

# Chapter 9

## Predictive Assessment of Changes in Water Needs of Accompanying Crops of Rice Crop Rotation in Changing Modern Conditions

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DOI: 10.4018/979-8-3693-8307-0.ch009

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## **ABSTRACT**

*The chapter considers an approach for assessing and forecasting the water needs of accompanying crops of rice crop rotation in changing modern conditions of rice irrigation system's functioning. The obtained results can be effectively used in the development of adaptive measures to the climate changes in the context of water, energy, and food crises, as well as in the justification of resource-saving regimes and technological solutions in projects of reconstruction and modernization of rice systems aimed at achieving the goals of optimizing the use of water and energy resources during their functioning. The chapter presents the results of a machine experiment on the predictive assessment of the water needs of accompanying crops in variable natural-agro-melioration conditions of the Danube area. The conditions of the water needs formation for various types of accompanying crops were determined according to accepted schemes of technologies and water regulation regimes on irrigated lands of rice systems. A comparison of the obtained results with real production data was carried out.*

## **BACKGROUND**

The existing global problems associated with climate change, food, water and energy crises pose a need for the world community, including Ukraine, to adapt to existing challenges and threats and to increase the efficiency of all spheres of economic activity, including the efficiency of agricultural production in the face of modern changing conditions and requirements (IPCC, 2020; FAO, 2019; Recovery Plan, 2022; Siddique, K. H. et al, 2016; Sourour, A., et al, 2017; Zhou, X. et al, 2017).

It is well known that melioration, and especially irrigation, is one of the most effective tools for reducing the negative effects of climate change on agricultural production, and irrigated lands harvest in 2–3 times higher harvest compared to rainfed lands.

In order to achieve the goals of restoring melioration in 2019 the Cabinet of Ministers of Ukraine approved the Irrigation and Drainage Strategy in Ukraine until 2030 (Irrigation and Drainage Strategy, 2019), and in 2020 adopted a plan for its implementation. In addition, to identify the existing needs for adaptation of economic sectors to climate change, in October 2021, the Cabinet of Ministers of Ukraine adopted the Strategy on Environmental Security and Climate Change Adaptation until 2030 (Strategy for Environmental Security, 2021), the first national document that creates a legislative framework for adaptation measures for systematic and long-term work on climate change adaptation.

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