MODELING OF THE AQUIFER OF THE PLAIN OF THE RIVER DJENDJEN (JIJEL)

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Abstract :

The alluvial plain of the river Djendjen is part of the coastal plains region of Jijel, it closes a unconfined aquifer contained in a Quaternary alluvial. In recent years, the recharge from rainfall has decreased due to drought. Moreover, the increasing needs of people, industries and agriculture has increased the need for pumping, which can lead to an imbalance in the water.

To avoid such situation and a more rational capacity of the water of the Quaternary alluvial plain of the river Djendjen, management by mathematical method becomes necessary. It seemed to us through this work, present management scenarios based on a mathematical model: ASM “Aquifer Simulation Model”.

After a performance of the overall functioning of the aquifer system, using the mathematical model based on the finite difference method in permanent system improves knowledge of hydraulic characteristics of the aquifer and the development of a comprehensive water balance. The calibration model was used to check the reliability of results concerning the geometry and boundaries of the aquifer and its hydrodynamic parameters (estimate values of the coefficient of permeability and storage coefficient).

The second simulation phase (exploitation model) allowed determining the impact of rates levied trends in climate change the groundwater. For this purpose, and maturity of 20 years, operating scenarios were considered.

The result of simulation under the present operating conditions has reached a misallocation of debits extracts (very dense along the river especially in the middle), also causing a critical situation in the northern plains, resulting in the water intrusion. It also appears that groundwater is in a midst of hydraulic characteristics consistent on virtually any body. The aquifer is affected by variations of different trivia hydrodynamic characteristics.

The operation of the model by achieving the scenarios allowed us to simulate the future behavior of the water in case of overuse. We propose as a solution implementing a battery of coastal drilling and injecting water already used in its drilling or installation of infiltration basins in the upstream which increases with time the level piezometric and also reduce contamination of groundwater by salt water (two scenarios yield very interesting results to increase the supply of water. The establishment of new wells on the borders do not cause

significant drawdown in the center the water. This is more interesting than when increasing the flow of drilling and exploitation of existing wells.

Immediately, for better management of the water and minimize these effects, it is necessary to start well flow control operations and the level of the water, the establishment of a policy to protect vulnerable areas (central axis and northern plains) and finally ban the implantation of coastal drilling is Necessary and urgent.

Keywords : modelling; unconfined aquifer; calibration; overexploitation; the balance sheet; management; salt wedge.