

Supporting the cooperative management of the Nubian Sandstone Aquifer System

The challenge...

The Nubian Sandstone Aquifer System (NSAS) is the largest 'fossil water' aquifer system in the world. Its water is ancient and practically non-renewable. Stretching beneath the four African countries of Chad, Egypt, Libya and Sudan, it covers some two million square kilometres. Its vast reserves have the potential to meet growing water demands and to support development goals in the region. However, fossil water is not replenished, risking over-abstraction and eventual depletion. To ensure the availability of water in the region, shared, rational and equitable management of the NSAS is essential. However, gaps in understanding how the NSAS works still remain. Improving the information base is a key first step towards the optimum management.

The project...

Through a regional technical cooperation project, the IAEA, together with the United Nations Development Program and the Global Environment Facility, as well as the United Nations Educational, Scientific and Cultural Organization, have helped the four African countries that share the NSAS to develop a three dimensional computer model to gain a better understanding of its dynamics. The project helped countries to utilize isotope techniques to characterize the aquifer, providing essential information for the development of the computer model. Isotope techniques were used to determine the size of the aquifer, the drawdown of water, the lifespan, potential impact of human activity and the possible transboundary effects.

Through the project, the results of the data collection and modelling efforts were shared, and views were solicited on the top threats to the aquifer. Expert missions and numerous training courses trained specialists and supported the transfer of knowledge and technology between the four countries.

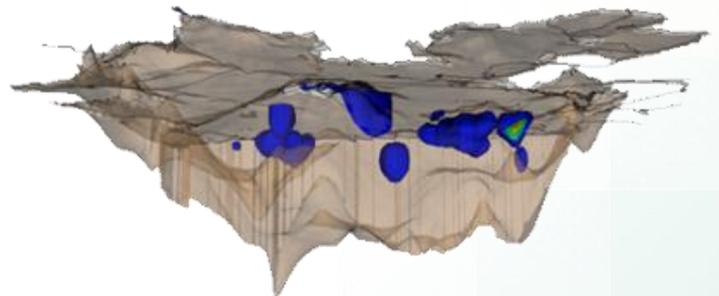
As a long term goal, the project aims to establish appropriate regional strategies for the management of the aquifer for sustainable socioeconomic development and the protection of biodiversity and land resources.

The impact...

As a result of the project, a three dimensional computer groundwater model has been created which can simulate and predict how water moves through the aquifer and how water levels may change over time. The project produced a shared aquifer diagnostic analysis (SADA) that identifies transboundary threats and their root causes, as well as other priority issues.

A strategy action programme was drawn up on the basis of the SADA technical data to strengthen the cooperative management of the NSAS and establish a framework of collective management actions to address transboundary concerns. In addition, a legal and institutional framework was partially set up to govern the shared use of the aquifer.

The three dimensional model shows that there are no major transboundary implications arising from the unequal use of the aquifer in any of the countries. Furthermore, the model shows that in the future – even in 1000 years – there will be enough water to meet the needs of all four Member States.



Three dimensional model grid for the NSAS showing the effects of pumping.