

ENVIRONMENTAL EFFECTS OF MILITARY CONFLICTS

Daniela CĂRUȚAȘU

“Nicolae Bălcescu” Land Forces Academy, Sibiu, Romania
d.carutasu@yahoo.com

Abstract: *Humanity is currently facing a number of problems. Environmental pollution, deforestation, climate change, desertification, population explosion in some parts of the world, declining living standards, human migration, increasing acts of terrorism and conflicts of all kinds are just some of these problems. Recently, the number of military conflicts has increased due to poverty, social and/or economic inequality. These conflicts were, and continue to be, generally located in African, Asian and South American countries. Starting with February 2022, a major conflict broke out in Europe with the invasion of Ukraine by the Russian Federation. The effects of this conflict, now in its third year, are visible both in areas where fighting has taken place or is still taking place and globally. Generally, there is reference to the impact of the conflict on the local and global economy, on civilians in the conflict zone, on infrastructure, hospitals, schools, etc. But a conflict of this scale is also destroying the environment.*

Keywords: military conflicts, environmental protection, environmental factors

1. Introduction

From the end of the World War II until the invasion of the Russian Federation in Ukraine, mankind has never known conflicts of such magnitude. “Russia's invasion of Ukraine, initiated on February 24, 2022, is among the most - if not the most - significant shocks to the global order since World War II” [1].

However, in the period between the two major conflicts, mankind has not known peace in all regions of the globe.

The University of Uppsala (Sweden), “identifies 285 distinct armed conflicts having taken place since 1946” [2].

No matter the size and duration of the conflict, it will have severe consequences on people, economy, infrastructure and environment.

Figure 1 shows 15 of the biggest environmental problems facing humanity in 2024, according to Earth.org. [3].

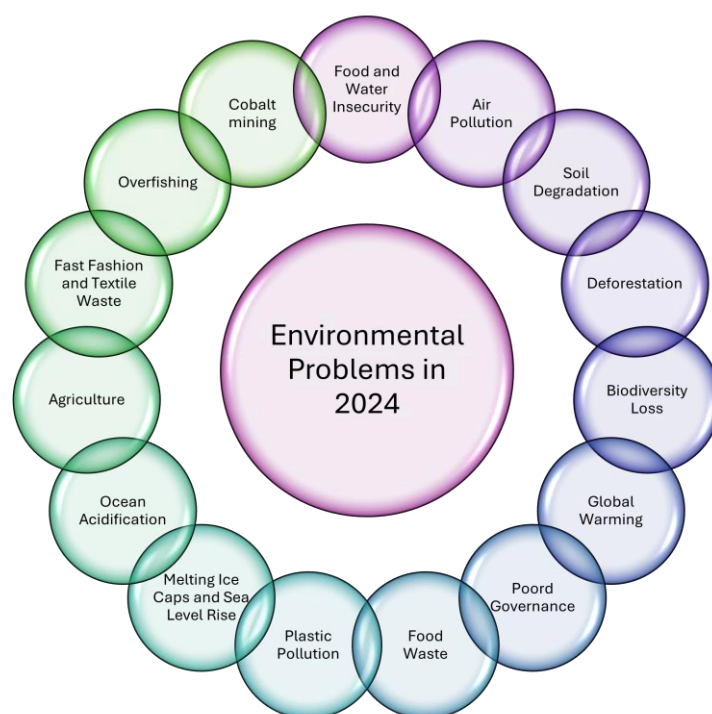


Figure 1: Environmental problems faced by humanity in 2024
(Source: The Author)

Some of these problems – food insecurity and water shortages, air pollution, soil degradation, deforestation, loss of diversity – are also present mostly due to past or current armed conflicts.

2. Research Methodology

This research paper addresses the means in which military conflicts affect the environment, both in the conflict zone and in neighbouring areas. Based on the literature and our own observations, we present some of the environmental damage caused during armed confrontations in general and in the Russian-Ukrainian conflict in particular.

3. Military Conflicts and the Environment

According to “NATO crisis and disaster management”, the small number of studies on military conflicts has a negative effect on the knowledge of the problem and therefore there are two theses in defining the concepts of “war” and “military conflict” [4].

According to the first thesis, the leading concept in the relationship of “war - military conflict” is military conflict. The war is defined as “a complex social phenomenon that can best be characterized by the intensity of hostilities and operations” [4]. Depending on the nature of operations, military conflicts can be:

- a) of high intensity;
- b) of medium intensity;
- c) of low intensity.

The second thesis starts from the premise that the phrase “military conflict” is synonymous with “local warfare”, but at the same time considers armed conflict as part of war because “war is a complex deterministic socio-political phenomenon - an expression of the maximally intensified confrontation between states, nations and peoples, various social, ethnic and religious groups, the main content of which is the volume of the comprehensive use of military force in the first place” [4].

In general, military conflicts can be:

- (a) international – when the conflict is between two states and may degenerate into war.

(b) non-international – it takes place within a state and it is also called civil war. Without taking into consideration their nature, military conflicts are carried out with negative effects on the inhabitants of conflict zones, on economic and social areas.

It is no exaggeration to say that with the first military conflict, the environment suffered as well as inhabitants. “Burning, poisoning water, cutting down forests were only a small part of the military tactics that caused major damage to the environment” [5].

Even though “the natural environment as such is not a military objective and should not be affected by the conduct of hostilities” [6], during military conflicts, “the natural environment [...] becomes of major importance for the deployment and training of armed forces, for the execution of missions and facilities for military purposes” [6].

Military conflicts have a significant impact on the environment also due to the fact that “military objectives are located in the environment, and the action of belligerents on them automatically produces ecological effects, sometimes real disasters” [6].

In general, environmental damages produced during military conflicts can occur as an unintended consequence of military activity (e.g. fires resulting from air strikes) or as part of a military strategy of one of the parties involved (e.g. intentional destruction of dams, digging of trenches, 'planting' of anti-tank mines).

Conflicts are currently taking place in all parts of the world. According to the International Crisis Group [7], in 2024, 10 conflicts around the world are to be monitored. Figure 2 shows the situation of these conflicts.



*Figure 2: 10 Conflicts to Watch in 2024
(Source: The Author)*

The USA-China conflict, even though it is not a military conflict, is on the list of

conflicts because of the strained relations between the two countries. In this case,

“probably the bigger danger is that Chinese and U.S. planes or ships collide. According to the Pentagon, the number of risky encounters in the past two years exceeds those of the past two decades” [7].

4. Effects of the Conflict in Ukraine on the Environment

On 24th of February 2022, Russia invaded Ukraine, moment which represents the beginning of what Russian President Vladimir Putin called a “special military operation” [8]. The aim of the operation was to support and protect the population of the separatist republics of Donetsk and Luhansk, as well as to “demilitarize and denazify Ukraine” [8].

The invasion of Ukraine led to changes in all areas, and the effects of the Russian-Ukrainian conflict are visible both locally and globally. A few days after the conflict in Ukraine began, World Bank President David Malpass told the BBC that “The war in Ukraine comes at a bad time for the world because inflation was already rising” [9] and “the economic impact of the war stretches beyond Ukraine's borders” [9]. But, “while the effects of war are generally

calculated in terms of human, economic, and social costs, the environment is often the silent victim of war” [10], and “the Russian invasion has created a lower-profile killer as well - one that could haunt Ukrainians for years, if not decades, scientists say. The war has scarred Ukraine's natural environment - polluting its rivers and lakes, contaminating its soil, eviscerating its forests - a circumstance that experts fear could lead a long-term increase in cancers and other illnesses among civilians” [11].

But whether we are talking about the Russian Federation's offensive or Ukraine's defensive military actions, the actions of both countries have had a negative impact on the environment (Figure 3). As the Russian-Ukrainian conflict continues, severe air and water pollution, soil degradation, deforestation increase. In early 2024, “the Ukrainian government claimed that the war had already caused some \$56bn of damage to the country's environment” [12].

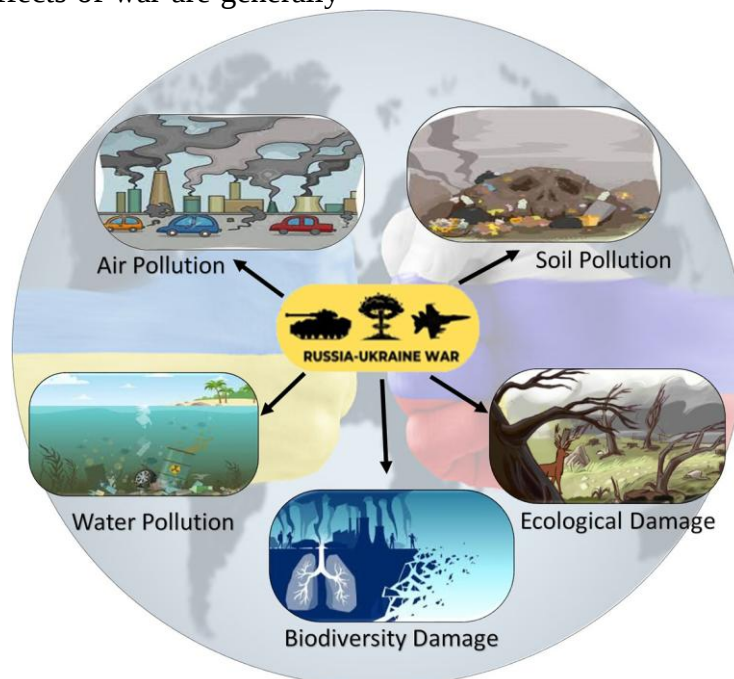


Figure 3: Effects of the conflict in Ukraine on the environment
(Source: Rawtani et al., 2022 [13])

Air pollution. The impact of the Russian-Ukrainian conflict on air quality in Ukraine “have been complex, dynamic, and have included both increases and decreases in air

pollution” [10]. In Table 1 we present the factors that have led to increased air pollution.

*Table 1 Factors that have led to increased air pollution
(Source: The Author)*

Crt. No.	Factor	Observation
1	Movement of military equipment	Gas emissions, dust generation.
2	Bombing and resulting fires	Increase of fine particles in the air.
3	Destruction of fuel depots	Generation of pollutants from burning oil, petroleum products and petrol.
4	Attacks on industrial installations	Release of toxic substances into the air (e.g. ammonia, nitric acid).
5	Destruction of buildings	Release of residues and hazardous toxic substances (glass, cement dust, asbestos, lead, etc.) and generation of dust.
6	Forest fires	Release of smoke, chemical compounds (carbon monoxide, , nitrogen oxides, methane, volatile organic compounds, etc.).

The decrease in air pollution occurred in the first weeks of the war, due to the decrease in civilian use of personal and service vehicles and the closure of factories and construction sites.

Soil pollution can occur through:

(a) planting of anti-personnel and anti-tank mines; unexploded ordnance. It is estimated that it will take up to 50 years after the end of the war for the soil to be cleared of mines and unexploded ordnance;

(b) soil disturbance occurs as a result of trench digging, movement of troops and military equipment, cratering as a result of the use of explosives;

Chemical contamination occurs as a result of the use of ammunition, explosives and chemical warfare substances, spillage of oils, lubricants and sometimes fuels from

operational equipment, damage to industrial installations. In conflict zones, heavy metals are the most frequent and persistent contaminants.

Water pollution can occur through:

(a) chemicals resulting from the use of chemicals, ammunition or explosive substances;

b) physical contamination by toxic waste;

c) biological contamination by pathogens.

Biodiversity Damage occurs as a result of environmental pollution and disruption of the local ecosystem. Often forested areas are cleared or used by troops for shelter or fighting. Noise from guns or artillery fire causes damage to species in the area.



Figure 4: The environmental impact of the Russian-Ukrainian conflict
(Source: Rawtani et al., 2022 [13])

5. Conclusions

The impact of the conflict between the Russian Federation and Ukraine on the environment is particularly high and complex: environmental factors are polluted as a result of the movement of military equipment, the use of ammunition and explosive substances, the shelling of industrial facilities, residential areas and infrastructure.

In the long term, the impact of war on the environment will be visible in:

- decreased area of agricultural land – due to the existence of mines and unexploded

- ordnance, trenching and soil contamination with oils, lubricants and fuels;

- decreased area of forest – due to the felling of forests during the conflict;

- high pollution of surface and groundwater;

- loss of biodiversity;

- affecting people's quality of life.

After the end of the conflict, recovery of the affected areas will take a long time and the affected ecosystems will need to be restored.

References List

- [1] Brunk (Wuerth) I., Hakimi, M. Russia, Ukraine, and the Future World Order. *American Journal of International Law*. 2022; 116(4), 687-697. <https://doi.org/10.1017/ajil.2022.69>.
- [2] ***. Major Military Operations Since World War II. Updated July 31, 2023. Available at <https://www.infoplease.com/history/us/major-military-operations-since-world-war-ii>, accessed at 25.04.2024.
- [3] Robinson, D. 15 Biggest Environmental Problems of 2024. Available at <https://earth.org/the-biggest-environmental-problems-of-our-lifetime/>, accessed at 15.03.2024.

- [4] ***. NATO crisis and dezaster management. L.2.1. Nature and classification of military conflicts. Available at https://www.afahc.ro/ro/erasmus/DDHE/Courses/NATO%20crisis%20and%20disaster%20management/l21_nature_and_classification_of_military_conflicts.html, accessed at 30.04.2024.
- [5] Iacob, E. Impactul conflictelor militare asupra mediului. Februarie 2018. Available at <https://cudor2002.ro/impactul-conflictelor-militare-asupra-mediului/>, accessed at 30.03.2024.
- [6] Halmaghi, E.E. Aspecte privind efectele conflictelor militare asupra mediului înconjurător. Revista Academiei Forțelor Terestre. 2004; 3(35). https://www.armyacademy.ro/rev3_2004.php.
- [7] ***. 10 Conflicts to Watch in 2024. Available at <https://www.crisisgroup.org/global/10-conflicts-watch-2024>, accessed at 16.03.2024.
- [8] Walker, N. Conflict in Ukraine: A Timeline Story. Available at <https://commonslibrary.parliament.uk/research-briefings/cbp-9847/>, accessed at 20.03.2024.
- [9] Josphe, J. Ukraine war is economic catastrophe, warns World Bank. 4 March 2022. Available at <https://www.bbc.com/news/business-60610537>, accessed at 30.03.2024.
- [10] Hryhorczuk, D., Levy, B.S., Prodanchuk, M., Kravchuk, O., Bubalo, N., Hryhorczuk, A., Erickson, T.B. The environmental health impacts of Russia's war on Ukraine. Journal of Occupational Medicine and Toxicology. 2024; 19(1). <https://doi.org/10.1186/s12995-023-00398-y>.
- [11] Stein, J., Birnbaum, M. The war in Ukraine is a human tragedy. It's also an environmental disaster. The Washington Posts. March13, 2023. <https://www.washingtonpost.com/world/2023/03/13/ukraine-war-environment-impact-disaster/> accessed at 30.04.2024.
- [12] ***. Ukraine's animals are also victims of the war. The Economists. Mar 7th 2024. Available at <https://www.economist.com/europe/2024/03/07/ukraines-animals-are-also-victims-of-the-war>, accessed at 30.04.2024.
- [13] Rawtani, D., Gupta, G., Khatri, N., Rao P.K., Hussain C.M. Environmental damages due to war in Ukraine: A perspective. Science of the Total Environment. 1 December 2022; 850: 157932. <https://doi.org/10.1016/j.scitotenv.2022.157932>.