

## The Integrated Water Management of the Northern Saharan Aquifer System in a Climatic Changes Context

**Authors :** Mohamed Redha Menani

**Abstract :** The Northern Saharan aquifer system "SASS" shared by Algeria, Libya, and Tunisia, covers a surface of about 1 100 000 km<sup>2</sup>. It is composed of superposed aquifers; the upper one is the "Continental terminal - CT" (Eocene calcareous formation) situated at 400 m depth in average, while the "Continental Intercalaire - CI"(clay sands from Albian to Lower Cretaceous) is generally at 1500 m depth. This aquifer system is situated in a dry zone with a very weak current recharge but with a non-renewable big volume stored, estimated between 20 000 and 31 000 km<sup>3</sup>. From 1970 to nowadays, the exploitation of the SASS has increased from 0.6 to more than 2.5 km<sup>3</sup>/year. This situation provoked risks of water salinisation, reduction of the artesianism, an increase of drawdowns, etc. which seriously threaten the sustainable socioeconomic development engaged in the SASS zone. Face the water shortage induced by the alarming dryness noted these last years, particularly in the MENA region, the joint management of this system by the three concerned countries, engaged for many years, needs a long-term strategy of integrated water resources management to meet the expected socio-economic goals projected not only in the SASS zone but also in other places, by water transfers. The sustainable management of this extensive aquifer system, aiming to satisfy various needs not only in the areas covered by the SASS but also in other areas through hydraulic transfers, can only be considered if this management is genuinely coordinated, incorporating schemes that primarily address the major constraint of climate change, which has been observed worldwide over the past two decades and is intensifying. In this particular climate context, management schemes must necessarily target several aspects, including (i) Updating the state of water resource exploitation in the SASS. (ii) Guiding agricultural usage as the primary consumer to ensure significant water savings. (iii) Constant monitoring through a network of piezometers to control the physicochemical parameters of the exploited aquifers. (iv) Other aspects related to governance within the framework of integrated management must also be taken into consideration, particularly environmental aspects and conflict resolution. However, problems, especially political ones as currently seen in Libya, may limit or at least disrupt the prospects of coordinated and sustainable management of this aquifer system, which is vital for the three countries.

**Keywords :** transboundary water resources, SASS, governance, climatic changes

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