13 Climate change and planning for the military

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Table of Contents

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Michael Brzoska

Abstract

A core debate about the consequences of climate change concerns its security-related aspects. Elements of that debate include the expected extent of climate as well as definitions of security. Official documents on national security and defense planning are investigated with respect to these two elements of debate. A content analysis of relevant documents from 38 countries reveals a diverse response by national security establishments to the challenges presented by climate change, which also changes over time. Seven potential roles for armed forces in response to climate change are identified and quantified for the selected documents. A predominant expectation is a greater demand for disaster relief by armed forces. However, there are also governments which expect an increase in traditional security threats, as well as governments who do not foresee any security challenge resulting from climate change.

KEYWORDS: *Armed forces, defense planning, national security, disaster management.*

Introduction

Climate change will affect the conditions under which societies, governments, and institutions in general are going to have to operate. Most probably, this will also include armed forces. Climate change should therefore be of concern to those responsible for the roles and functions of the military. And indeed, the relevance of climate change for armed forces has been widely debated, also by a number of security and defense think tanks (CNA 2007, CNA 2014; CSG 2018), among various militaries (Brzoska 2012a, GMACC 2014, Brzoska 2015, Scott and Kahn 2016, Causevitz 2017) and, more prominently, in political fora such as the United Nations Security Council (Detraz and Betsill 2009, Scott and Ku 2018).

Views expressed in these debates have ranged widely, from seeing a world marked by "climate wars" (Dyer 2008) – implying a great demand for traditional military forces – to a need to cut military spending in order to be able to finance climate adaptation and mitigation measures (WBGU 2008).

Academic analysis has been similarly diverse. Some authors have evaluated the debates on the potential military consequences of climate change as very forceful and effective tool of advocacy or changing the course of climate-related policies (Brauch 2009, Floyd 2010), while others have analyzed them as results of a deliberate effort to push for an increased militarization of societies (Hartmann 2010, Gilbert 2012, Marzek 2015).

The purpose of this paper is to go beyond such contradicting perspectives in two ways. One is to provide a more differentiated analysis of the consequences climate change can have for armed forces. While there are some straightforward connections between climate change and armed forces – e. g. the military's contribution to climate change due to its consumption of energy – others are subject to a number of constructions about the future risks of climate change and the relationships between major powers and weaker states. As a result, a number of different potential "military futures" are identified. The second innovation of this paper is to empirically investigate to which extent these "military futures" are informing current military planning. For this purpose, official documents on military planning were analyzed. While perceptions of the implications of climate change for armed forces and military policies may change in the future, the empirical investigation of the current planning of future roles and functions of armed forces is an indicator of the future effects of climate change on armed forces.

This paper first presents the state of debate on the military and climate change in its various strands. Future pathways for the military, which can be identified in relevant literature, will be illustrated by examples from the two countries, in which the debate on climate change and the military has been most extensive, the United

Kingdom and the United States. The following section empirically reviews how "military futures" are represented in official planning documents. This includes discussing two factors potentially shaping different perspectives on the future of armed forces, namely perceptions of climate change as a security issue and the power status of countries. The conclusions sum up the paper and link the results to the broader debate on the connections between climate change and the military.

The military in the climate change discourse

The military has contributed to the climate change debate in three strands of debate and literature, both as an object of and as a contributor to discourses.[1]

First, and most prominently, there is the debate on security threats or risks marked by major climate change. Some analysts and policy makers have painted dark pictures of an unstable and violent future, implying a greatly increased need to protect people and countries by military means if mitigation of climate change failed (Schwarz and Randal 2003; Dyer 2008; CNA 2014, Wallace and Silander 2018). The large majority of authors with such a pessimistic view of the consequences of climate change argue for drastic changes in climate-related policies in order to prevent future wars. Still, an increased need for armed forces is easily justifiable when substantial security consequences loom (Brzoska 2009; Hartmann 2010; Marzek 2015). Predictions of major disasters, large numbers of refugees, and political instability can be easily understood to imply important roles for armed forces in an insecure future. The literature on climate change-induced security threats and risks is full of rather general remarks on the future demand for activities by armed forces in an environment, in which global warming exceeded two degrees Celsius.

Armed forces have not only been an object of advocates of major changes in climate policies. A second link between the military and climate change has been the prominent voice of active and former high-ranking officers in the climate policy discourse. The importance of officers and institutions associated with the US armed forces, particularly the Navy, for the climate policy debate in the US in the past decade is well documented (Floyd 2010). The above-mentioned study by Schwarz and Randall, one of the earliest scenario studies of climate change, was sponsored by the Office of Net Assessment in the US Department of Defense. Within the Pentagon, the various branches of the armed forces initiated internal and external studies (Brzoska 2012a; Marzek 2015; Thomas 2017). Concerns over consequences of climate

[1] This is a slightly revised and abbreviated version of Climate Change and Military Planning, published in the International Journal of Climate Change Strategies and Management, Vol. 7 Issue: 2, 2015, pp.172–190.

change are often focused on particular issues such as demand for military capabilities to meet humanitarian disasters (McGrady et al 2010) or effects of climate change on military bases (Smith et al 2010, National Academy of Sciences 2011, Foley 2012). In most of these contributions, climate change is seen through the lens of the effects of climate change on traditional military operations. In a second strand, the focus is on ways the military itself can contribute to climate change mitigation. In addition to the US military, some others, such as the UK and Australian armed forces, initiated studies on the security effects of climate change and formulated a full-fledged climate strategy (United Kingdom 2009, Thomas 2017). The Global Military Advisory Council on Climate Change (GMACCC), a group of military officers from around the world, has produced a number of reports and policy statements (GMACCC 2014).

A third strand of literature on the link between climate change and the military has been a lively, critical debate on the use of climate change in discourses on future security, and particularly military, requirements (Oels 2011; Trombetta 2012; Rothe 2016; Dietz, von Lucke and Wellmann 2016). Most of this debate revolves around different concepts of securitization. While securitization is a broader concept for the analysis of constructing an issue as a security threat, the military dimension can be easily made a part of it. Taking the predictions about growing instability and disasters as a clue, a number of authors have critically assessed whether the talk about insecurity in the two strands of discussion have led to a discourse dominated by the idea that climate change needs to be met with larger armed forces. Authors predominantly agree (but see Gilbert 2012) that, at least so far, this has not occurred. There have been no major consequences of climate change for armed forces yet. "Exceptional measures" such as large increases in military budgets or major expansions of the roles of armed forces, which would be indicators of successful securitization in the analysis of the "Copenhagen School" of securitization have not occurred (Brzoska 2009; Oels 2012). Authors are more divided on changes in security "practices", for instance the role of armed forces in border or disaster management. These would be indicators of securitization for authors of the "Paris School" such as Bigo and Balzacq (Balzacq 2010). Nevertheless, there is mostly talk of such change and little empirical evidence of it (Brzoska 2012; Oels 2012). In this strand of critical analysis, climate change is increasingly found to be one element among several such as terrorism and cyber security, which present largely unpredictable future risks (Oels 2011). The type and nature of these risks, including climate change, require broad sets of measures, such as the prevention and strengthening of the resilience of potentially affected people and communities. Attention in the debate on the possible securitization of climate change has therefore moved away from concerns about armed forces to broader issues about the consequences of "riskification", such as a shift of decision-making away from democratically elected bodies to groups of "risk experts" (Corry 2012, Oels 2012, Trombetta 2012).

In summary, the attention given to potential security consequences of climate change, including possible future "climate wars", has also raised the profile of armed forces in climate discourses, albeit in a variety of different ways. Military officers have raised their voices warning of the security consequences of climate change, but also discussing future military engagements. Militaries have been portrayed as being directly threatened by climate change, for instance because of sea level rise, but also as possible "winners" in terms of additional resources and missions. However, much uncertainty about the consequences of climate change for the future role of armed forces remains dominant, precluding a dominant discourse on prescriptions on what to expect and what to do. The following two sections aim at advancing the discussion by first providing a classification of potential future roles and functions of armed forces in more detail and then assessing the prevalence of these military futures in a set of relevant documents.

Consequences of climate change for armed forces

Potential pathways

The following classification of possible future roles and functions of armed forces, called "military futures", is based on a collection of suggestions found in relevant documents and the literature summarized above. Most of the examples are drawn from the United States and the United Kingdom, the two countries, in which the links between climate change and the military have been most vigorously debated (Brzoska 2012a). While not exhaustive, the six potential "military futures" identified below as possible consequences of climate change for armed forces capture a large part of the various strands of the debate outlined above. By themselves, these "military futures" represent ideal types, which are often combined in particular documents and discussions. While being useful to illustrate different perspectives on the future armed forces, the six' military futures should not be considered to be exclusive. They are likely to influence the future of armed forces in some combination, if at all.

Each of the "military futures" is marked by a particular perspective of the way, in which climate change is expected to affect armed forces. These perspectives will be further explained below. They have consequences for the major characteristics of armed forces, reflecting inputs, internal workings, and output of these institutions. Three dimensions reflecting these characteristics seem to be of particular relevance in relation to climate change (see Table 1). One is the potential changes in what armed forces are actually used for. Force functions may or may not change with climate

	force functions	**force structures**	**financial resource allocations**
"greener" military	little change; some reluctance to perform energy intensive operations (Air Force)	little change, some reductions in energy intensive elements (Air Force, Navy)	additional costs through investments into alternative energy; energy savings
"leaner" military	focus on high-priority functions	focus on elite forces	shifts away from military spending to finance climate change mitigation and adaptation
climate change "victims"	none	none	additional costs to preserve base structures and operational capabilities
armed "rescuers"	greater emphasis on disaster management capacities	increased air assets, logistics, equipment for disaster management	additional costs to enhance disaster management capabilities
armed humanitarians	greater emphasis on capacities for low-violence interventions	more transport assets, ground forces for peace-keeping	additional costs for low-violence interventions
climate warriors	greater emphasis on war fighting	more military assets for war-fighting	additional costs for military investments across the board

Table 1: Potential climate change induced changes (compared to baseline without climate change).

change, depending on differing perspectives of the implications of climate change for armed forces. Another indicator is the funding of armed forces. As climate change mitigation and adaptation are costly, there are financial trade-offs.

On the other hand, additional functions of armed forces associated with climate change require additional funding. A third indicator is changes in the composition of armed forces, the relative importance of elements of armed forces performing particular functions. Certain operational elements may become more, or less, important with climate change.

"Greener" military

One aspect of the debate on climate change and the military has been that it has directed a spotlight on armed forces as a major producer of greenhouse gases (see e. g. Klare 2003). While there are no reliable estimates of the global greenhouse gas production by militaries, it is likely that their shares in global greenhouse gas production

are similar or higher than the shares of military expenditures in global income because of energy intensive activities such as transport and flying.

By far the largest consumer of energy and producer of greenhouse gases in the world is the US military. Its size, global spread, and military action in places distant from most major installations, such as Afghanistan during the military intervention there, make the Pentagon's agency in charge of supplying energy to the largest single customer of energy in the world.

US armed forces have seriously begun to take energy considerations into account for the full spectrum of their activities (Brzoska 2012a, Thomas 2017; CSA 2018). They have defined energy saving goals and objectives in operations, including combat operations, as well as acquisitions. One of the objectives is the increased use of alternative energy. Substantial amounts of money have been invested in solar and wind energy on military bases as well as the adaptation of systems, such as aircrafts and warships, to use biofuels. Reporting and inspection schemes have been developed and more and more data on energy use by the US armed forces is becoming available (United States 2011; 2016). It is difficult to assess the effects of all these activities compared to changes in US military engagements, particularly the partial withdrawal of troops in Afghanistan. However, overall energy consumption and production of greenhouse gases have been reduced substantially, from 110 billion barrels in 2011 to 90 billion barrels in 2016 (United States 2017). The UK Ministry of Defense (MOD) and military have also adopted substantive measures to reduce greenhouse gas emissions. As in the case of the US, it is difficult to separate efforts to "green" the military to changes in military deployments. Still, the consumption of fuel and production of greenhouse gases have been reduced substantially since 2009 (United Kingdom 2018). Little is known about efforts in other countries. The potential to save energy and reduce greenhouse gas emissions is clearly substantial within the current spectrum of military activities, particularly, with respect to flying and other activities requiring substantial amounts of fuel. "Greening" the military is not necessarily about changing its functions (Table 1), but is obviously linked to military deployments and operations. Saving energy also saves costs; developing alternative energy, however, requires additional investments.

"Leaner" military

Mitigation and adaptation to climate change require investments. In view of the uncertainty of future security risks of climate change and the role of the armed forces in meeting them, defense ministries might be expected to find it harder to justify the allocation of resources to the military. Furthermore, one can argue that the prevention

of potential conflicts through spending to limit climate change before conflicts arise is a smarter strategy than investing in the military to later meet these risks (WBGU 2008).

Although this sounds logical, there is little evidence that this argument has been used, successfully or not, in political decision-making on military budgets. However, there is more evidence of an indirect link in many countries, via the distribution of financial austerity measures over government departments. In NATO countries, for instance, military spending has declined during the past few years (SIPRI 2018).

Beyond mitigation, a feature that might facilitate funding shifts away from the military is the increase in general debates on security of comprehensive concepts such as risks and threats. Rather than giving the military a privileged role in providing for security, as was the case with traditional security thinking, it becomes one actor among an assemblage of actors and practices funded to prevent and manage future risks. Climate change, marked by a high degree of uncertainty about its consequences, is one of the risks, for which a good number of actors, such as disaster management organizations, can legitimately claim resources for management purposes.

Global military spending amounted to about 1.7 trillion US dollar in 2017 (SIPRI 2018). Obviously, this offers major opportunities for the redirection of financial resources. Governments wishing to find money for investments into mitigation or adaptation measures therefore might find it attractive to reduce their expenditures on armed forces. The armed forces resulting from such cuts will only be able to perform some of their earlier functions. They are also likely to be "trimmer", with a focus on elite forces (Table 1).

Climate "victims"

One of the effects of climate change on the military mentioned in the secondary literature and some official documents is the threat to low-lying military installations, particularly naval bases. Both in the US and the UK, assessments of the dangers of sea-level rise for bases have been initiated, which conclude that costs of adapting military installations to higher sea levels will be substantial (National Academy of Sciences 2011; US GAO 2014; United States 2014; Union of Concerned Scientists 2016, United Kingdom 2009).

Beyond costs, climate change may have geostrategic implications. It has been argued, for instance, that costs for oversee deployments may rise with the greater likelihood of extreme weather (Foresight 2011, 46). If governments choose to maintain deployments, they will have to allocate additional funding to their armed forces.

Armed "rescuers"

As most predictions of climate change indicate an increase in extreme weather, it is very likely that the number and intensity of disasters will grow. This, in turn, will increase the demand for disaster management.

Disaster management is done by a host of local, national, and global organizations, public, volunteer, and private. Armed forces are already often involved in disaster prevention, management, and relief, both within their home countries and abroad (Schnabel and Krupnaski 2012, Scott and Kahn 2016).

Equipping armed forces with additional capabilities to perform functions related to disaster management will lead to changes in force structures. Additional assets will be required; elements of armed forces able to perform rescue tasks have to be expanded (Oxfam and CNA 2011). A major justification is the associated costs. Armed forces are generally judged to be a cost-effective solution to disaster management because personnel and equipment are predominantly employed for other purposes and only directed to disaster management in times of need.

The role of armed forces in disaster management is partly limited in many countries because disaster management is seen as a civilian activity, within civilian legal and organizational frameworks. Using armed forces in disaster management can be seen as a form of "militarization", even if it occurs for beneficial purposes. One reason the government in Rangoon was reluctant to allow foreign organizations into Myanmar after the devastating cyclone Nargis in 2008 was its fear that foreign humanitarian support with military assets might lead to a military intervention, as indeed suggested by the French government at the time (Brzoska 2017).

Armed humanitarians

Beyond disaster relief, a frequent topic in publications and debates about the future consequences of climate change is complex humanitarian emergencies. These come about because of a confluence of consequences of climate change with a lack of capacity to deal with the causes of violent conflicts. They are marked by a combination of the threat or use of physical violence with shortages of food, housing, and other basic requirements. Examples include the lack of capacities of authorities to prevent disasters from fanning conflicts or the combination of major negative consequences of climate change with state collapse or refugee flows in conflict areas. Frequently, in the literature on climate change, complex emergencies are seen as a major future risk in conflict areas or those already marginalized economically (WBGU 2008; Smith and Vivekananda 2007).

Predictions of an increased number of military interventions by Western powers are often based on such assessments. For instance, authors of the UK Foresight report argue about the combination of climate change and violent conflict:

> […] in many countries that face the double-headed problem, the government is going to be either unwilling or unable – or both – to take on the task of adaptation and peacebuilding. […] The task of helping communities adapt to climate change cannot be left to such governments (Foresight 2011, 23)". Mabey et al write that "… security in the 21st century will require a major increase in the capacity to launch coordinated international humanitarian and preventive missions (Mabey et al. 2011, 133).

Few countries currently maintain armed forces that are optimized for such humanitarian interventions, implying the need to change force structures if the importance of this function increases. Even in countries, in which armed forces already focus on this role, a greater demand for such interventions will require additional funding (Table 1).

Climate warriors

As mentioned above, some authors have argued that climate change is likely to lead to national security problems, implying that larger militaries capable of fighting conventional wars will be needed. Some critics of the argument that climate change presents a national security problem have expressed their fear that climate change may be instrumentalized to legitimize larger and stronger militaries.

While there are many suggestions of future "climate wars" (e. g. Dyer 2008), few governments have adopted the view that climate change is likely to result in a traditional national security problem. Very informative in this respect are the debates on climate change, which have occurred in the UN Security Council in 2007, 2011, and 2018. The majority of governments argued that climate change was a "human security" issue; nonetheless, a good number denied that it was a security issue by any means. However, some of the biggest military powers, including the United States, the United Kingdom, and Russia, are among those who express fears about tensions rising with sea levels, water shortages, the melting of ice sheets, and other consequences of climate change that may amount to national security challenges.

Among the greatest worries are conflicts over resources, their shortage, but also their abundance. A prominent example of a region, in which climate change may change the availability of natural resources, is the Arctic. It is often seen as a region of future competition among major states, including Russia, the United States, and

potentially even China. This has already led to military planning and action in a number of countries (Bailes and Heininen 2012, Heininen 2014).

Other potential national security hot spots of climate change have been mentioned in the relevant literature. However, any prediction about future military action resulting from climate change is subject to the assumption that climate change will increase threats to national security. While climate change does have this potential, it need not be this way. As in the prominent case of the Arctic, other factors, including the interest to avoid wars, may offset the tensions created by climate change.

Military futures in overview

The consequences of climate change remain uncertain, and so do the possible changes in the perceived future requirements for armed forces. Predictions based on worst-case scenarios have little basis in current evidence, not only because of the associated uncertainties but also due to the inherently political nature of decisions over size, structure, and deployment of armed forces. The various "military futures" distinguished in this section have partly overlapping and partly differing consequences for armed forces (Table 1). Furthermore, they are partly complementary. Thus, the US military has been striving to become "greener" but at the same time more efficient in fighting wars for more than a decade.

Still, military planners and their masters in governments and parliaments will have to make choices among military and other budget spending as well as about what to prioritize among the potential roles and functions of armed forces. These choices are inherently a political decision, an issue I will turn to in the next section.

Choosing military futures – the evidence from national security documents

Introducing the data set

This section will focus on the available evidence about what decision makers have authorized as views about the future of armed forces in the wake of climate change. The emphasis of the analysis thus shifts from general suggestions on the military implications of climate change to the examination of how changes of the role and functions of armed forces as a result of climate change are described in authoritative documents on military planning. The classification developed above is used for this purpose. Sources for the analysis are official authoritative documents such as white

papers and similar official documents on national security and defense planning (see also Brzoska 2012). In total, 53 documents from 38 countries made public between 2001 and 2013 were analyzed (see Brzoska 2015 for more detail). They were collected through an extensive internet search for documents authorized by governments or Ministries of Defense, describing the role of armed forces in national security policies. Because for many countries such documents are not available or not published on the internet, the set of documents used here is not representative. It has a strong bias towards countries from the global North with open political systems and above average per capita income. Still, it presents a fairly broad array of perceptions of the consequences of climate change for military planning. Very few documents contain direct references to future roles and functions of armed forces. However, many contain lines of arguments which imply preferences for one or more of the military futures. Both instances of evidence of perceived links between climate change and the military were linked to the six military futures identified above (Table 1) through a number of keywords, used as frames for the analysis of the documents. In order to capture those cases, in which climate change was not mentioned in a document at all or was explicitly mentioned as not being connected to security or not having an influence on military planning, a seventh analytical category of "naysayers" was added.

Two sets of frames were used. The first set relates to the explicit mentioning of consequences of climate change for armed forces. Such direct connections were related to the six "military futures" identified above (Table 2). The second set of frames relates more indirectly to potential futures for armed forces. It takes particular arguments about policy priorities to meet the challenge of climate change and identifies them as being relevant for the future of armed forces. To explain in more detail: Since the documents analyzed here all are about security, it is assumed that a policy priority on mitigation implies that armed forces should become "leaner" in order to increase the amount of financial resources available for the funding of mitigation. Where adaptation was emphasized as a priority in the documents, this is classified as providing arguments for a "greener military", one that is more adapted to future ecological requirements. Similarly, where "resource re-allocation" was mentioned in the documents as a necessary response to climate change, this was classified as the proposition of a "greener military". These frames are assumed to prioritize particular military futures but may also support other changes in armed forces as well. For instance, arguing for the need for adaptation may not only intend to reduce the energy consumption of armed forces but also be a reaction to expected future vulnerabilities. In both the US and the UK, threats to military installations were a major driving force for adapting energy saving projects[2].

[2] I am grateful to Delf Rothe for making me aware of this argument.

	"military futures"						
	"greener"	**"leaner"**	**"victims"**	**"rescuers"**	**"humanitarians"**	**"warriors"**	**"naysayers"**
consequences of climate change for armed forces	"greening"	reduced role of armed forces	threat to military installations	military disaster management capacities	flexible forces	military power and preparedness	none
primary response to climate change in documents	Adaptation, Resource re-allocation	Mitigation	adapt military installations	disaster management	humanitarian action	increase military preparedness	exclude military

Table 2: Frames for the classification of "military futures".

The framing was more straightforward where "disaster management" or humanitarian action was prioritized, as these relate fairly directly to the above identified "military futures", even when the armed forces were not explicitly mentioned as actors performing these functions.

In total, 79 such frames were found in the 53 documents. The following sections first provide a frequency count of the six military futures, which is then enhanced by a time perspective. Two additional sections address the question of potential drivers of different military futures. Two such potential drivers are investigated: the perception of the extent of the threat emanating from climate change and the power status of the relevant governments responsible for the documents. Data for the first driver are also taken from these documents, while the power status is taken from a standard source. These two drivers certainly do not exhaust the list of possible factors influencing perceptions of the effects of climate change on armed forces but rather represent a first attempt at finding explanations.

The quantitative distribution of "military futures"

Among the "military futures", the storyline of the armed forces as "rescuers" is found most frequently in the documents analyzed here (Table 3). This is in line with other research that also found disaster management to be the predominant response to climate change connected with the future of armed forces (Oels 2011; Oels 2012, Brzoska 2012). To some extent, this reflects the high degree of uncertainty about the consequences of climate change, which may be of relevance for armed forces. After the frames linked to "rescuers", three others add up to a similar number of counts, namely "leaner", "greener", and "humanitarians" ("naysayer" frames are similarly

frequent). These military futures, while clearly less frequently mentioned than "rescuers", are found in a diversified set of countries. This is different for the two remaining categories, which are mentioned least frequently, "warriors" and "victims". These frames were only found in official documents from the United States, the United Kingdom, Canada, and Australia.

leaner	rescuers	warriors	greener	humanitarians	victims	naysayers
15 %	38 %	6 %	14 %	11 %	3 %	13 %

Table 3: Incidence of "military futures" in official defense documents. Percentage of frame occurrences.

Priorities over time

The debate about potential security impacts of climate change began in the late 1990s and reached a peak in 2007/2008. There is reason to expect that perceptions of the future role of armed forces have changed with the ups and downs of this debate. The analysis of relevant security documents is therefore divided into three periods: documents published prior to 2007, those published during the period of intense debate on the security implications of climate change in 2007/2008, and documents published after 2008 (Table 4).

There are trends over time but there are also some distinct differences between these three periods. The number of documents without any mentioning of climate change or explicitly denying that climate change is a security threat has dropped considerably. The intense debate on climate change and security during 2007/2008 obviously made it difficult for governments not to take a stance in official documents on security strategies and defense planning.

The share of governments indicating a role of armed forces as "rescuers" has declined concurrently. While this remains the most frequently mentioned category, its relative incidence has decreased markedly after 2008. This may be less due to a decreased acceptance of a military role in disaster management in the future but rather to the global financial crisis beginning in 2007. The increased pressure on public finances may have reduced the willingness to propose an increased role of armed forces in disaster management. The data on "leaner" militaries in the future at least also points in this direction. The share of documents that mention the need to reallocate finances and to put an emphasis on mitigation has doubled between the first and the third period, with a big jump after 2008.

period	greener	leaner	victims	rescuers	humani-tarians	warriors	naysayers
pre-2007	6 %	11 %	0 %	50 %	0 %	6 %	28 %
2007/2008	14 %	10 %	7 %	41 %	14 %	7 %	7 %
post-2008	19 %	22 %	0 %	28 %	16 %	6 %	9 %

Table 4: Predominant "military futures" in defense planning documents over time Percentage of frame counts.

The mentioning of a "greener" future for armed forces has continuously grown, from very small to substantial. While again fiscal issues may have played a role, there seems to be a growing perception that armed forces can substantially contribute to climate change mitigation. It is quite likely that this increase in the official recognition of the need to "green" armed forces reflects broader programs for the reduction of greenhouse gas production, as in the cases of the United Kingdom and the United States mentioned above.

The number of instances, in which armed forces are seen to have a role in complex emergencies ("humanitarians"), has increased as well. Again, the debate in 2007/2008 has had an impact, elevating this "military future" from one being discussed as an option in the secondary literature to one being mentioned in official documents. However, the number of governments that foresee a growing fighting role of armed forces remains low. Correspondingly, the share of the "warriors" category, where climate change is linked to military actions for national security, has not grown.

In summary, the period of intense debate on climate change and security during 2007/2008 seems to have substantially increased the awareness of potential consequences of climate change for armed forces. At the same time, perceptions of what these consequences might be have not converged but rather widened. The analysis here thus confirms the research on a general failure to "securitize" climate change. The majority of governments continue to resist the ideas of linking climate change to "hard" security and requiring military action in the future. They still see the need to change their militaries, predominantly by making them "greener" and "leaner".

Perception of climate change as a threat and military futures

Does the way in which climate change is perceived make a difference for the kind of "military future" one foresees? Many of the documents analyzed here contain assessments of the importance of climate change as a future threat for security. However, perceptions of the type of the future extent of climate change differ. These were

coded into four "threat levels" of climate change: None/negligible (this also includes the lack of mentioning of climate change in the document), minor, emerging, potentially large, and major[3].

The data presented in Table 5 indicate that the perception of the severity of climate change, and in particular its relevance for security, makes a difference with respect to some of the potential "military futures". Differences are notable, for instance, for the category of "leaner" militaries, which gets more prominent with increasing perception of the importance of climate change. The same holds for "humanitarians", where the opposite is the case. Obviously, the category of naysayers not seeing climate change as a security issue or not seeing any role for armed forces in future climate change is particularly large when climate change is seen as no or only a negligible threat. For other "military futures", however, no systematic difference is notable in the perception of the danger of climate change.

climate change threat	greener	leaner	victims	rescuers	humanitarians	warriors	naysayers
none or negligible	0 %	6 %	0 %	29 %	12 %	0 %	53 %
minor	9 %	18 %	0 %	55 %	0 %	9 %	9 %
emerging	24 %	10 %	0 %	48 %	10 %	10 %	0 %
potentially large	8 %	23 %	8 %	38 %	8 %	15 %	0 %
major	22 %	22 %	6 %	22 %	22 %	6 %	0 %

Table 5: Climate change threats and "military futures" - Percentage of total frame counts.

Powerful versus small countries?

Another possible explanation for differing "military futures" are security policies of governments, particularly with respect to the role they intend to play in global power politics. In an attempt to analyze this potential explanation, countries were grouped into four categories indicating different levels of "power": Major powers, regional powers, local powers, and small states. The classification of countries into these groups is based on the Composite Index of National Capability (CINC), initially created by J. David Singer and maintained by the Correlates of War project.[4] It attempts to measure "hard power" by using the averages of the percentages of a particular country's indices in world rankings of six different components representing demographic, economic, and military strength.

[3] For coding rules and procedures, see Brzoska 2015.

[4] For details of composition and data see http://www.correlatesofwar.org/data-sets/national-material-capabilities, last accessed 5 August 2020.

power status	greener	leaner	victims	rescuers	humanitarians	warriors	naysayers
minor	14 %	21 %	0 %	50 %	4 %	0 %	11 %
local	12 %	18 %	0 %	41 %	6 %	12 %	12 %
regional	15 %	5 %	5 %	25 %	20 %	5 %	25 %
major	13 %	13 %	7 %	27 %	20 %	20 %	0 %

Table 6: Power status and "military futures" - Percentage of frame counts.

The data (Table 6) show that "hard" power is important for explaining the perceptions of climate change on the future of armed forces. However, it does not suffice as an explanatory factor. Governments differ in their views about "military futures" even if they are in the same power category. This is particularly obvious for the two major powers China and the United States, at least as reflected in the documents published since 2007. While documents from the United States since 2007 portray climate change as a major threat that will shape the future of armed forces in many ways, the Chinese government refuses to consider climate change a traditional security issue. Implications for armed forces are only foreseen in the field of disaster management. However, China is somewhat atypical. In general, perceptions of future roles correspond with the expectation that power does make a difference. States that are more powerful expect militaries to become leaner or "rescuers" less frequently. Instead, they increasingly expect armed forces to have a role in complex emergencies, and even to become victims and warriors. Their generally wider range and greater importance of military efforts also reaffirm their expectations of the consequences of climate change for armed forces.

Conclusions

Climate change has become an issue for armed forces worldwide (Carmen et al 2010; Holland and Vagg 2013). The number of governments that do not explicitly foresee or imply the need for changes in the functions, internal structure and funding of armed forces when presenting their views of national security and the future of armed forces has become rather small.

It is shown that the intensive debate on the security implications of climate change in 2007/2008 has raised the level of attention towards the implications of climate change in security institutions worldwide. Potential consequences of climate change have added another justification for expanding armed forces but have also raised the possibility that funding for armed forces will be cut in order to reallocate

money away from armed forces towards investments into climate change mitigation and adaptation. There is a wide divergence of perceptions of changes concerning future shape, size, and structure of armed forces to expect with climate change. The documents analyzed here indicate a broadening of the range of perceptions of the consequences of climate change for armed forces. The most frequent response to the expected challenges is the indication to increase disaster management capacities. However, the relative importance of this "military future" has decreased over the past ten years or so, when climate change first became an issue in documents on security strategies and defense planning. Responses have become more differentiated, albeit not necessarily in the same direction. In some countries the emphasis lies on making the armed forces "greener", in others it is on increasing their capabilities to successfully address complex emergencies.

Climate change has become a standard issue in national security thinking and defense planning. However, with the exception of a few countries over certain periods (US, UK), climate change has not been a dominating issue. Thus, indications of the effects of climate change on force planning are generally embedded in broader perceptions of the roles of armed forces. Armed forces, which are already used for power projection, are seen as facing a new threat, while militaries that predominantly already have "secondary" functions are predicted to remain focused on these. A general perception of the importance of climate change, combined with much uncertainty about its consequences, seems to feed the expectation that climate change will amplify already existing priorities of armed forces. There are only a few cases, albeit growing in numbers, where investments in climate change mitigation and adaption are already on their way. Correspondingly, "national security" is one of the least-mentioned sectors for which adaptive responses are reported in a recent survey of National Communications prepared by 117 parties to the United Nations Framework Convention on Climate Change (UNFCCC) (Lesnikowski et al 2015, 287). Judging by the official documents analyzed here, climate change has not been generally "militarized" in the way some other threats have in the past, most notably during the Cold War. Tendencies to so, which were notable in 2007/2008 can only be detected in a few countries, such as the US and the UK, and have been weakened since then even in these instances. In the majority of cases, climate change has become another legitimization for the allocation of resources to armed forces, based on the argument that there will be a necessity for increased demand for military capabilities, even though there is no clear understanding of its specificity.

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