

ECOLOGICAL PROBLEMS OF WATER RESOURCES IN UKRAINE

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Ukraine is considered to be one of the countries with a deficit of water resources. It is among the European countries with the biggest water shortage. Russia's bloody war against Ukraine has greatly worsened the situation.

The continuous bombardment and artillery attacks on urban areas resulted in the discharge of a significant quantity of hazardous chemicals into the surroundings. The complexity of this issue arises from the fact that explosions from munitions release various detrimental substances that eventually infiltrate groundwater and subsequently enter surface water, leading to a substantial adverse effect on water resources.

The shelling leads to significant releases of nitric acid into the air. Concentrated nitric acid is prone to intense evaporation upon contact with the atmosphere, resulting in the formation of nitrogen dioxide. This compound readily dissolves in water, giving rise to nitric acid. This process leads to acid rain and has a profound impact on living organisms. Owing to its high solubility in water, nitric acid vapors swiftly infiltrate soils and groundwater, causing a rapid increase in their acidity levels. This, in turn, leads to widespread devastation among the ecosystems in the affected areas (Angurets, 2023).

The integrity of sewage systems faces continuous disruptions, and pipes lose pressure in the areas affected by shelling along the front lines in the Donetsk, Luhansk, Zaporizhzhya, Mykolaiv, and Kherson regions. Assessing the present extent of sewage water leakage into the soil and groundwater across Ukraine's entire territory remains unfeasible and will remain so until the war concludes. Additionally, the recurring shelling-induced power outages impede the proper operation of water-pumping systems within treatment facilities and disrupt the oxygen levels in the water (Rubryca, 2023).

Another important problem related to the disruption of the work of treatment facilities is the departure from the occupied territories of qualified specialists responsible for the maintenance of these facilities. Ukrainian scientists had to suspend their work due to problems with the supply of water and electricity, destroyed laboratories, forced evacuation. The loss of specialists significantly worsens the problem of water resources management (Stein, Birnbaum, 2023).

It is a recognized fact that military operations result in both mechanical and chemical contamination of water bodies and groundwater. Among the most significant causes are the widespread submersion of military vehicles and ammunition in water bodies, the release of oil-based products and various chemicals stemming from the destruction of major industrial sites, and the biological contamination due to the accumulation of human and animal corpses (Gleick, 2023).

Due to the terrorist attack carried out by the Russians at the Kakhovskaya Hydroelectric Power Plant, a deliberate submersion of a considerable amount of military equipment occurred. The submersion of various types of military equipment results in substantial water pollution from metal ions. Tons of steel corrode, aquatic ecosystems become overloaded with these metal ions, which are harmful to the environment. Additionally, each submerged unit of military equipment releases significant quantities of petroleum products used in its operation, such as diesel fuel, gasoline, oils, and lubricants. Oil and oil products are extremely toxic (Vogler, 2023).

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