

WAR-RELATED ECOLOGICAL PROBLEMS OF WATER RESOURCES

Dmytro Borzdov

Faculty of Chemical Technology,

National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”

Environmental issues related to water resources in Ukraine are among the most pressing challenges, especially against the backdrop of the full-scale Russian invasion which broke out on February 24, 2022. As an essential natural resource, water is crucial for sustaining human life and maintaining ecological balance. However, during hostilities, water resources and related infrastructure are severely damaged, posing a serious threat to society and the environment.

The war has been at the core of significant damage to Ukraine’s water infrastructure, especially in industrial areas. Ukraine's water supply system includes large reservoirs, hydroelectric power plants and irrigation canals, most of which are located in the south and east of the country where the active military actions continue. The destruction of this infrastructure has regional and global implications, affecting not only the local population but also global food security.

In addition to the direct impact of hostilities, climate change is another important factor that exacerbates environmental problems. High temperatures,

droughts and other climatic anomalies further exacerbate the situation with water resources. Combined with the consequences of warfare, such as water pollution caused by the destruction of industrial facilities, this creates a serious environmental crisis.

In the Ternopil region, artillery shelling destroyed mineral fertilizer tanks, leading to an increase in ammonia and nitrate levels in the water, killing large numbers of fish. Such cases show that the fighting directly affects the quality of drinking and agricultural water.

Another notable problem is the lack of wastewater treatment facilities in areas where the war has destroyed vital infrastructure. A vivid example is the destruction of the Kakhovka Hydroelectric Power Plant on June 6, 2023. With the power plant having been undermined, the Kakhovka reservoir was depleted by almost 70%, an area of 600 000 hectares has faced irreversible consequences and the nearby regions of Dnipropetrovsk, Kherson, Mykolaiv, and Zaporizhzhia have also felt the outcomes. According to the latest estimates, the financial damages already exceed the amount of \$4 billion.

The power plant destruction has also caused the total collapse of hydraulic structures, leading to the contamination of wastewater flows into rivers and water bodies, affecting the environment and public health. For example, the Kakhovka Reservoir was contaminated after the wastewater treatment plant near Zaporizhzhia stopped functioning, a situation that could have long-term consequences for agriculture and water quality in the region.

Furthermore, it is worth noting that many of the environmental problems related to water resources in Ukraine predate the outbreak of the war. The water quality in the Dnipro River is reportedly in a critical state due to ongoing pollution from industrial waste and the lack of proper water treatment infrastructure. The lower reaches of the Dnipro are in a particularly poor state, which negatively impacts fisheries and biodiversity. Thus, it is important to address the war-related problems as soon as possible.

One of the most important recommendations is the need to engage international

partners to rebuild water infrastructure. In particular, it is about installing treatment systems in hospitals, schools and other socially important facilities.

While temporary drinking water supplies may be necessary for a certain period of time, a more sustainable solution is to introduce modern treatment technologies and provide each household with a water treatment plant.

Another important aspect is the development of modern legislation to protect water resources and the introduction of innovative technologies for their conservation. That is why the website of the Ministry of Environmental Protection and Natural Resources of Ukraine has created a reform called "Integrated Water Resources Management", which aims to ensure equal access to quality and safe drinking water and proper sanitary and preventive measures.

Summing up, with the provision of water resources being disrupted and water infrastructure being damaged, it is of the utmost significance to take measures to address this issue.

References:

1. Impact of the Russia–Ukraine armed conflict on water resources and water infrastructure. Retrieved from <https://www.nature.com/articles/s41893-023-01068-x#ref-CR1>
2. Integrated water resources management. Retrieved from <https://mepr.gov.ua/diyalnist/reformy/integrovanе-upravlinnya-vodnymy-resursamy/>
3. Protection of water resources of Ukraine: from crisis to recovery. Retrieved from <https://www.wareg.org/articles/protection-of-water-resources-of-ukraine-from-crisis-to-recovery/>