Chapter 14
Strategic Ways of Post-War Restoration of Irrigated Agriculture in the Southern Steppe of Ukraine

Sergiy Lavrenko
https://orcid.org/0000-0003-3491-1438
Kherson State Agrarian and Economic University, Ukraine

Dmytro Ladychuk
https://orcid.org/0000-0002-5729-2521
Kherson State Agrarian and Economic University, Ukraine

Nataliia Lavrenko
https://orcid.org/0000-0002-6924-7437
Kherson State Agrarian and Economic University, Ukraine

Valentyn Ladychuk
https://orcid.org/0009-0004-9233-7360
Kherson State Agrarian and Economic University, Ukraine

ABSTRACT

The chapter outlines strategic approaches to the post-war restoration of irrigated agriculture in the Southern Steppe of Ukraine, with a focus on the Kherson region, which has been severely impacted by military operations. The region has faced significant anthropogenic damage, including military degradation of soil cover, destruction of the Kakhovka Dam and Reservoir, looting of reclamation systems, and

DOI: 10.4018/979-8-3693-8307-0.ch014

loss of fertile soil layers. The chapter proposes a comprehensive set of ecological and remedial measures, including agronomic, remedial, and technical interventions, to restore the irrigated agriculture system. One of the keys is the restoration of hydro-technical structures such as the Kakhovka Hydro Power Plant in a revised framework. This entails an evaluation of the infrastructure and the implementation of necessary upgrades or modifications to ensure reliable functioning in the post-war context. The chapter emphasizes the importance of integrating ecological considerations into restoration efforts, such as soil conservation practices and the protection of natural habitats.

BACKGROUND

The Kherson region lies within the temperate geographical belt of Eurasia, characterized by a steppe zone covering an area of 28.5 thousand km^2. Geologically, the region is part of the platform, specifically the southern portion of the Precambrian East European platform, with a marginal depression toward Crimea. This depression forms the Black Sea Lowland, sloping from north to south. The climate is moderate-continental, featuring relatively mild winters (with average temperatures ranging from -10°C to -30°C) and hot, lengthy summers (with average temperatures around +22°C to +23°C). The average annual temperature ranges from 9.3°C to 9.8°C, showing a consistent upward trend. The region typically receives around 400 mm of precipitation annually, with recent years seeing an increase of 50-80 mm on average. However, rising temperatures lead to increased evaporation from water surfaces and soils (About Kherson region, 2021).

These climatic conditions underscore the necessity of implementing irrigation for crops, as the region falls within the zone of risky agriculture. Concurrently, existing agricultural challenges demand attention alongside the restoration of irrigation systems.

The intensive development of the Lower Dnieper and Black Sea regions began in the late 19th century. Development initiatives favored selective rather than extensive irrigation, fearing excessive water usage could transform the steppe into marshland, as cautioned by D.I. Mendeleev (Chugaev L.A., 2009)..

At the onset of the 20th century, a survey of the Dnieper revealed that constructing a dam with locks near Zaporizhzhia would suffice to create a waterway "from sea to sea" on the river. However, these warnings, lacking ecological and economic justifications, were disregarded in the post-war years. The construction of the Kakhovka Hydro Power Plant (HPP) and its accompanying reservoir, along with irrigation canals, has contributed to an ongoing environmental and resource crisis described as a "permanently progressive creeping environmental and resource catastrophe" (term