

## **ABSTRACT**

The irrational water management in the M'Zab valley has led to a critical health situation such as environmental degradation and pollution of the groundwater.

The main objective of this present work is therefore to monitor and preserve the environment and water resources in the M'Zab valley, especially underground against any degradation of their quality, and risk of pollution by urban discharges, and of assess the water treatment plant which has been installed with the aim of eliminating nuisances and the risks of contamination in urbanised areas in the rebalancing of the valley ecosystem.

In this perspective, sampling campaigns for urban and industrial discharges were made at several points in the valley followed by a physical and chemical analyses of groundwater wells. A particular attention was given to the treatment plant in the M'Zab valley by physical and chemical and bacteriological analyses (more than 100 samples) were undertaken over 2 years to assess the treatment yield, the quality of the treated water and their ability to use them in the agricultural field.

These works are supplemented by surveys carried out in the field and data already existing in the study area in order to highlight the evolution of the water resource on quantitative and qualitative plans. We finalised our work by implementing a new strategy based on WEAP modelling to study the effect of climatic and anthropogenic conditions in the process of increasing urban discharges, and pollution, and to opt for integrated and sustainable management of water resources in the valley.

The results showed that; urban discharges of the M'Zab valley present very strong organic pollution, including the aquifer characterised by a vulnerability ranging from medium to high. The analysis of groundwater shows that this water, including excessive pollution, requires specific treatment, this water is unusable for irrigation, with the exception of crops very tolerant of salinity (date palms).

The experimental results obtained during monitoring of purified water from the M'Zab valley treatment plant (2013-2015) show that this water has a poor quality, requires tertiary treatment to reuse it in the agricultural field. The balance calculation allows us to clearly conclude the irrational management of water resources in the valley. Our intervention by the WEAP model represents a forecast vision through sustainable scenarios considered for managers as an aid tool for integrated management of water resources in the valley.

### **Keywords:**

Urban reject, pollution, groundwater, vulnerability, M'Zab, cartography, purification; reuse; Integrated management