SUSTAINABLE DEFENCE:
ECO-FRIENDLY INNOVATION AND ADAPTATION IN THE MILITARY

Interview with

LT GEN (RET.) RICHARD NUGEE

Former Executive Director for Climate Change & Net Zero UK MoD

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During your service, were environmental considerations incorporated into military operations, and can you provide moments that underscore their importance?

There are 2 types of environmental consideration. The first is about environmental protection, an approach that tries to reduce the damage done by military equipment and, to a limited extent the damage done by weapons, to the environment. Most of the protection is less about the effect on the environment (although some commanders will take this more seriously) and more about the potential hazards faced in the future by friendly troops, or even the local population being supported. Indeed, waste and spills can act as indicators as to where troops are or have been and are therefore detrimental to concealment and stealth. Thus, poisoning agricultural land through spills of oil etc is seen as harmful, and may be outside legal limits, and is thus paid attention to. This is not new, and Environmental Protection policy in defence has been around for a long period. Most of this however has been around the effect on land mass and on the oceans.

The second type is about the wider effect that militaries have on the environment in terms of carbon dioxide and other harmful emissions. Militaries have not concerned themselves with this in the past and have assumed, from the advent of coal fired ships to oil fired equipment in all 3 traditional domains – air, land and sea – that pursuing the objective is more important than any emissions. But with the growing awareness of the damage to climate change that the burning of fossil fuels creates, there is a growing industry of alternatives to fossil fuels. Many of these have both operational advantage for the military and may even cost less in whole life cycle terms. Therefore the military, like other sectors, are actively looking to see how they can reduce emissions, primarily to take advantage of novel technologies that provide other benefits. The most obvious of these is the use of alternative energy sources for static (base) locations such as solar, micro-nuclear, hydro or wind. Other sustainable approaches such as recycling, water production and other new approaches such as hydroponic food growth and 3D printing of spare parts, are also being actively considered. The benefit is not just saving money, but significantly reducing logistic resupply requirements and thus, in a contested environment, also releasing protection assets (armour, infantry, aviation) for alternative tasks. This will reduce cost, allow increased military capability to be brought to bear but also save lives; a significant number of casualties in Iraq and Afghanistan were suffered on logistic resupply patrols.

It should not be forgotten however that environmental considerations can and are also deliberately used as a weapon – the recent bombing of the dam in the Donbas in the Ukraine/Russia war, and through history use of scorched earth policies or destroying water supplies are useful examples.

Given the rising global environmental concerns, how crucial is it to integrate sustainable practices within the military framework?

This is key for a number of increasingly important reasons. Industry is moving to accommodate the requirements of non-military customers who are increasingly demanding sustainable practices. Indeed in some cases military contracts are being re-engineered to take out sustainable features as they are not stipulated in the requirements. So to take advantage of the way industry is reacting, it is vital that defence follows suit and also stipulates sustainable practices within procurement. Of course not only will this improve the environment but will in all probability reduce cost over the lifecycle of the purchase. Without such an approach there is a real possibility that defence will be stuck with stranded assets, extremely expensive to maintain and improve.

Society (in western democracies) is increasingly aware of the issues surrounding climate change, sustainability and is likely to demand changes. For defence to claim exemption will become increasingly unsustainable. Further there are already issues with recruiting into the Armed Forces and having no policy or limited policies that address sustainability is likely to further reduce defence's attractiveness for future employees/recruits in some parts of the Force.

Legally, there are a growing number of organisations and potentially individuals prepared to take governments and organisations to court over their sustainability performance. Whilst defence should always prioritise achieving its mission, it is taking unnecessary risk by not addressing and considering the potential environmental hazards from its actions.

Above all, however, the key issue is that new technology, particularly designed to increase sustainability and potentially self sufficiency and resilience, will be missed and not taken advantage of if defence ignores what is happening in this sector. There are great opportunities to deliver more effective and more efficient defence from the consideration of sustainability factors within defence. There will also be opportunities to save money in defence from considering the treatment of waste, avoiding landfill charges, to using waste to replace existing cost (such as burning waste to produce heat and electricity). Without considering what is available, defence would be missing out on potentially significant technological improvements.

How do you foresee climate change, especially its role in altering geopolitical landscapes, impacting future military strategies and priorities?

Climate change affects each nation's national security, albeit in different ways. There are 5 ways in which national security is affected:

Water: with the melting of the arctic and the opening of the passages through the arctic sea there is both the opportunity for raised tensions between Russia and the west, and potentially with China who have described themselves as a 'near-arctic' state. How the politics plays out is for the future, but already NATO and Russia are increasing their Forces in the region, either permanently (Russia) or through extensive exercises. But there are other ways that water affects national security: Lloyds of London suggest that in the future many of the existing cargo fleet around the world may not get insurance for much more extreme weather patterns. The potential for the Atlantic Meridional Overturning Circulation (AMOC) to fail or weaken significantly may alter the seasons and macro weather of the Northern hemisphere significantly, with implications for trade and food. Rising sea levels, even if some way off, have the potential to increase the likelihood of conflict within countries most affected, and between countries and potential adversaries. Further, fresh water as a resource may lead to conflict and certainly tension if used as a weapon, either by non-state (or even state) actors and the local population, or between states – the Great Ethiopian Renaissance Dam or the dams on the Mekong are good examples.

Food: food scarcity through the destruction of agriculture from drought, heat domes or wildfires is a distinct possibility. What that might engender is selling food at significantly higher prices or perhaps countries limiting the amount of exports that they are prepared to accept. For those countries that rely on imported food this could be difficult.

Energy: a move to renewable energy will both produce energy resilience and self sufficiency for more countries, which will loosen existing ties between exporters of energy (oil/gas) and importers (Saudi Arabia and the US for example, with a consequent clear shift by the Saudi government towards Russia and China), and will produce significant winners and losers. Winners will be those countries that have the raw materials (e.g. rare earths) that are needed for the energy transition and those that refine the raw materials (predominantly China) and the losers will be those that are over reliant on oil/gas for their GDP – Nigeria is a good example. Alliances will shift, as will the potential causes of war (arguably Japan went to war in WW2 in order to secure oil for their growing empire). The strategic direction of WW2 was to an extent governed by the need for oil.

Border/immigration: with a potential for a large number of misplaced persons (perhaps 1 in 10 of the world's population) and many of those (perhaps 20-25%) moving outside their own region, there is a prospect of mass movements of peoples. Not only will this prove very difficult to cope with for those countries where the refugees are likely to first land, this may also drive a push towards more reactionary (and right wing) politics, ultimately potentially threatening and overwhelming western democracies.

Personal/human: climate change is likely to cause increased numbers of storms, wildfires and droughts, more intense rainfall and increased flooding, and potentially the increase of toxic pathogens causing disease, all of which will drain a country's resources at exactly the time when conflict will be more likely. Militaries will also be distracted to deal with the aftermath of these events, leaving both their own defences and their ability to support alliances more vulnerable. This is turn may well again lead to different alliances of necessity.

From your perspective, what challenges or resistances might the military face in adopting more sustainable practices?

The most obvious resistance will be from those who believe that militaries should concentrate on their core purpose, and that anything else that does not contribute to the core purpose (now often being referred to as woke) is an unaffordable distraction. There is a strong lobby therefore that wilfully looks to avoid sustainability as an unnecessary and ill advised 'experiment'. This is often epitomised by the lobby that says that because a wholly electric tank is ridiculous, therefore all sustainable options are similarly ridiculous.

Resistance will also be felt by the lack of a whole lifecycle cost approach to operations and procurement. New, sustainable technology is often more expensive on purchase, but will save cost during the whole lifecycle. The financial paradigm in defence procurement is such that the value of ultimate savings is rarely taken into account when looking at the initial costs. This lack of whole lifecycle thinking will mean that more expensive but ultimately more efficient and effective equipment may not be bought. And some sustainable products are just more expensive, which brings with it a resistance from those who believe that just being sustainable is poor use of resources.

There are very real concerns over the potential for a loss of interoperability and interchangeability of parts and fuels etc as different countries approach sustainability in different ways. A single fuels policy for ships is essential for navies for example, and yet there is currently no agreed sustainable fuel that all navies have agreed on. Similarly sustainable aviation fuel and e-fuels have yet to be produced in sufficient quantity to make them economically viable.

Concerns over supply chains for sustainable products also provides resistance.

However, probably the biggest resistance is from the bureaucracy of the defence sector. If the system for procurement and the commercial frameworks do not include sustainability as a core part of all procurement or of social value (in the UK's case) then it will not be considered. Having to deal with new materials, new fuel systems and new environmental parameters has to be built into the requirement setting, programme management and procurement of defence's relationship with industry as without it, despite intentions to the contrary, sustainability will not be considered when it matters.

Drawing from historical military campaigns or exercises, can you emphasize the role of resource management in determining the success of operations?

In almost all military operations, the role of logistics is of crucial importance ("amateurs talk tactics, professionals talk logistics") and there are recent examples from the Russia/ Ukraine war where the Russian thrust towards Kyiv was halted because of a lack of logistics. Similarly in Afghanistan, the provision of fuel to Kandahar and Helmand demanded the attention of the Commander ISAF Joint Command as it was so vital to the war effort. Sustainable developments offer the opportunity for increased self-sufficiency, either through recycling waste, using technology to reduce the logistic resupply, or through modern techniques such as 3D printing.

A few examples:

At the tactical level, in Afghanistan, NATO troops left their generators for the benefit of the Afghan troops. Unfortunately each nation left its own type of generators, with each being of a different type, possibly different fuels and even different electricity outputs. As there were no common training manuals, spare parts or engineers the generous offer of electricity rapidly failed, with each generator eventually dying due to logistical chains that were not sustained. If solar panels had been used, this would not have been so inevitable.

At the operational level, the failure to provide sufficient protected logistic support stopped the Russian column from achieving its objective of Kyiv, with knock on effects for the whole campaign.

At the strategic level, in WW2, the German push towards the Caucasus (which became distracted by Stalingrad) and to the Suez canal (stopped at El Alamein) and the Japanese push into areas such as Malaya, were driven by the need to either seize the oil supply chain for the war effort, or deny the oil supply chain to others. So the strategic construct of both the Axis and Allied powers were designed to some extent around the need for oil to sustain the Armed Forces.

What advice would you offer today's military leaders and upcoming generations about weaving sustainability into their core ethos and practices?

The key is to start now ("if you don't deal with it today you will not be able to deal with it tomorrow") and to understand the landscape of what future technologies are likely to exist and how they can be used for military uses, to improve self-sufficiency, improve operational advantage and reduce reliance on supply chains. Understanding the landscape is vital to making the most of the opportunities. Further, by looking through a 'sustainability lens' (understanding what effect carbon has) at both procurement and operations, there is increased chance of understanding where savings could be made or capabilities enhanced. In one example, on a transit camp, new more sustainable buildings with reduced embedded carbon were not only more efficient and cost less to run, but were cheaper to build.
Sustainability is still not seen as a necessity, unlike for example Health and Safety. As a result it is more likely to be subject to the fashions of the moment, and less likely to be embedded. Therefore, it is imperative to build sustainability into the relevant infrastructure, bureaucracy and committees within Defence, so that in the future it has to be addressed and cannot be ignored. That way it will also seep into the culture and become much less dependent on individual champions making the case.

Taking a sustainable approach can build operational advantage and enhance military capability. Already there are examples of improved self-sufficiency and greater resilience from taking a different approach. By thinking laterally, it is quite possible to identify some of the opportunities, and these should be pursued. Importantly though, the narrative should not be about sustainability but about operational capability, as otherwise it is too easy to ignore.

Similarly, opportunities for saving money should be sought, on a whole life cycle cost basis as well as potentially on a capital expenditure basis, by looking at alternative sustainable approaches to any issue, equipment or process.

Defence leaders should understand, and influence where possible, government policy on sustainability. Defence is very different to most if not all other government departments, and policies from them will often not accommodate the idiosyncrasies of defence. In order to stop this becoming a non-compliance issue, defence should make sure that it drives change and innovation in this space, rather than just be the recipient of policies that don't suit it. Defence leaders could become some of the most effective leaders in this area, with their mix of pragmatism, strategy and planning. This talent should not be wasted by the rest of government.

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