

# USING GIS TO CHARACTERIZE THE VULNERABILITY TO POLLUTION APPLICATION TO THE ALLUVIAL AQUIFER OF THE RIVER NILE (JIJEL, NORTH-EASTERN ALGERIA)

Abdelmadjid BOUFEKANE, O. SAIGHI

## Abstract:

To characterize the vulnerability to groundwater pollution, improving the standard DRASTIC method universally used, is proposed here. This new technique, in addition to the parameters for charging, such as soil type and topography, thickness and nature of the unsaturated zone, which determine the transfer of pollution to the soil surface to the water, involves more critical aspects related to the permeability of the aquifer. Indeed, the characterization of the vulnerability of groundwater to horizontal transfer of pollution having reached (also called sensitivity to pollution) depends heavily on parameters specific to the saturated zone, such as speed of groundwater flow, quality water saturation and productivity of the water. The concept of vulnerability was then extended

To parameters related to the saturated area of the aquifer.

This new method of evaluating vulnerability to pollution of groundwater is used by the alluvium of the river Nil (Jijel) enclosing an important water reserve in the region. Its implementation has been achieved through the use of MapInfo software has enabled the development of a Geographic Information System (GIS), which yielded a considerable amount of geological, hydrogeological, geophysical and other ...

The database used for this purpose was made during a field survey and supplemented by the gathering of information was collected from various departments involved in this issue (ANRH, DHW, DSA ...). It includes :

Piezometric conducted a campaign in September 2008 and the results of pumping tests performed in 36 wells;

- Geophysical reports (maps of apparent resistivity, resistance and cross sections geo-electrical) and agricultural (soil maps and educational profiles) ;
- A sketch geological and geological drilling logs ;
- The meteorological records needed to estimate the infiltration by the establishment of local water balance, ...

The results of this study show that the aquifer is considered as a whole characterized by a sensitivity to pollution, medium to high. This is especially the catchment areas most productive (up to 200 l / s), located along the wadi in the central axis of the plain, which are

the most sensitive sectors. Therefore, the establishment of protective perimeters around these sites is essential and urgent.

**Keywords:** pollution; vulnerability; sensibility; GIS.