From Protection to Dependency: Hydrological Lock-In, War, and the North Crimean Canal

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War, Soil, and Freshwater Systems

PROBLEM

The environmental duration of war

Vietnam: persistent dioxin contamination after wartime herbicide use

Crimea: disruption of water supply and pressure on local sources

Consequences can persist for decades beyond military operations

The Soviet hydraulic project

The 1951 stamp depicts the Kakhovka dam and planned canals

A common state governed the source and the receiving territory

The image represents an early vision of territorial transformation



USSR stamp, 1951, CPA 1653

The geography of water dependence



Historical schematic supplied by the author

Dnipro water entered from the Kakhovka Reservoir

The canal served northern and eastern Crimea

Irrigation networks and reservoirs distributed the imported water

Historical system schematic, not a 2026 operating map

Groundwater limits before the canal

Local groundwater supported agriculture before Dnipro deliveries

A Soviet account described depletion and salinisation

Many artesian wells required plugging and irrigation stopped

Hydrological Lock-In

Imported water supports new settlement and economic activity

Development fixes demand around continued water deliveries

Loss of supply disrupts an established territorial system

The pre-canal landscape cannot simply be restored

Ruptures in the water regime

2014: Russia occupies Crimea and Ukraine stops Dnipro deliveries

2022: deliveries resume after Russia's full-scale invasion

6 June 2023: destruction of the Kakhovka dam

The reservoir's loss removes the basis of the previous supply regime

An empty channel at Lenino



Aleksander Kaasik, 5 July 2014. CC BY-SA 4.0

Photograph taken on 5 July 2014

A channel can remain while its water supply disappears

The photograph documents 2014, not the whole canal in 2026

A different resource base

45.7 million m^3 delivered to eastern filling reservoirs in 2025

Sources included three groundwater wellfields and local reservoirs

Surviving canal sections transport local water

Annual delivery does not establish long-term source security

Groundwater abstraction and salinisation

Intensive pumping changes groundwater flows

Saline water can move towards wellfields

Coastal sources face seawater intrusion

Russian modelling documents risks and existing intrusion

The next ten years

A prolonged loss of the former Dnipro supply

Continued pressure on local groundwater

Potential loss of usable freshwater through salinisation

An established population and economy still require water

Sevastopol's population and water demand

393.3 thousand in the 2014 census

558.3 thousand at the start of 2025, approximately 42% higher

Russia's naval stronghold relies on local freshwater sources

Rapid development increases demands on water reliability

The aggressor's environmental consequences

Russia's aggression disrupts water security in occupied Crimea

Military possession cannot guarantee the conditions of territorial life

Decisions initiate consequences beyond their original objectives

Residents bear the consequences of decisions made by political leaders

Long-term water security

Historical experience and groundwater models already identify limits

Assessment must include source quality and sustainable abstraction

Settlement and development decisions require a long-term water balance

Scientific knowledge does not guarantee its use in political decisions

KEY TAKEAWAYS

War and the future of freshwater

The canal created an enduring territorial dependence

War disrupted the source while established demand remained

Intensive replacement supply can generate further environmental damage

An aggressor can undermine the conditions of life in territory it controls