO planning and operations".⁸⁶ Moreover, climate change was also acknowledged as a "significant threat multiplier" by the NATO Parliamentary Assembly in 2014.⁸⁷ There are national efforts by the American, British, Canadian and Norwegian member state governments on acknowledging and integrating climate change as a security issue in strategic documents and discussions.⁸⁸ It might be difficult to further integrate climate security and initiatives as part of NATO's policy and operations after Donald Trump's official notice of withdrawal from the Paris Climate Agreement to the United Nations on November 4th, 2019.⁸⁹ However, current

⁷⁸ Tamnes, 2011: 56-57

⁷⁹ Stokke, 2014: 140

⁸⁰ Pincus, 2020: 56

⁸¹ McGrath, 2013

⁸² Guy et al., 2020: 40

⁸³ Causevic, 2017: 59

⁸⁴ Causevic, 2017: 65-66

⁸⁵ Both NATO bodies; Causevic, 2017: 72

⁸⁶ NATO, 2012

⁸⁷ NATO Parliamentary Assembly, 2015

⁸⁸ Causevic, 2017: 78

⁸⁹ Causevic, 2017: 79; Pompeo, 2019

President-elect Joe Biden has announced his intention to rejoin the Paris Agreement the first day of his presidency, signaling a more active role for the US on climate change.⁹⁰

The Norwegian Prime Minister, Erna Solberg, stated that NATO's envisioned role would be to "analyze the root causes for changes in security in different areas", and encouraging political will around stopping climate change, rather than using the "defense part of NATO".⁹¹ Boris Ruge, former German diplomat and ambassador and Vice-Chairman of the Munich Security Conference, respectfully disagreed with Solberg, suggesting that it was exactly the military, analytical, assessment side of NATO that could help with the credibility of perceiving climate change as a security risk, if "military people write these things up".⁹² Ruge mentions the US as a serious military actor that understands and describes climate change as a threat by referencing the 2019 US DoD report (even with the US withdrawal from the Paris agreement). Yet NATO as a whole is made up of 30 different countries who all have different policies internally and externally on climate change in general, which complicates the common stance and policy on this issue.⁹³ Nevertheless, NATO Secretary General Jens Stoltenberg published in September 2020 an op-ed in *Die Welt*, characterizing climate change as "one of the biggest challenges of our time".⁹⁴

Climate change implications for NATO are also connected to the Arctic, which in turn has implications for Norway's security and defense. In 2018, a joint force command in Norfolk, Virginia was established in order to "ensure alliance maritime security in the Atlantic".⁹⁵ Due to Russia's renewed capabilities in the Arctic and the north, their ability to "project power into the crucial strategic routes (...) into the North Atlantic and the Greenland-Iceland-UK (GIUK) gap" could be assumed

to be the reason for the reestablishment of the NATO joint force command in Virginia.⁹⁶ Such organizational changes and capabilities could continue to be influenced by the security implications of the double rate of climate change in the Arctic, and thus changes in the regional strategic environment as a result. Such considerations show how multifaceted the security implications of climate change can be, and how climate change is fittingly described as a threat multiplier.

Climate change and Norway's participation in international operations

The main research on Norway and security and defense and climate change has been focused on the Arctic and the high north, where climate change is accelerating at double the pace of the global average.⁹⁷ However, for a small, northern state such as Norway, international operations will demand mastery of a completely different operational environment, as well as the inevitable logistics of allied cooperation. Combine this with climate change, intensifying the environmental and social challenges – whether they be drought, temperatures changes, floods, or increased social unrest and conflict – and envision the future of serving in international operations in countries ravaged by climate change.

Western small powers have been largely replaced by non-western states in UN operations since the end of the 1990s-early 2000s.⁹⁸ However, resource-strong small powers may be called upon to increase their future participation, as small state participation has been "increasingly emphasized to a larger degree in both Brussels and Washington" as their economic limitations were increasing.⁹⁹ In addition, they may be called upon to increase their participation in UN operations as their "coveted niche capacities" may contribute to UN forces operating more effectively – such as the Norwegian contribution of a transportation aircraft.¹⁰⁰ There is a potential increase in

⁹⁰ Harder, 2020

⁹¹ Atlantic Council, 2019

⁹² Atlantic Council, 2019

⁹³ Atlantic Council, 2019

⁹⁴ Stoltenberg, 2020

⁹⁵ Garamone, 2018

⁹⁶ Foggo & Fritz, 2018: 123

⁹⁷ Norsk Polarinstitutt, 2018

⁹⁸ Jølberg, 2014: 47

⁹⁹ Kjølbjerg, 2014: 53

¹⁰⁰ Kjølbjerg, 2014: 53

demand for Norwegian participation in UN operations related to climate change impacts, warranting a look at climate change predictions in current areas of operation for the Norwegian Armed Forces.

Africa

Norway's main contribution to the United Nations Multidimensional Integrated Stabilization Mission in Mali (MINUSMA) is a transportation aircraft (C-130J).¹⁰¹ It is clear that climate change is likely to affect the operational aspects of the Norwegian participation in future similar military operations given the above mentioned impact of temperatures and humidity on the efficiency of aircrafts.¹⁰² Higher temperatures and dew point¹⁰³ combine to create a higher density attitude, which "can be catastrophic to aircraft performance" which can also pressure them to "reduce payload" in order to be effective.¹⁰⁴ One representative example of the detrimental effects of temperature on military aircrafts were the Black Hawk helicopters used in the raid on Osama Bin Laden in 2016; one was "critically damaged during a hard landing" due to the higher temperature of the enclosed compound.¹⁰⁵ Even practicing the landings repeatedly, the helicopters reacted differently due to the changed temperature variable.¹⁰⁶

There has been a move away from UN operations for Norway.¹⁰⁷ It has been predicted that militaries will be more likely to handle humanitarian, peacekeeping and peacebuilding operations connected to the threat multiplier effects of climate change.¹⁰⁸ The interrelationship "between the activities understood to reduce risk of conflict, and those needed for climate resilience" could be operationalized by the UNSC.¹⁰⁹ A potential justification could be through UN Security

Council resolution 1625 on strengthening the UNSCs role in conflict prevention.¹¹⁰

Asia

Afghanistan straddles the Middle East and Asia and has been ranked as one of the most vulnerable countries to climate change, due to its low capacity for adaptation, and high "exposure to climate fluctuations".¹¹¹ This low capacity for adaptation is due to the effects of conflict in Afghanistan for the past four decades, resulting in poor infrastructure and institutions, underdevelopment, and poverty.¹¹² In Afghanistan there is uncertainty around the effect of climate change, as there is so little research.¹¹³ Even with a changing climate, the Norwegian national report "A Good Ally: Norway in Afghanistan 2001-2014" found that the ability to adapt had been "substantial" for the Norwegian Armed Forces on the practical and technical level, in weapons, protection and security gear and clothing.¹¹⁴

There is little specificity in the report otherwise, stating that most of the learning that was retained in the military organization was on the practical and tactical levels.¹¹⁵ The Norwegian engagement in Afghanistan did show that it would be difficult to have different equipment for all "imaginable operational types and environments in international operations".¹¹⁶ The fragility of Afghanistan's institutions, infrastructure and development could be severely affected by climate change as a threat multiplier, and both environmental and social challenges would likely arise. If climate change impacts security for the worse, it is plausible to imagine a demand from NATO for a higher force contribution in Afghanistan.¹¹⁷

¹⁰¹ Forsvaret, 2019

¹⁰² Villanova University, 2019

¹⁰³ "the atmospheric temperature (...) below which water droplets begin to condense and dew can form" (Lexico, 2020).

¹⁰⁴ Furtek, 2019: 4; Villanova University, 2019

¹⁰⁵ Furtek, 2019: 4

¹⁰⁶ Furtek, 2019: 4

¹⁰⁷ Kjølberg, 2014: 47

¹⁰⁸ Scott & Khan, 2016: 87

¹⁰⁹ Scott & Khan, 2016: 87

¹¹⁰ UNSCR 1625 is on strengthening the UN Security Council's role in preventing armed conflict, which could be operationalized for climate change action in the face of armed conflict that is perceived to be caused by climate change; Scott & Khan, 2016: 87

¹¹¹ Aich et al., 2017: 2

¹¹² Aich et al., 2017: 2

¹¹³ Aich et al., 2017: 2

¹¹⁴ NOU 2016: 8, 57

¹¹⁵ NOU 2016: 8, 57

¹¹⁶ Daltveit, 2014: 165

¹¹⁷ Forsvaret, 2020

Middle East

In the Middle East, “upward temperature trends” are deemed as “notable and robust” in the past few decades by the IPCC.¹¹⁸ There is little research on issues such as water scarcity, but according to Kohler et al., 36 % of a selection of refugees in Germany interviewed from Iraq, Syria, Yemen and Afghanistan, reported the beginning or “a significant increase of electricity and water scarcity, or both, after violence started in their place of origin”.¹¹⁹ As there is shaky evidence on the effect of climate change on water scarcity, or loss of precipitation or desertification in West Asia, it is harder to predict how Norwegian soldiers could be affected in these areas of operation.

One implication is the possibility of Norwegian soldiers operating in higher temperatures, as the upward temperature trends are robust. This could then lead to the aforementioned temperature effect on aircrafts. In Iraq more specifically, infrastructure and the political situation is much less stable to enact adaptive measures than for instance in Israel due to their differences in development. If there is a danger of increased water scarcity in Iraq due to climate change and bad infrastructure, the controlling and denying of such resources in conflict would be multiplied by the effects of climate change. During the 2020 NATO summer training exercise in Iraq, “temperatures regularly exceeded 50 degrees”.¹²⁰ Being able to transport resources such as water or electricity may become even more important to Norwegian forces in international military operations in such areas in the future.

Changes in the European natural environment – implications for international operations

All of Norway’s European contributions, whether big or small, cover various areas and environments in Europe, and include land, air and sea forces. For air and sea forces, the major climate effects and vulnerabilities are

linked to installations, infrastructure and equipment. There is a high confidence that sea level rise and “increases in extreme rainfall” are projected to increase flood risk in Europe.¹²¹ There is also high confidence of a significant increase in “high temperature extremes” in Europe, along with increasing precipitation in Northern Europe and decreased precipitation in Southern Europe.¹²² The adaptation capacity is however much higher in Europe, thus military operations in most of Europe could most likely rely on adaptation measures enacted by the various states. However, this is not a certainty, and it is hard to predict how climate shocks, and steady climate trends such as increasing temperature, will interact with socioeconomic circumstances of various European countries.¹²³ The implications – and changes in the military equipment and the way they operate – may be more significant than what the current state of knowledge allows us to predict.

Climate change and security: knowledge gaps

The potential implications of climate change for the Norwegian Armed Forces in international operations covered in this article is brief. There is need for more research on this topic. Climate change is a knowable threat, insofar that we know that human activities “have caused approximately 1.0 C of global warming above pre-industrial levels”, and that global warming is “likely to reach 1.5 C between 2030 to 2052 if it continues to increase at the current rate”.¹²⁴ Not preparing nor researching the possible security implications of climate change, which is already happening, and will continue, is wishful thinking. The following section summarizes the knowledge gaps that have not been mentioned already.

As Ole Jacob Sending, Indra Øverland, and Thomas Boe Hornburg suggest, there are five broad areas of research that are key “to better understand how climate change will reshape world politics: sovereignty, security, status

¹¹⁸ Hijjoka, 2014: 1333

¹¹⁹ Kohler et al., 2019: 5

¹²⁰ Stoltenberg, 2020

¹²¹ Kovats et al., 2014: 1271

¹²² Kovats et al., 2014: 1270

¹²³ Kovats et al., 2014: 1273

¹²⁴ IPCC, 2018: 4

and reputation, norms and coalitions, and the geopolitics of energy".¹²⁵ This five-pronged research agenda provides a useful structure for knowledge gaps that should be addressed, even if the list is non-exhaustive.

Security

Security cooperation and security alliances are not global. They are usually regional and rooted in historical polarities. How will cooperation on climate change affect such security alliances, like NATO, for a small country such as Norway? Will there be a development in other security alliances, such as with the EU, due to the internal politics of the United States (climate change denier Donald Trump as the current commander-in-chief, though not for long)? Or will the need for a strong ally for Norway as a small state, override climate change cooperation, wherein our security relationships are put above the threat of climate change and the work to mitigate it? Hard-core climate change implications should be further investigated, such as possible consequences to military installations and equipment.

Norms and coalitions

Will there be more defined climate change norms that are possible to violate? How will the climate change world politics and the distribution of moral responsibility affect the structure and purpose of Norway's Armed Forces, its security policy, and its security alliances? Kate Guy is currently pursuing a PhD at Oxford University focusing on the impact of climate change shocks on the international system, national security and global governance.¹²⁶ The connection between security, international cooperation, global governance and climate change is little explored, and should be further explored, especially from the perspective of a small state such as Norway, which has not been much addressed.

Geopolitics of energy

Norway's oil reserves have given the country riches beyond what its size would indicate. Norway has used this money to prop up foreign, security, and aid policies, which could be in jeopardy if one of the "world's main commodities" is phased out.¹²⁷ How will Norway ensure security in an oil free world? How will this change power balances?

Research such as McRae's finding that predicted anthropogenic climate change and higher temperatures will affect Density Altitude, which in turn will affect Hercules C-103J's performance, is the kind of vital knowledge and consideration that can benefit military planning. Large picture thinking on how climate change could change great power politics is also important for long-term strategic thinking. The future challenges of climate change demand interdisciplinary attention, which it has not received enough of in security and defense fields. Failure to consider climate change does not mean it will not happen.

¹²⁵ Sending et al., 2020: 183

¹²⁶ DPIR, 2020

¹²⁷ Sending et al., 2020: 186



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Photo credit: © NASA Earth Observatory. Yellow line represents 1981-2010 median, white is the sea ice extent at its minimum on September 15th 2020.

