



IAEA

Atoms for Peace: The First Half Century

1957-2007

Investigating and managing groundwater and geothermal resources in the Afar rift valley, Ethiopia

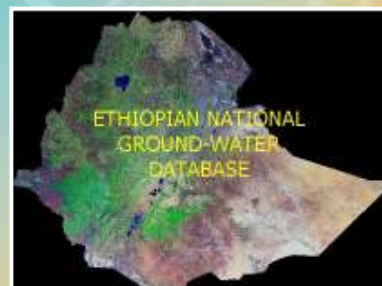
The challenge...

The arid Afar rift valley and the adjacent highlands of Ethiopia face water management challenges, but also have interesting geothermal potential. The project used isotope hydrology techniques to investigate groundwater and geothermal resources in the area.

The project...

The project investigated the nitrate source in the Sebian well field of Direedawa town, Eastern Ethiopia, and the sources of sulphate in Mekelle town well field groundwaters. It examined groundwater origin and recharge, and the interaction between surface water and groundwater in the vast area of Afar rift floor aquifers. It also looked at groundwater origin, recharge and dynamics in three alluvial grabens bordering the Afar plain from the West. Finally, it focused on the application of isotope hydrology tools for the development and management of the Dofan and Fentale geothermal fields, and on capacity building through the installation of a national isotope hydrology laboratory.

The initiation of a national groundwater database, the “Ethiopian National Groundwater Database” (ENGDA) was a major activity of this project. The database is designed to serve the broader groundwater resources assessment programme “Ethiopian Ground Water Resources Assessment Programme” (EGRAP), which was developed with the support of the IAEA.



The impact...

- The ENGDA water database was established, with over 3200 data points included.
- The hydrological and geochemical characteristics of the mountains, plateau, and basin floor were delineated, as were the connections between these features including structural and geological features which control the hydrological characteristics and water quality (especially fresh vs. saline waters).
- An understanding of groundwater recharge locations and rates was reached.
- Reservoir temperatures in the geothermal system were estimated, and the major recharge source was identified.

ETH/8/006: Ethiopian Ground Water Resources Assessment Programme (EGRAP). EGRAP is being implemented by a national coordinating body. The IAEA continues to support EGRAP through Technical Cooperation projects ETH/8/008 and ETH/8/010.

ETH/8/007: Groundwater and Geothermal Resource Exploration in the Ethiopian Rift Valley and Adjacent Areas

Partners: This multi-counterpart project involved three Ethiopian institutions: the Ministry of Water Resources (MWR), the Ethiopian Geological Survey (EGS), and the Department of Earth Sciences of Addis Ababa University (AAU). The Department of Earth Sciences acted as the principal counterpart of the project.