



Evaluation of Water Quality Parameters using Numerical Modeling Approach for the El-Salam Canal in Egypt

The El-Salam Canal was designed to supply irrigation water in the northern Delta and crossing the Suez Canal eastward to the northern Sinai Peninsula in Egypt. The canal receives both the Nile water and contaminated drainage water with a ratio of 1:1. The drainage water comes mostly from Hadous and El-Serw pumping stations. In this regard, the water quality of the El-Salam Canal can be estimated to check the level of usage. So, the water quality of the El-Salam Canal was simulated using the one-dimensional surface water quality model (AQUASIM). The water quality simulation focuses on five nutrients: chlorophyll-a (Chll-a), ammonia (NH₄), nitrate (NO₃), chemical oxygen demand (COD), and dissolved oxygen (DO), based on the kinetic rates of production-death-respiration of Chll-a, nitrification-denitrification of NH₄ and NO₃, reaeration-oxidation-deoxidation of DO and COD. The calibration and validation were performed for the model predictions along the El-Salam Canal. The accuracy of the AQUASIM model was evaluated applying various statistical rating tools. The water quality variation along the El-Salam Canal is evaluated using the water quality index (WQI). The results were affected by agricultural and domestic uses. The canal is acceptable for irrigation with much concern of pre-treatment in the Hadous drain (one of the main drainages providing the El-Salam Canal). Further, the El-Salam Canal showed a decline in DO with respect to the flow profile as a tropical zone of north Egypt especially in summer. The outcomes acquired in this study will facilitate the development of a policy for the operational enhancement of sustainable water quality in the El-Salam Canal.