



Development of Strategies for Sustainable Irrigation Water Management in Russia

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During 1960 – 1990 years irrigated areas in Russia have increased rapidly, helping to boost agricultural output. Although the impressive achievements of irrigation in this period its large experience indicates problems and failures of irrigation water management. In addition to large water use and low irrigation water efficiency, environmental concerns (excessive water depletion, water quality reduction, water logging, soil degradation) are usually considered like the most significant problem of the irrigation sector.

Despite of considerable shrinking of irrigated areas in Russia and decreasing of water withdrawal for irrigation purposes during two last decades a degradation of environment as well as degradation of soil and water resources in irrigated areas was prolonged and will probably continue if current irrigation practices are maintained.

Nowadays, in different regions of Russia there are societal demand to restore agricultural irrigation in Russia as answer to challenges from climate pattern changes and degradation of land & water resources. In the respect of these demands there is a need to develop strategies for sustainability of agricultural irrigation in Russia that should be based on three main societal objectives: costeffective use of water in irrigated agriculture at farm level, and satisfactory preserving the natural environment. Therefore sustainable irrigation water management is not only an objective at farm level but also an overall goal at the local and regional as well. A way to achieve sustainability in irrigation water management is to solve the local conflicts arising from the interactions between water use at irrigation areas and surrounding environment. Thus should be based on the development of irrigation framework program including on the irrigation water management issues, policies & decisions making at federal and regional levels should be based on the indicators of environment & irrigation water efficiency monitoring promoting the use of the appropriate irrigation technologies confined to a field scale and local environmental conditions.

In presented contribution a case studies of large and small irrigation schemes based on sprinklers at Saratov Region will be discussed. Analyze is focused on the identification of main causes of groundwater logging, following soil salinization and impact to surrounding environment at irrigation areas. This analyze is based on plot and field scales experimentations as well as time series about 40 years long monitoring of ground water and soils. Main conclusion from this analyze accuses current irrigation practice at this region using high irrigation dozes & intensities as well as uniformity of water application within the irrigated perimeter promoting chain of processes starting by ponding of applied water at mezodepression of soil surface, preferential flow through out macropores-cracks, wormholes, or decayed root channels and groundwater rising.

Special attention is done to simulate relationships between uniform technology of water application by sprinkler and spatial nonuniformity of moisture storage (zoning of high soil moisture in depressions) in soil and as consequence of infiltration capacity.

Technological alternative aimed at reducing these problems is analysed by the use of SWAP model application to uniform and nonuniform irrigation water applications.

Model results indicate that use nonuniform water application technology is increasing an irrigation efficiency, increasing yield and stopping rising of groundwater.

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