MISTRA

Scoping study

Sustainable Defence in a Challenging Environment

Framing a new Mistra programme

November 2025

Author: Dan Smith

With the support of a reference group of
Dr Jürg Staudenmann (Switzerland) Wyss Academy for Nature;
Dr Rod Schoonover (USA) Georgetown University and Ecological Futures Group

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Introduction

At the June 2025 NATO summit, the alliance's member states agreed to increase military spending to 5 per cent of GDP by 2035, comprising at least 3.5 per cent on core security and up to 1.5 per cent on infrastructure.[1] Not all NATO states have committed themselves to this target and, because of competing needs for financial resources, it is a realistic prospect that not all who have committed to it will reach it. For the same reason, there will likely be diverse interpretations of what expenditure qualifies for the second element. Sweden, however, has committed itself to this target and will likely be serious about aiming to achieve it.

Against this background Mistra has commissioned a report to frame a research programme aimed at addressing the linkages between defence and security considerations on the one hand and ecological sustainability on the other.

This report begins with the context and, from that, the aim of this research programme. On that basis the report then outlines six considerations that could be borne in mind when shaping the programme and, from those considerations, derives four research streams. The report finishes with some suggestions about how the programme might look and offers an appendix on some of the terminology it uses.

1 *The Hague Summit Declaration*, NATO, 25 June 2025, https://www.nato.int/en/about-us/official-texts-and-resources/official-texts/2025/06/25/the-hague-summit-declaration.

The dual context

The underlying rationale of NATO's June decision is the darkening security horizon. Russia's February 2022 escalation of its war against Ukraine with the full-scale invasion drives that perception and the corresponding rationale for a stronger defence. In cyberspace, under the sea, in the air with drones, in outer space, and in a new arms race there are other, equally important parts of the picture. Of less geographic immediacy for Europe, but featuring strongly in the background, is the complex and insecure relationship with China. Pressure from the USA to increase NATO states' military spending is also important. It predates the escalation in Ukraine and is likely to persist, whatever the outcome of the 2028 US presidential election. All these elements combine to form one part of the context for consideration of a new Mistra programme.

The second part of the context is formed by disruptive and accelerating changes in the natural environment. According to UNEP's *Emissions Gap Report 2025*, the goal of keeping global warming to less than 1.5°C above the pre-industrial average will "very likely" be missed in the coming decade.[2] This is just one part of a broader pattern of ecological disruption that includes loss of biodiversity and biomass, pollution of multiple spaces (including the human body) by multiple novel entities, disruption of the hydrological and nutrient cycles, widespread loss of soil quality, and increases in antimicrobial resistance and in invasive species.[3]

Each of these contextual issues is an era-defining challenge for research, policy and politics alike. The proposed Mistra programme will set out to tackle how they are connected, and how their connections can be addressed.

2 *Emissions Gap Report 2025: Off Target*, UNEP, https://wedocs.unep.org/20.500.11822/48854; 'For the first time, climate models show the 1.5°C goal is dead', *The Economist*, 4 Nov 2025, https://www.economist.com/graphic-detail/2025/11/04/for-the-first-time-climate-models-show-the-15c-goal-is-dead.

3 *2024 Living Planet Report: A system in Peril*, WWF 2024, https://www.worldwildlife.org/publications/2024-living-planet-report/; *Towards a Pollution-Free Planet*, UNEP 2018, https://wedocs.unep.org/items/4f38ebdc-e343-49b0-9b9d-f85084971f45; Global Commission on the Economics of Water, *The Economics of Water: Valuing the Hydrological Cycle as a Global Common Good*, OECD Environment Directorate, 2024, https://economicsofwater.watercommission.org/report/economics-of-water.pdf; *Soil Atlas 2024*, Heinrich Böll Stiftung, 2024, https://eu.boell.org/sites/default/files/2024-11/soilatlas2024_web_20241112.pdf; J O'Neill, *Tackling Drug-Resistant Infections Globally: Final Report and Recommendations*, The Review on Antimicrobial Resistance, 2016, https://www.scirp.org/reference/referencespapers?referenceid=2618400; *Summary for Policymakers of the Thematic Assessment Report on Invasive Alien Species and their Control of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*, IPBES secretariat, 2023, https://doi.org/10.5281/zenodo.7430692.

Programme aim

The overall aim is to explore relationships between defence and security considerations on the one hand and ecological sustainability on the other. These relationships are diverse: the causal connections go in both directions, operate at multiple levels (national, local, regional and transnational) and timescales, and include both synergies and siloisation.

The idea for the new programme is sparked by the NATO summit decision in June. In other words, it comes out of a political moment. It is, accordingly, part of the aim of the programme that it speaks to that political moment. This influences what issues the programme will prioritise, who participates in it, what deliverables it will seek to provide, and what audiences it wants to address.

Speaking to that political moment, there are two versions of the aim. One would be to contribute to minimizing to zero both the potential negative environmental impact of increased military expenditure, industry, infrastructure and operations, and the diversion of financial resources and political focus away from necessary (and already belated) policies and action to mitigate ecological disruption and its impact. A more ambitious version of the aim is to find a way in which enhancing national security and accelerating the green transition are mutually supportive. If the first version can be thought of as the principle of *Do No Harm*, the second is the intention to *Do Some Good*.

It is axiomatic that the programme will have a focus that is broader than Sweden. The issues are cross-border by definition: NATO is an international alliance; security threats come from outside Sweden and also affect other states; the ecological crisis does not respect national borders. The programme can include the international dimension in the way it shapes the conceptual background, in the focus and empirical basis of its individual research projects, and in the choice of participants in it.

In light of these considerations, the aim of a new Mistra programme could be formulated as follows:

1. To explore relationships between the priorities placed by government on defence and security considerations and on ecological sustainability;
2. To identify how harmful interactions between the two areas can be mitigated and minimized, and see how to highlight and operationalise positive interactions;
3. To connect the research and policy discussion about these issues in Sweden and its immediate neighbourhood with a broader, international context.

Angles of inquiry

The field of inquiry for this programme is potentially very big, encompassing the interactions of two fields, each of which encompasses a wide range of problems and is routinely addressed in a variety of disciplines. The task of this report is to find a relatively compact research approach for this potentially vast field. What, then, are factors to bear in mind in shaping the research programme so it can speak to the political moment that gave it birth, generate some useful policy thoughts, and link to related research and discussion in other countries?

1. There is widespread acceptance of the strategic need to increase military spending to build strength against the threat from Russia. As well as concern about kinetic warfare, this includes a growing awareness of more insidious and often cyber-based security challenges posed by Russian activity. The NATO decision in June establishes the scale of increase, containing two notional elements – a minimum of 3.5 per cent on core military activity and up to 1.5 per cent on infrastructure and "other security-related priorities". The decision has been widely interpreted as necessitating a build-up of NATO defence industrial capacity and activity. This in turn can be expected to have a heavy environmental footprint.
2. It is unarguable that the pressure of ecological disruption is increasing and it is not controversial to identify this as an existential threat to our way of life. The EU's five-yearly report says, "Europe is the fastest-warming continent on the planet; our climate is changing at an alarming rate, threatening security, public health, ecosystems, infrastructure and the economy."[4] A report by UK intelligence chiefs, which appears thus far to have been suppressed by the government, makes the same point.[5] So does NATO's *Strategic Foresight Analysis 2023*, which stated, "Climate breakdown and loss of biodiversity is the most consequential and, in the long-term, the most likely existential challenge."[6] One problem that NATO member states face is that a focus on one of these two era-defining challenges risks drawing attention and resources away from the other, undermining policy and action on it.
3. Research has identified a variety of relationships between defence and security, on the one hand, and the natural environment and ecological sustainability on the other. These include mediated two-way causality between environmental change and conflict risk, and high level relationships, also two-way, between environmental change and social, economic and political institutions at local, national

4 *Europe's environment and climate: knowledge for resilience, prosperity and sustainability: Europe's environment 2025 – main report*, European Environment Agency, 2025, https://www.eea.europa.eu/en/europe-environment-2025/main-report, p11.

5 F Harvey & H Horton, 'National security threatened by climate crisis, UK intelligence chiefs due to warn', *The Guardian*, 8 Oct 2025, https://www.theguardian.com/environment/2025/oct/08/national-security-threatened-climate-crisis-uk-defence-chiefs-warn.

6 *Strategic Foresight Analysis 2023*, NATO ACT, 2023, https://www.act.nato.int/wp-content/uploads/2024/05/SFA2023_rev2.pdf.

and international scales.[7] These interactions are often acknowledged in official policy, not least by NATO,[8] but are less well taken up by political leaders. Further research is needed to deepen as well as spread knowledge in these areas, a priority acknowledged in NATO's research programmes.[9]

4. The EU seeks a comprehensive reduction in ecological stress through the Green Deal. It is not on track to meet most of its 2030 targets.[10] The sensitive issue at the heart of the proposal for a new research programme in this area is the risk that increasing military expenditure on such a scale might sink the Green Deal. The challenge NATO states including Sweden face is to strengthen security against Russia without damaging security by exacerbating ecological disruption. But there is also a different way round to look at this. While it is an important objective to minimise the additional ecological disruption that increased military expenditure may cause, it could be productive to explore whether and how increasing military expenditure, with the industrial and infrastructural investment expected to result, could actually contribute to meeting Green Deal targets.

5. The world order is in crisis.[11] Toxic geopolitics appear to be reducing the appetite of the great powers and many of their respective allies for far-reaching cooperation on environmental issues and on other matters such as pandemic risk, trade, international crime and terrorism, at the exact historical moment when the need for it is growing. The global institutions of the UN and its agencies face increasing financial and political pressures that are summating as crises of legitimacy and efficacy. This affects both the context and the detail of policies and actions aimed at responding to the ecological and security challenges.

6. The use of evidence as the basis for policy and advocacy is declining. European and US politics are increasingly disfigured by statements and policies based purely on ideology or the arbitrary preference of key political actors. This goes along with a distaste for nuance and complexity in debate, discourse and policy. In a complex world, this is a problem for research programmes designed to address aspects of that complexity, such as how to balance the potentially competing requirements of national security and ecological security. A recently published study addresses the difficulties of implementing long-identified policies for which all the necessary technical tools exist unless standards of accuracy and honesty in public discourse are raised.[12] This facet of today's post-truth social and political patchwork may form a discomfiting influence on the reception and discussion of the programme's research and findings.

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7 In addition to material cited in notes 4, 5 and 6 above, see Björn-Ola Linnér, Henrik Carlsen & Therese Bennich, eds, *Handbook on the Geopolitics of Sustainability* (*Edward Elgar Publishing Ltd*, 2025), a product of the Mistra Geopolitics programme.

8 Cf the establishment of the NATO Climate Change and Security Centre of Excellence (CCASCOE), *https://ccascoe.org/*.

9 See NATO's Science for Peace and Security programme: *https://www.nato.int/en/about-us/organization/nato-structure/science-for-peace-and-security-hub/key-priorities*.

10 Only two-thirds of the 2030 policy targets have been quantified, and of the 22 out of 35 for which there are metrics, only two are on track to be met on time: *https://www.eea.europa.eu/en/europe-environment-2025/main-report*, p17.

11 D Smith, 'International stability and human security in 2023', *SIPRI Yearbook 2024*, Oxford University Press, 2024, *https://www.sipri.org/sites/default/files/YB24%2001%20Intro.pdf*.

12 M Berners-Lee, *A Climate of Truth*, Cambridge University Press, 2025.

Four research streams

Against this background, there seem to be four fruitful avenues to explore. Taken together, these could be articulated in a future call for proposals as the core research streams of the programme. In headline form, they are:

1. Establishing and analysing the underlying data;
2. Identifying not only the trade-offs but also and especially the potential synergies between different policy objectives;
3. Developing theory in different academic fields to address the present ecological and geopolitical moment;
4. A fuller exploration of environment-security interactions than yet achieved.

To fill out the picture, there follows a non-comprehensive set of possibilities below:

Research stream 1: Establishing and analysing the underlying data

There are inevitable and irreducible uncertainties in the prospects of how NATO's June decision will be implemented. These include whether all countries will carry the decision out, likely opportunity costs in government budgets, and choices about the focus of increased spending (e.g., which arms of the armed forces and whether emphasizing more personnel or procurement). Moreover, there is reason to believe that NATO Europe lacks the capacity to satisfy its own likely level of demand for new military equipment.[13] That complicates assessments both of the likely scale of environmental impact and of options for a tech input to the Green Deal (further discussed below).

Accordingly, it would not be out of place for the programme to include a systematic effort to delve into the data on the likely scale of activities, producing both interesting analysis and statistical underpinning for other research streams.

i Based on the data and knowledge about budgeting processes and economic prospects, it would be possible to model the shape of a defence budget of the projected size, with the details differing according to different choices about force structure. This could depict what the defence establishment would probably look like if it were resourced by 3.5% of Sweden's GDP (amounting to a tripling of the share in just two decades). The same analysis could be undertaken on a NATO Europe scale. A similar exercise might be possible with the 1.5% proposed for infrastructure, though there are more uncertainties, complicating the exercise.

ii As well as identifying likely components of the defence budget and infrastructural spending, it is important to try to gauge what impact the decision will have

13 'Europe's defence firms are flying. Now for the hard part', *The Economist*, 30 Oct 2025.

on other categories of government spending. Again there is a range of options but it is both possible and worthwhile to track the impact through the system.

iii If NATO Europe lacks capacity to satisfy its own demand for military equipment (see note 13), it will increase imports. Primary suppliers are likely to be the USA and South Korea. Import of military equipment equates to the export of environmental impact and technological advance. Exploring this aspect would fill out the evidence base for some of the studies within the new programme.

Research stream 2: From trade-offs to synergies

The relationship between different policy objectives such as a secure defence and ecological sustainability is often thought of in terms of zero-sum outcomes and trade-offs because resources available for one are unavailable for another, while the activity in one may impose a cost on the other. The aim in this research stream would be to re-imagine trade-offs as opportunities for co-benefits and deliberate strategic convergences. Then, "both/and" replaces "either/or" in a systematic search for synergies based on both risk assessment and the aim of optimal cost-effectiveness.

i Europe's fossil fuel dependence on Russia suggests a positive synergy between energy independence and renewables. Renewables now account for just over 40% of world electricity supply.[14] Further and quicker growth in renewables is needed to restrain global warming, especially if currently stalled progress on providing universal access to electricity is resumed.[15] This suggests that reducing energy vulnerability could combine mitigation of both environmental and geopolitical risk in one policy package.

ii Studies suggest European societies will likely need to make greater efforts to have access to key resources in coming decades.[16] Risks if access is inadequate include insecurity of water supply, food insecurity, and loss of biodiversity.[17] Managing the appetite for natural resources (e.g., through the circular economy) is therefore part of risk management. Again, reducing vulnerabilities resulting from ecological disruption can be combined with reducing geopolitical and conflict risk in a single package.

iii In both the 'soft' 1.5 per cent part of the planned increase in spending and the 'hard' 3.5 percent, there will be increased investment. Flipping the normal narrative, it is worth exploring how increasing military expenditure could be done in such a way that it supports the Green Deal.[18] Part of what this is about is often known as greening the military by reducing GHG emissions and energy consumption. The military will likely be on board with greening as long as it does not reduce operational standards, and especially if it enhances operational security.[19]

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14 E Graham *et al*, *Global Electricity Review 2025*, Ember, 8 Apr 2025, *https://ember-energy.org/latest-insights/global-electricity-review-2025/*.

15 *World Energy Outlook 2025*, International Energy Agency: (to restrain global warming) *https://www.iea.org/energy-system/renewables*; (lack access to electricity) *https://www.iea.org/commentaries/access-to-electricity-stagnates-leaving-globally-730-million-in-the-dark*.

16 *Critical raw materials*, European Commission, *https://single-market-economy.ec.europa.eu/sectors/raw-materials/areas-specific-interest/critical-raw-materials_en* (accessed 12 Nov 2025); S Bogojević, 'The European Green Deal, the rush for critical raw materials, and colonialism', *Transnational Legal Theory*, 2024, Vol. 15 No. 4, *https://www.tandfonline.com/doi/full/10.1080/20414005.2024.2399408*; V Correia *et al*, 'Invisible Mining: Addressing EU Raw Material Challenges Through Technological Innovation', *Intereconomics*, 2024, Vo. 59, No. 6, 344-351, *https://www.intereconomics.eu/contents/year/2024/number/6/article/invisible-mining-addressing-eu-raw-material-challenges-through-technological-innovation.html*.

17 *Sustainable use of key natural resources*, European Commission, *https://commission.europa.eu/topics/environment/sustainable-use-key-natural-resources_en* (accessed 12 Nov 2025).

18 I Rentzhog, 'How A Fossil-Free Military Could Save Europe's Economy', *Forbes*, 11 Mar 2025, *https://www.forbes.com/sites/we-dont-have-time/2025/03/11/how-a-fossil-free-military-could-save-europes-economy/*.

19 Remarks by Jens Stoltenberg, NATO Secretary-General, at COP 28 in Dubai, NATO, 1 Dec 2023, *https://www.nato.int/en/news-and-events/events/transcripts/2023/12/01/remarks*.

iv Synergistic effects for national security and the Green Deal are also available if infrastructure is built so as to be useful both in security emergencies and normal times.[20] This could be done in shoreline reinforcement and flood prevention, decentralization of infrastructure, civilian readiness, and improved environmental monitoring. This is not so much a spin-off from either the Green Deal or the NATO decision in June 2025 but rather of spin-in, of the planned convergence of diverse benefits in one product, process or system. In this perspective, the Green Deal could contribute to security and enhanced security could likewise contribute to fulfilling the Green Deal.

v One issue is how to manage and regulate a much larger defence and military-related marketplace and pass on the intention to gain co-benefits and positive synergies to the players in the market, industry and military alike. Concerning GHG emissions, it might be thought straightforward for government simply to issue instructions to be followed in procurement. However, most GHGe in a product's life-cycle and across corporate value chains do not arise directly from production but from earlier and later stages of the life-cycle and in more than one country[21] The same is true of other aspects of the environmental footprint. Current efforts to standardise GHG reporting over the full life cycle and value chains may have a key part to play in a new phase of government regulation of markets if they can also acknowledge the trans-border dimension.[22]

Research stream 3: New theoretical approaches

Most book-length explorations of the ecological crisis, some scholarly studies, many policy reports and untold numbers of op-eds and blogs conclude by emphasising the need for a new approach, a new way of thinking, a paradigm shift and the like.[23] Yes, but how would that look in practice? How deep and how wide does the change have to go? What would be the minimum change (in the name of parsimony) that would achieve the desired effect?

Such questions can seem both tempting and, yet, more the stuff of advocacy than of scholarly research. But they also get to the heart of the policy, academic and cultural challenges in a period when both national security and ecological security – so also human security – are under pressure. The combination of stressors is unprecedented in the modern era. Developing new theoretical approaches could be the key challenge in a new programme, calling on diverse disciplines and types of scholarship.

i Social psychological theory helps illuminate how political decisions are shaped by the perception and articulation of problems in general societal and political discourse.[24]

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20 *Greening the Armies*, EU GSC Analysis and Research Team, January 2024, *https://www.consilium.europa.eu/media/69607/art-greening-the-armies.pdf*; P Cormarie & SR Stephenson, 'Can NATO Supercharge Military Greening?' *RAND Research and Commentary*, 1 Dec 2025, *https://www.rand.org/pubs/commentary/2023/12/can-nato-supercharge-military-greening.html*.

21 'What are Scope 1, 2, and 3 emissions?', McKinsey, 17 Sept 2024, *https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-are-scope-1-2-and-3-emissions*.

22 'Carbon Footprint', UNEP Life Cycle Initiative, *https://www.lifecycleinitiative.org/starting-life-cycle-thinking/life-cycle-approaches/carbon-footprint/* (accessed 12 Nov 2025); I Makarov & S Alatas, 'Toward Consumption-Based GHG Emissions Accounting: From Calculation to Policy-Making', *International Organisations Research Journal*, 2024, Vol 19., No. 1, pp 85-105, *https://www.researchgate.net/publication/381568848_Toward_Consumption-Based_GHG_Emissions_Accounting_From_Calculation_to_Policy-Making*.

23 E.g., *Environment of Peace*, SIPRI, 2022, pp 76-80, *https://www.sipri.org/publications/2022/policy-reports/environment-peace-security-new-era-risk*.

24 See *inter alia* M Berners-Lee, *A Climate of Truth* (*cit*); KS Fielding & MJ Hornsey, 'Developing a social psychology of climate change', *European Journal of Social Psychology*, August 2014, Vol. 44, No. 5, pp 413-20, *https://doi.org/10.1002/ejsp.2058*; DK Sherman & L Van Boven, 'The connections, – and misconnections, – between the public and politicians over climate policy: A social psychological perspective', *Social Issues and Policy Review*, Jan 2024, Vol. 18, No. 1, *https://doi.org/10.1111/sipr.12104*.

ii International relations theory needs a shake-up. 'Realism' remains the dominant paradigm. In its purest versions (such as Morgenthau[25]), it cannot encompass ecological issues,[26] though efforts are sometimes made to show it can,[27] and it has trouble with cooperation that is not based on narrow self-interest.[28] One issue in current discussions is whether to start with the ecosphere or the state (leading to what is sometimes called 'ecological realism').[29] A new Mistra programme could both draw on this theoretical discussion and contribute much to its evolution.

iii As ecological disruption continues, interest has revived in the question of how societies collapse.[30] Looking at drivers of societal collapse and how it might be avoided needs to integrate – as collapse studies generally do – different disciplinary approaches ranging at least from anthropology to economics.[31] Going back to the classics, Tainter's approach – that societies collapse when the marginal costs of solving a new problem that was created by solutions to earlier ones are too high – might prove a fruitful source of insight into the dynamics that flow out of NATO's decision in June 2025.[32]

iv The term 'security' is contested and appears in numerous guises, e.g., national security (since the 1950s), human security (since 1994[33]) and ecological security (more recently[34]). Research could develop hypotheses underpinning an approach that integrates these three concerns into an understanding of a single security space.

Research stream 4: The two-way relationship

The first three research streams support a new approach to understanding the interactions between defence and national security issues and ecological sustainability. They could provide a platform for a better version of research on them than has so far been achieved. Under this heading, there is already a significant body of research but there remain plenty of opportunities, especially with a stronger body of data to work with, an understanding of synergies between different areas of government policy, and with fresh theoretical approaches to light the way.

i It would be worth taking a regional focus on the links between insecurity and ecological disruption. The Arctic and the Baltic are good examples. Ecological disruption is extreme in both – climate-related in the Arctic,[35] more broadly biotic in the Baltic[36] – and both are strategic epicentres in the new geopolitics.

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25 Morgenthau, H. J., *Politics Among Nations: The Struggle for Power and Peace*, (Alfred A. Knopf: New York, 1948).

26 See my argument in D Smith, *Elements of a Planetary Emergency: Environment of Peace (Part I)*, SIPRI, 2022, p40, https://www.sipri.org/sites/default/files/2023-01/elements_of_a_planetary_emergency-environment_of_peace_part_1.pdf.

27 K Sofer, 'The Realist Case for Climate Change Cooperation', *Center for American progress*, 30 Nov 2015, https://www.americanprogress.org/article/the-realist-case-for-climate-change-cooperation/.

28 JM Grieco, Anarchy and the Limits of Cooperation: A Realist Critique of the Newest Liberal Institutionalism', *International Organization*, Summer 1988, Vol. 342, No. 3, 485-507, https://www.jstor.org/stable/2706787.

29 McDonald, Matt (2021). *Ecological security: climate change and the construction of security* (Cambridge University Press, Cambridge); SM Patrick, 'The case for ecological realism', *World Politics Review*, 20 July 2020; and 'The US is waking up to climate change's security implications', *World Politics Review*, 8 Nov. 2021.

30 E.g., L Kemp, *Goliath's Curse* (London, Verso, 2025).

31 E.g., J Diamond, *Collapse: How societies choose to fail or survive* (London, Penguin, 2011).

32 J Tainter, *The Collapse of Complex Societies* (Cambridge University Press, 1988).

33 UN Development Programme, *Human Development Report 1994* (OUP New York, 1994).

34 R Schoonover & D Smith, *Five Urgent Questions on Ecological Security*, SIPRI, April 2023, https://www.sipri.org/sites/default/files/2023-04/five_urgent_questions_0.pdf

35 *The Arctic in a Changing Climate*, Arctic Council https://arctic-council.org/explore/topics/climate/ (accessed 20 Oct 2025); S Goodman *et al*, *Climate Change and Security in the Arctic*, Center for Climate security, Council on Strategic Risks & NUPI, Jan 2021, https://climateandsecurity.org/wp-content/uploads/2021/01/Climate-Change-and-Security-in-the-Arctic_CCS_NUPI_January-2021-1.pdf.

36 A Rimkuté, 'The Baltic Sea is suffocating from algae invasion, European farmers and agricultural policies', *VoxEurop*, 30 June 2025, https://voxeurop.eu/en/baltic-sea-suffocating-eutrophication-agriculture/.

ii Disruption of the Atlantic Meridional Overturning Circulation (AMOC) could have profound effects on society and security. While the nightmare of a complete stop is low probability, the AMOC's continued weakening is well-documented.[37] Best results might come from a mix of research, modelling and foresight workshops to address the uncertainties involved. Other regionally relevant tipping points (Mediterranean Basin hydrology, European glacier disappearance, etc.) also warrant study.

iii Environmental impact is an evident research theme of great potential interest within the new programme, meaning impact both in peace and in war.

a. The environmental impact of NATO's decision includes GHG emissions, land use and natural resource extraction. There is some research on military activities and GHGe, though relatively little has been peer-reviewed.[38] There is less on the military impact on land-use, with some results showing benefit for biodiversity and land cover, against advocacy organisations' expectations.[39] There is more on the effect of military spending decisions on natural resource extraction but mainly focusing on extraction in that country. NATO's decision, however, probably means increasing imports of critical minerals so impact will cross national borders. Overall, there are significant knowledge gaps about the environmental impact of military activities.

b. Knowledge about the environmental impact of war is available in studies of individual countries, such as Gaza, Sudan and Ukraine.[40] There are also studies on the weaponization of the natural environment in war.[41] The research, however, tends to leave a gap in knowledge about effects over distance and across borders.

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37 'What is the Atlantic Meridional Overturning Circulation (AMOC)?' National Ocean Service, *https://oceanservice.noaa.gov/facts/amoc.html* (accessed 20 Oct 2025).

38 S Parkinson, 'Military spending surge is critical threat to climate', *Responsible Science Journal*, No.8, Sept 2025, *https://www.sgr.org.uk/resources/military-spending-surge-critical-threat-climate*; A Keser *et al*, 'The Impact of Militarization and Industrialization as a Threat to Sustainable Environmental Development in NATO Countries', *Sustainable Development*, Aug 2025, *https://onlinelibrary.wiley.com/doi/10.1002/sd.70126*.

39 SR Sveningsen *et al*, 'Military land use and the impact on landscape: A study of land use history on Danish defence sites', *Land Use Policy*, Vol. 84, May 2019, 114-126, *https://doi.org/10.1016/j.landusepol.2019.02.041*; C Pascaline & G Sébastien, 'Contribution of military training areas for the conservation of calcareous grasslands', *Journal for Nature Conservation*, Vol. 78, March 2024, *https://www.sciencedirect.com/science/article/abs/pii/S1617138124000281*; World Beyond War, *No Basis for these Bases: The damage foreign military bases do in 2025*, WBW 14 July 2025; *https://worldbeyondwar.org/wp-content/uploads/2025/07/BasesReport2025g.pdf*.

40 UNEP, *Environmental Impact of the Escalation of Conflict in the Gaza Strip: Second assessment of environmental damage and recommendations for recovery and reconstruction planning*, 2025, *https://wedocs.unep.org/items/7aa1738b-c460-499b-9227-5818dbac66bc*; Conflict and Environment Observatory, *The environmental costs of the war in Sudan*, May 2025, *https://ceobs.org/the-environmental-costs-of-the-war-in-sudan/*; European Commission: Joint Research Centre, *Status of Environment and Climate in Ukraine*, European Union, 2025, *https://euagenda.eu/publications/status-of-environment-and-climate-in-ukraine*.

41 LH Risi & E Greenbaum, 'The Global Challenge of Water's Weaponization in War: Lessons from Yemen, Ukraine, and Libya', *Climate Diplomacy*, 23 Apr 2024, *https://climate-diplomacy.org/magazine/conflict/global-challenge-waters-weaponization-war-lessons-yemen-ukraine-and-libya*.

The research programme

Research stream 1 (underlying data) both provides a foundation of key data for the other three research streams and entails statistical analysis that is revealing and important in its own right. **Research stream 2** (synergies) could unlock some of the key issues faced in this programme in terms of understanding what to do and designing action that supports goals in defence and security goals as well as in environmental management and ecological sustainability. For that promise to be realised, **Research stream 3** (theory) is essential, because business as usual in the academic and research worlds will lead policy astray. **Research stream 4** (interactions) takes the programme into a much stronger analytical depiction of the relationships between the fields of national security and ecology than has so far been achieved.

There are various ways of designing a research programme comprised of these four streams of work. Figuring out what works best given capacities, ambitions and resources will be the task of applicants for the programme when everything is ready. But there are some key features of any programme that sets out to cover the ground laid out above. They include:

- Basic data on what the NATO decision directly entails, and on the future options it implies, for Sweden and other European states in terms of the scale of military spending, the military establishment, force structure, procurement and industrial investment. All these data points are needed for a consequential evidence base.
- A way to bring together in one policy package the mitigation and management of core vulnerabilities to ecological disruption and external threat. This is where the questions of how to maximise synergies and minimize zero-sum trade-offs will be addressed.
- Identifying and exploring the mechanisms, such as defence market regulation and incentives, by which green considerations become a part of defence policy and procurement and military preparations, so that enhanced security and the Green Deal contribute to each other.
- Making an original contribution to the theoretical foundations of research and knowledge on these linked security and ecological issues.
- Studies of interactions and vulnerability management in specific geographies such as the Arctic or the Baltic, or in conflict countries such as Gaza, Sudan and Ukraine.
- A creative discussion of response to potentially catastrophic tipping points such as AMOC – as they unfold rather than after they are complete – bringing in findings from risk-management, integrated security and collapse studies.
- Participation that is multi-sector (e.g., research, policy-oriented, private sector), multi-disciplinary, and transnational.
- A mixed methods approach to the practice of the research.
- A plan for speaking to the political moment of the dual security and ecological crisis – in other words, a plan for effective diffusion and dissemination of research conclusions to the most relevant audiences.

Appendix: Glossary

Precise definitions of the most important terms and concepts used in this report are hard to come by because they are all contested or at least ambiguous, sometimes for academic reasons, sometimes because of politics. The subject matter makes crisp definitions and distinctions elusive. That said, here are some indications of how this report uses nine terms:

Defence
An instrument for achieving security. It implies defensive aims, which can be misleading.

Ecological disruption and ecological security
Ecological disruption is a supra-concept covering climate change, biodiversity loss, pollution and other planetary stresses, and their consequences. Ecological security is a policy approach aimed at mitigating the resulting human and societal vulnerability.

Foresight
Foresight refers to a process of imagining possible future scenarios in order to work out how to minimise risk of negative developments and optimise benefits.

Geopolitics
Power-based, competitive relationships, especially but not exclusively concerning control of territory and natural resources, between those states that carry the greatest weight in a given geographic context – a region, a continent, an ocean, or the globe.

Peace
The most important concept in the field is the most slippery. The absence of armed conflict is generally referred to as negative peace. The conditions that rule out armed conflict create positive peace. The Global Peace Index identifies ***23 quantitative indicators*** of peace, and ***eight pillars of a peaceful society*** that include good governance, low levels of corruption, equitable distribution and a sound business environment. Other understandings of positive peace emphasise cooperation and relationships. Writing 1600 years ago, ***Augustine of Hippo*** argued justice was essential in a proper definition of peace. ***One helpful definition*** is simply that "Peace is when people resolve conflicts without using violence... (with) conditions that allow for respectful coexistence and positive social change." If there were no violence between people, against nature or against the future, a society would be about as peaceful as it can get.

Security
This is the second most slippery concept. The term has huge baggage and many uses (social security, security service, cyber security, etc). In many hands it refers purely to the security and benefit of the state. Counterposed to that is the notion of human security, emphasising individuals' well-being. Classical liberal theory suggests the purpose of the state is the well-being of the people, so state security and human security are complementary rather than counterposed. Alongside this pairing the concept of ecological security brings nature into the frame. An integrated security concept includes national (or state) security, human security and ecological security as three spheres within a single security space.

Ecological sustainability
An approach that maintains the integrity, stability and life support functions of earth systems so that human societies can thrive. The concept of ecology emphasises process, change and flow. Distinguishable from the more static of concept environmental sustainability in which the natural environment is not destroyed, even if it is changed by human action.

World order
The way in which international relations between states are arranged through institutions, treaties, laws and norms. As these four pillars of order weaken, so the world order changes.

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