BOX II The Costs of Military Spending, Wars, and the Plausibility of Climate Futures

The Russian attack on Ukraine is both an expression of and a driver for increased geopolitical tension, further worsening the prospects for international cooperation in many policy fields (Scheffran, 2023). Beyond its great human toll and destruction, the war has hastened major increases in spending on military forces and increased the danger of more armed conflict elsewhere. Both effects are likely to hamper efforts to mitigate and adapt to climate change.

Rising military expenditures

Already before the recent war in Ukraine, global military expenditures had risen since 2014, attaining a record high of USD 2.24 trillion, corresponding to about 2.2% of global GDP and 5.9% of global government expenditure in 2022 (Lopes Da Silva, 2023). Based on announcements of future miliary spending, additional substantial increases are to be expected in the coming years (Lopes Da Silva, 2023). Growing military spending signals an increase in the perception that threats need to and can be met by military force. This reinforces a view that pervades documents from defense ministries and armed forces worldwide, namely that some likely consequences of climate change—such as increased violent conflict—require to be met with military means (Vogler, 2023).

Military emissions

Military activity and its financing are directly relevant for climate change policies primarily because of two effects. One is the carbon footprint of the military; the other is the opportunity cost of military spending.

Data on emissions from military activity is neither comprehensive nor reliable (Rajaeifar et al., 2022). Official national data for the US, Germany as well as the few other countries which publish such data covers both direct emissions and emissions from purchases of energy as well as transport of goods and people from civilian contractors but exclude those emissions for the production of goods, infrastructure and other services purchased by armed forces. The US military's carbon footprint for the fiscal year of 2021 is given as 51 $mtCO_2e$, corresponding to about 1% of total national emissions (US Department of Defense, 2023). Outside estimates including secondary emissions are substantially higher (Parkinson and Cotrell 2022; Rajaeifar et al., 2022). In the case of Germany, the total is reported as 1.71 $mtCO_2e$ (Bundesministerium der Verteidigung, 2022).

Official data for most of those countries whose governments publish data show a downward trend in emissions over the past decade or longer. Main drivers have been the increased use of renewable energy, particularly for electricity, and improvements in energy efficiency in miliary buildings (Crawford, 2022). However, despite considerable investment there has so far been little success in substituting traditional fossils fuels in use by military vehicles, warships, and aircraft (Barry et al., 2022).

Furthermore, increased military spending counters this trend of decreases in emissions by the military. Much of the increased military spending is used for new weapon systems, such as aircraft and their operation, whose contributions to the militaries' carbon budgets are particularly difficult to reduce. Germany is a case in point: While there has been an overall reduction in emissions of 35.7% between 2005 and 2021, emissions increased by 16 percent between 2020 and 2022 (Bundesministerium der Verteidigung, 2022).

The difficulty in reducing emissions of major weapon systems has stimulated discussions about changing force structures, substituting fuel-intensive systems with others that are more energy efficient, such as small drones and missiles (Barry et al., 2022). Judged by current investment plans of major military powers, however, it seems likely that manned aircraft, warships and tanks will continue to dominate military arsenals for decades to come (Depledge, 2023; de Klerck et al., 2023).

Opportunity costs of military spending

Beyond direct emissions from materials they pay for, military expenditures affect carbon budgets through their demands on public budgets by increasingly squeezing out funding for other purposes. One of the policy fields which has already suffered is development assistance, resulting in a growing likelihood that a number of the Sustainable Development Goals will not be met (Sachs et al, 2023). Promises of financial assistance for climate mitigation and adaptation are also becoming more difficult to fulfill. The UN Secretary General has therefore called upon member states to reduce "the human costs" resulting from military spending (UN Secretary General, 2023).

Armed conflict emissions

The number of armed conflicts in the world has grown alongside global military spending. The early 2020s have seen record highs since the end of the Cold War, with more than 50 conflicts reported by the Uppsala Department for Conflict Research (Davies et al., 2023).

Armed conflicts have many costs, human, material, and immaterial. The aggregate global GDP loss directly attributable to war has been substantial (de Groot et al., 2022). With growing involvement of armed forces from high-income countries in recent years, the carbon "bootprint" of wars in some poor countries, such as in Iraq and Afghanistan, has been large. Even so, other aspects of armed conflict, such as large-scale fires, as well as post-conflict reconstruction had more effects on emissions than military activities themselves in most armed conflicts (Depledge, 2023).

Estimates of the scale of emissions from wars are rare and differ widely, depending on the way they were conducted and what types of climate costs are considered. One case that has been studied in some detail with a focus on environmental damage is the war following the Iraqi invasion of Kuwait in 1991. Large-scale irregular oil burning led to the release of about 130-140 $mtCO_2e$, corresponding to about 2-3% of global emissions in 1991 (Lindén et al., 2004). Focusing on one aspect of direct military emissions, a study reports additional fuel use corresponding to 140 $mtCO_2e$ emissions between the fiscal years of 2001 and 2018 through the participation of the US military in the wars in Iraq and Afghanistan (Crawford, 2019).

The impact of the war in Ukraine and emissions

A more comprehensive estimate has been made for the war in Ukraine. A group of experts supported by the Ukrainian Ministry of Environmental Protection and Natural Resources arrived at a total of 119 $mtCO_2e$ of greenhouse gas emissions for the first year of the war (de Klerck et al., 2023). They added up estimates of the carbon footprint of war-related military activities (fuel and ammunition, build-up of fortifications) of 21.9 $mtCO_2e$, of fires resulting from military operations (17.7 $mtCO_2e$), of additional fuel consumption in global civil aviation due to rerouting of flights (12.0 $mtCO_2e$), refugee movements (2.7 $mtCO_2e$), the reconstruction of destroyed buildings, infrastructure, industry and utilities (50.2 $mtCO_2e$), and the destruction of the Nord Stream 1 and 2 pipelines (14.6 $mtCO_2e$). Some of the assumptions used for these estimates can be questioned—for instance, the release of methane and other greenhouse gases from the destruction of the Nord Stream 1 and 2 pipelines is generally estimated at about half the amount considered in the study (Jia et al., 2022). At the same time, the study leaves out some emissions attributable to the war for lack of data, such as the increase in wartime production of arms and ammunition in Russia as well as in those countries supplying Ukraine with weapons. It also does not attempt to estimate the indirect effect of reductions in economic activities in Ukraine and other countries due to the war.

Post-war reconstruction can be a major driver of the emissions resulting from wars. In the case of Ukraine, both the government and international donors aim for critical steps toward low-carbon reconstruction (World Bank et al., 2023, p. 1). Such reconstruction will also be a major challenge after the end of the war in Gaza, which began after the terrorist attack of Hamas on Israel on 7 October 2023. More than 60% of all buildings in Gaza had been destroyed or damaged by January 2024, with the war still ongoing (World Bank, 2024).

Effects of military conflicts on Climate Futures

The war in Ukraine demonstrates anew that wars can have substantial effects on emissions, as does, probably to a smaller extent, the war in Gaza. Both wars already led to more military spending and increased geopolitical tension. They also raise the danger of more warfare in the future.

The plausibility of specific climate futures will likely be increasingly affected by the declining willingness of states to cooperate over geopolitical divides, including on issues related to climate change, as well as growing emissions from increased military activity and the corollaries of wars. Focusing on the immediate impact of wars on the climate, more comprehensive analytical work on emissions from military activity and warfare is warranted. As of now, the database is small, and methods for estimations are not well developed. In view of the carbon footprint of reconstruction, it will be instructive to learn about the extent of the implementation of emission objectives in times of dire need for quick provision of infrastructure and housing.

Author:
Michael Brzoska