



KAPITEL 9 / CHAPTER 9⁹ ENVIRONMENTAL HAZARDS AS A FACTOR OF SOCIAL INSTABILITY: LESSONS FOR THE WORLD

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The war in Ukraine has caused a humanitarian, economic, and environmental crisis, the consequences of which will be felt for decades. The destruction of enterprises and contaminating soil and water with hazardous and toxic substances pose a serious environmental threat. This leads to migration, health problems, economic instability, and unemployment [1]. War-induced environmental disasters can result in social unrest and economic collapse. The experience of Ukraine and other regions confirms the global nature of environmental security issues [2].

The relevance of this topic is driven by the need to analyze the environmental consequences of the war in Ukraine and their impact on social processes. Studying the relationship between environmental degradation and social instability [3] is crucial for developing effective post-war recovery strategies.

This study examines how environmental hazards caused by military actions affect the social situation in Ukraine, particularly regarding living standards, migration patterns, and economic security.

A brief overview of the environmental consequences of the war in Ukraine reveals their multidimensional nature. Military actions have led to significant environmental pollution, the degradation of natural resources [4], and the disruption of ecosystem balance. The release of hazardous substances into the air, soil, and water [5], infrastructure destruction [6], and the increasing number of industrial accidents contribute to serious long-term environmental threats [7].

At the same time, the social aspects of environmental disasters are reflected in changes to people's way of life. The loss of clean water and food security, the spread of diseases caused by environmental pollution, and the forced displacement of Ukrainians create new challenges for society. Therefore, analyzing environmental

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hazards as a factor of social instability is crucial for further scientific and practical understanding of the problem.

9.1. Social consequences of environmental destruction

Military actions in Ukraine have caused significant changes in the natural environment, directly affecting public health. Pollution of air, water, and soil with toxic substances creates additional risks [8, 9] for the development of chronic and acute diseases, especially among people who remain in active combat zones or return to regions that have suffered environmental destruction (Table 1).

**Table 1 – Impact of Environmental Pollution Caused
by Military Actions on Public Health**

Type of Pollution	Possible Health Effects
Air Pollution	Respiratory diseases (bronchitis, asthma), allergies, weakened immune system, increased risk of infectious diseases.
Water Pollution	Acute poisoning, chronic digestive disorders, water-salt balance disturbances, intestinal infections, gastrointestinal disorders.
Soil Pollution	Consumption of contaminated food can lead to poisoning, cancer, and dysfunctions of the nervous and digestive systems.
Impact of Military Actions on Crops	Contamination of food products with toxic substances, pesticides, and heavy metals [10] may cause poisoning and increase the risk of cancer.

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Environmental pollution caused by military actions directly affects public health [11], which, in turn, has social consequences. The deterioration of public health leads to:

- Increased medical expenses and a heavier burden on the healthcare system.
- Declining quality of life, reduced work capacity, and increased disability rates.
- Population displacement due to environmental threats (forced migration).

This is a significant part of the social consequences, as healthcare is crucial to social stability. Research conducted after armed conflicts in other countries (e.g., the Balkans and the Middle East) confirms that the increase in cancer rates in affected



regions persists for decades after the end of hostilities.

In the Kharkiv region, the risk of accumulating carcinogenic substances in the environment is considerably high [12], necessitating continuous monitoring of public health and implementing early diagnosis and prevention measures.

The environmental destruction caused by war directly impacts human health, increasing the risk of chronic diseases. Comprehensive measures for land decontamination, pollution control, and medical supervision are essential to minimize the long-term consequences of the ecological disaster in Ukraine. The war-induced environmental destruction presents large-scale challenges to Ukraine's social stability (Fig. 1).

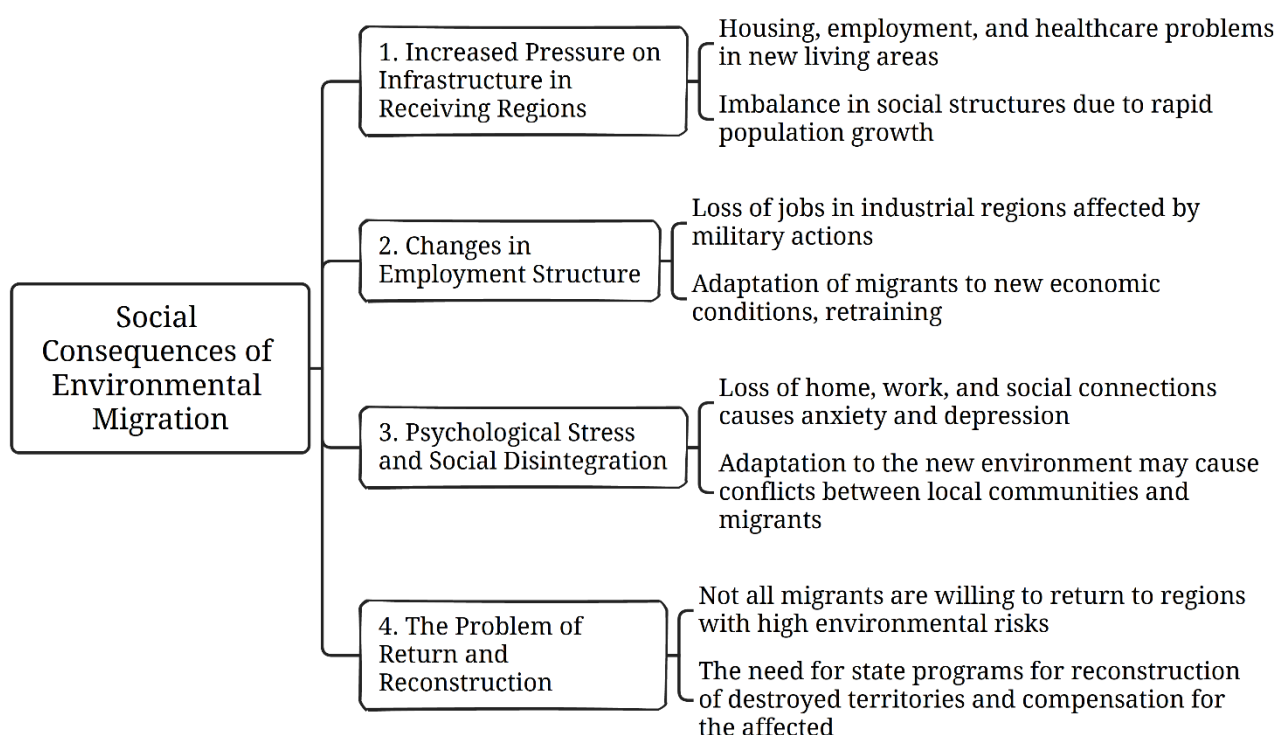


Figure 1 - Social Impacts of Environmental Migration Due to Armed Conflict

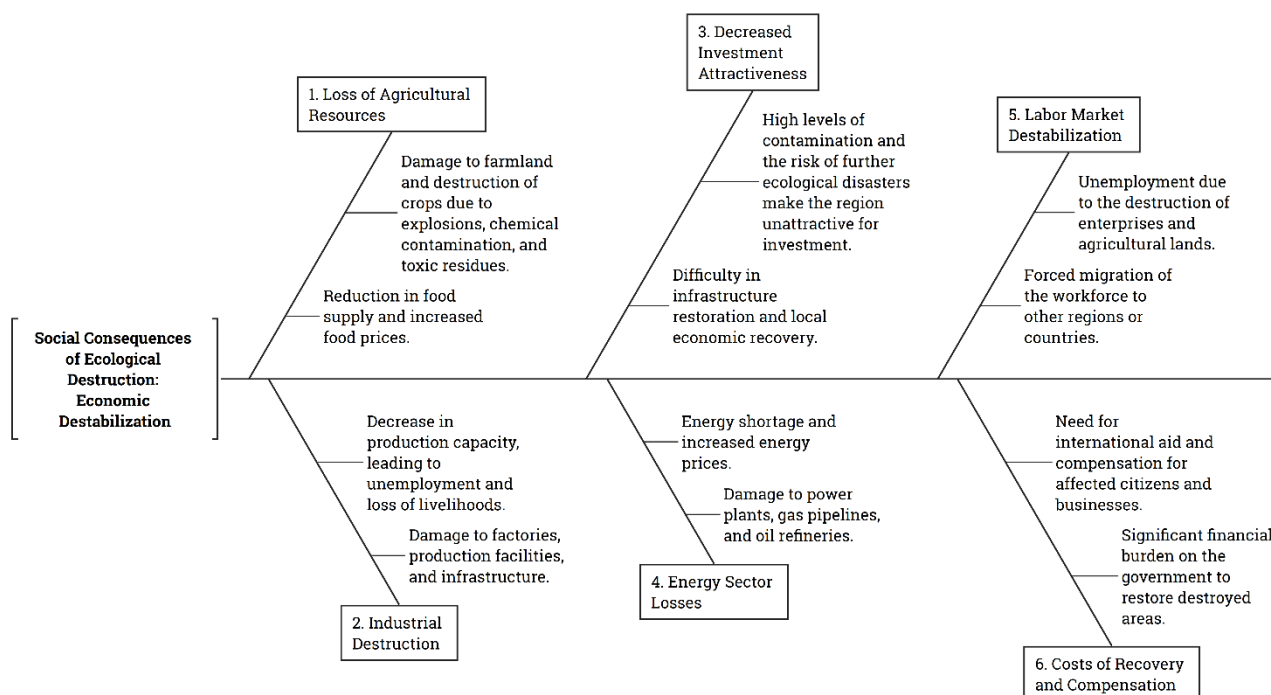
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Wars lead to mass population displacement, which affects migration flows and poverty levels [13]. Forced migration caused by environmental threats has long-term consequences for displaced individuals and host communities. Addressing this issue requires comprehensive measures, including environmental rehabilitation of affected



regions, social integration of displaced persons, and creating conditions for their safe return. War not only devastates the environment but also disrupts the education system, further exacerbating social instability [14].

Military actions cause large-scale environmental and economic destruction, negatively impacting the country (Fig. 2).



**Figure 2 – Social consequences of environmental destruction:
Economic destabilization**

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Damage to agricultural land and soil contamination with toxic substances due to explosions or destroyed structures leads to decreased crop yields and increased food prices. This creates a shortage of goods and heightens social tensions due to the disruption of food security. Research [15] examines the environmental consequences of destroying agricultural land and food supply chains due to war. The destruction of industrial facilities and infrastructure cripples a significant portion of the economy, causing unemployment and economic stagnation, particularly in the affected regions.

Environmental disasters reduce the investment attractiveness of affected areas, as high pollution levels make these regions less suitable for business, hindering infrastructure recovery and local economic development. Additionally, destroying



energy facilities creates an energy resource shortage and raises energy costs, worsening the economic situation. This affects Ukraine's energy strategy and Europe's ecological policies, particularly regarding renewable energy sources [16]. Losing enterprises limits employment opportunities, increases unemployment, and exacerbates social issues.

The restoration of destroyed territories requires substantial financial expenditures, placing additional strain on the budget and potentially leading to cuts in funding for other critical areas such as healthcare and education. Given these consequences, it is essential to plan effective recovery measures to support economic stability in the post-war period.

9.2. The relationship between environmental hazards and social tension. Lessons from the war and ways to minimize environmental and social risks

Environmental disasters, such as water, air, or soil pollution, climate change, and depletion of natural resources, can devastate citizens' lives. They contribute to economic decline, unemployment, and a reduced standard of living, leading to social protests. When people feel that their health and future are at risk due to worsening environmental conditions, they often resort to active forms of protest, such as strikes, demonstrations, etc.

One example is the numerous protests in many cities in India related to environmental pollution, especially air pollution, which reached catastrophic levels; mass protests took place against the government's inaction. In some cases, this led to social instability, as people became victims of chronic diseases due to the appalling quality of air and water, and the government's inaction caused frustration and growing tension.

Environmental crises can also contribute to economic downturns, which majorly cause social instability [17]. When areas that once relied on agriculture, fishing, or other natural resources become unusable, it leads to mass unemployment and a decline



in income. This often triggers a wave of protests, petitions for government assistance, and even strikes.

There are many examples worldwide where environmental disasters have triggered social and political conflicts. One of the most famous examples is the 1984 toxic gas leak from a chemical plant in Bhopal, India, which led to the deaths of thousands of people and numerous cases of poisoning. This disaster not only had a devastating ecological impact but also sparked mass protests, demands for compensation, and punishment of those responsible, resulting in significant social tension.

Another example is the social upheaval that occurred after the Chornobyl nuclear disaster in 1986 in Ukraine. The regional ecological consequences of this disaster, including the contamination of areas with radioactive substances, caused significant economic losses and forced millions of people to leave their homes. These factors became the basis for social protests and movements demanding appropriate compensation and safe living conditions for the affected citizens.

In Latin America, there have also been cases where environmental issues became the basis for social conflicts. For example, in Argentina, protests against water pollution caused by industrial enterprises led to large-scale demonstrations, during which citizens demanded changes in state policy regarding environmental protection.

The post-war period for Ukraine, particularly for affected regions such as Kharkiv Oblast, may become a time of further environmental and social challenges. Damaged infrastructure, water and soil pollution, and a decline in public health create additional social tensions. Local communities that have experienced numerous losses may demand more serious attention to addressing environmental issues, leading to growing tension.

The conflict potential of environmental problems in the post-war period in Ukraine will depend on how quickly the environment is restored, whether citizens are provided with sufficient information about the risks, and how effective state programs for restoring affected areas will be. The emergence of new forms of protest aimed at protecting the environment and the social rights of the affected population is inevitable.



To prevent social conflicts, timely measures need to be taken to restore the ecological situation, raise environmental awareness, and ensure the rights of the affected citizens.

War not only brings terrible humanitarian and social consequences but also has a significant impact on the environment. Post-conflict recovery requires an integrated approach to addressing environmental and social issues, including strategic measures and practical actions. The lessons learned from war provide the opportunity to reflect on effective environmental security strategies that can be applied during combat operations and in the post-war period to reduce environmental and social risks.

Therefore, during combat operations, it is crucial to develop environmental security strategies that minimize environmental losses and preserve resources for post-war recovery (Table 2).

Table 2. Environmental security strategies in wartime and post-war recovery

Direction	Strategy Description
Monitoring and assessment of the environmental situation	Regular monitoring of the environmental state during the war to detect threats such as water, air, and soil pollution, and infrastructure destruction.
Protection of natural resources and infrastructure	Preservation of natural resources and infrastructure during recovery, preventing pollution, and restoring biodiversity and ecosystems.
Application of sustainable recovery technologies	Use of sustainable technologies for soil and water purification, greening, and ecosystem restoration after the war.
Support for local initiatives and community engagement	Creating conditions for the active participation of local communities in ecological recovery, allowing for regional specific needs and making the recovery process more effective.

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International experience shows that environmental recovery after war requires a comprehensive approach. Different countries applied various strategies depending on the scale of environmental destruction and the economic situation. Here are a few examples:

1. Iraq (2003-2011). After the Iraq War (2003-2011), the country faced serious environmental problems, including water pollution by petroleum products, ecosystem damage, and soil contamination with heavy metals and explosives [18]. One of the main strategies was international assistance and the involvement of non-governmental



organizations in the recovery process. Water and soil purification programs and rational use of natural resources became key areas for recovery.

2. Balkan conflict. As a result of the armed conflict in the Balkans, significant pollution of water resources and land occurred, as well as disruption of ecosystems. After the war, international organizations, together with the Yugoslav government and neighbouring countries, initiated a comprehensive program to address the environmental crisis, which included not only the cleaning of polluted areas but also programs to support biodiversity and ecosystem restoration [19].

3. Syria. Over 10 years of war in Syria [20] led to severe environmental disasters, such as water and air pollution and the destruction of natural resources. Post-conflict recovery programs included ecosystem regeneration and cleaning of water resources from chemical contaminants.

These examples highlight the importance of international assistance and effective collaboration between government, private, and public organizations in addressing environmental crises. Considering the lessons learned from international experience and current challenges, Ukraine must implement a comprehensive strategy to minimize environmental and social risks after the war (Table 3).

Table 3: Comprehensive strategy to minimise environmental and social risks after the war

Direction	Description of Strategy
Development of a National Environmental Recovery Strategy	Creation of a national environmental security strategy, including measures for the restoration of natural resources, cleanup of polluted areas, and conservation of biodiversity.
Involvement of Local Initiatives and Communities	Active participation of local communities in recovery processes through the creation of environmental initiatives, volunteer programs, and training in ecological restoration methods.
International Cooperation	Collaboration with international organizations to secure funding, conduct joint research, and exchange experience in environmental recovery.
Raising Environmental Awareness Among Citizens	Educational programs, media, and public campaigns to raise environmental awareness and encourage participation in environmental restoration programs.

Author's development

The main lessons of the war highlight the need for a comprehensive approach to environmental security, the consideration of military risks in state policy, and the active



involvement of the public in recovery processes.

1. Environmental and Social Consequences of War. The war caused widespread environmental pollution due to the destruction of industrial facilities, toxic substance leaks, and the degradation of natural ecosystems. The loss of biodiversity, deforestation, and water resource pollution complicate the restoration of the environment. At the same time, social consequences include forced migration, deterioration of public health, and economic instability, which exacerbate the overall risks for the country.

2. Ways to Minimize Risks. To overcome the consequences of the war, it is necessary to implement measures at the state, local community, and civil society levels.

State Policy:

- Development of an environmental restoration strategy considering military risks.
- Creation of an environmental monitoring system for contaminated areas.
- Implementation of strict control over industrial emissions and hazardous waste disposal.
- Engagement of international support for addressing ecological consequences.

Local Initiatives:

- Implementation of programs for forest restoration and water body cleaning.
- Adoption of green technologies in construction and agriculture.
- Development of energy-independent communities through the use of renewable energy sources.

Public Involvement:

- Organization of environmental volunteer movements.
- Informing the population about ecological risks and safety measures.
- Encouraging participation in decision-making regarding the restoration of territories.

The implementation of these measures will enable Ukraine to minimize ecological and social risks, accelerate recovery processes, and create sustainable development in the post-war period.



Conclusions

1. The ecological consequences of war have a long-term impact, causing environmental pollution, degradation of natural resources, and disruption of ecosystem balance, which threatens health and economic stability.

2. The social consequences of ecological destruction include increased medical expenses, the spread of diseases, migration, and decreased quality of life, especially in the affected regions.

3. Forced migration due to ecological threats requires comprehensive measures for territory rehabilitation and social integration of migrants.

4. Economic consequences include reduced crop yields, increased food prices, infrastructure destruction, and unemployment, which worsens the economic situation.

5. A comprehensive approach to recovery requires significant financial resources, focusing on restoring public health and economic stability.

6. The lessons of the war in Ukraine should serve as the foundation for developing global strategies to respond to ecological and social crises, considering the risks of military actions.

7. International efforts are necessary to monitor and manage ecological disasters during wars to reduce their impact on social stability and ensure resilience to future crises.

Ukraine's experience demonstrates that war and environmental issues are global challenges that can cause societal instability. Research shows that ecological destruction caused by military actions exacerbates social tensions and requires comprehensive measures for environmental recovery and protection.

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