The current practice of irrigation in the Amu Darya river basin has been resulted to pollution of drinking water in the downstream of the rivers, to reduction of productivity of irrigated lands and to full disappearance of the river inflow into the Aral Sea. In these conditions it is necessary to develop a system thinking approach for water management aimed to adjust an environment in the lower reach of the river and of the Aral Sea level.

The Amu Darya river flow for period more than 100 years has close interrelation with such factors as the Sun activity fluctuation, temperature of air and precipitation. Our approach based on a long-term prediction of the Amudarya river flow and on environmental protected management in the river basin.

Many year's discharge of river depending on solar activity can be predicted as:

\[ Q = 35.95 + 0.18(\lambda_{10,7}) \text{ cu. km/year} \]

where \( Q \) – discharge of river, \( \lambda_{10,7} \) – averaged yearly solar flux.

This equation gives possibility to predict a long term river runoff and allows to plan an annual accumulation in dams, for irrigation and an ecological necessary discharge of the river runoff for downstream.

In this study proposed also an integrated scheme of water–land resources management for restoring of an ecological equilibrum in the basin. This scheme proposes: alteration of crop patterns and use of ecological fertilisers in irrigated areas of upstream, calculation of a natural irrigated ability of the Amudarya river, operative calculation of optimum irrigated rate in dependance from precipitation and regulation of irrigated agricultural area in accordance with predicted river discharge.