

## **Issues of water use for land reclamation purposes in Russia**

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Although Russia has abundant water, which accounts for 20% of the world's reserve, a number of its regions show water deficit due to non-uniform distribution of water resources throughout the territory and their inefficient use.

The largest water user is irrigation engineering, which uses 8.4 km<sup>3</sup>/year.

However, it is irrigation and drainage system where transportation water losses are largest and are as much as more than 30% of the volume of water use. The main reasons are poor technical conditions of irrigation systems and hydraulic structures and their substantial physical deterioration, which reaches 50-60 %.

Analysis of the technical conditions of irrigation systems and canals in the south of Russia (South and North Caucasus federal districts) by the FGNU "RosNIIPM" showed that 25 % of them were in unsatisfactory conditions, 72 % showed satisfactory conditions, and 3 % are good.

The analysis of data on performance of main and distribution irrigation canals shows that most of them (about 88 %) have coefficients of efficiency varying from 0.60 to 0.90 and only 12 % - higher than 0.90. According to Construction Standards and Regulations (CS&R), the coefficients of efficiency should be within 0.90-0.93. Since a coefficient of efficiency characterizes both flow capacity and operational losses, one may consider that vast majority of canals do not deliver the required volumes of water to agricultural producers and have very large losses of water, i.e. low flow efficiency and performance reliability.

At the same time, in our opinion, the new Set of rules, which is developed now instead of CS&R, should set increased irrigation system design and reconstruction requirements based on scientific and technological requirements over the last 25-30 years. For example, it is advisable to set that the coefficient of efficiency of irrigation network is not less than 0.85, while that of lined canals should be within 0.95-0.97.

It is estimated that such increase of performance of conveyance network will reduce water losses, especially seepage ones to 0.60 km<sup>3</sup>/year, and if water-saving technologies and rational irrigation techniques are introduced - to 1.0 km<sup>3</sup>/year.

The adopted "Concept of Land Improvement in Russia until 2020" stipulates huge amount of work on rehabilitation, modernization, and reconstruction of irrigation systems on an area of more than 4 million hectares. These large-scale efforts would improve technical conditions and ensure rational use and saving of water for a long-term. An important way for efficient water use is also more comprehensive utilization of local flows in areas that are short of water. According to data of FGNU "RosNIIPM", additionally up to 1.75 Mha can be irrigated only by utilizing local flow in the south and middle of Russia through efficient use of numerous ponds and small reservoirs.