Paper Number: 2600

Groundwater Resources Management for Lusaka Water Supply, Zambia

El-Fahem, T. [1] and Namayanga, L.[2]

[1]BGR – Bundesanstalt für Geowissenschaften und Rohstoffe, Stilleweg 2, 30655 Hanover, Germany, Tobias.El-Fahem@BGR.de
[2]WARMA – Water Resources Management Authority, Lusaka, Zambia
Keywords: groundwater, vulnerability, hydrochemistry, IWRM, Lusaka

---

For the first time in Zambia groundwater resources shall be regulated and protected as required by the Water Resources Management Act of 2011. The new Water Resources Management Authority (WARMA) was created in order to manage Zambia's water resources and create a sustainable environment for socio-economic growth resistant to climate change.

Groundwater is a viable solution of the water supply for the city of Lusaka but is now under stress due to the stress caused by the rapid development of the City. For the first time the City of Lusaka faces the second year in a row of severe water shortage caused by a number of reasons but most prominently the declining rainfall due to a draught period which has now been possibly exacerbated due to El-Ninõ.

Lusaka is the fast growing capital of Zambia and is situated on a productive but vulnerable karst aquifer. Based on comprehensive hydrogeological investigations WARMA is giving advice for the protection of Lusaka's aquifer in coordination with the responsible land use planners. A protection strategy for the future urban water supply is under development.

The hydrogeological data of the Lusaka aquifer was assessed through the collection of borehole data, groundwater monitoring and sampling campaigns. The data was analysed and visualized by thematic maps (hydrogeology, vulnerability) and processed in a groundwater flow model. Five alternative wellfield areas were identified and a study carried out to compare the costs for the development of these wellfields with the construction of a surface water pipeline from the Kafue River.

Today 60% of the water supply for Lusaka comes from groundwater and the rest from surface water. Lusaka's karst aquifer is very vulnerable to contamination from the surface due to the lack of any protective layer in many areas. The water table can be observed a few meters below the surface during the rainy season. The vulnerability of the aquifer is compounded with the fact that most of Lusaka is not connected to a sewage system and effluents from households and industries are directly infiltrating into the ground. Groundwater contamination by organic and also inorganic substances has been identified in in many places.

Domestic and industrial development around Lusaka is growing rapidly and is heavily dependent on groundwater from boreholes on their plots. The introduction of groundwater as a resource to be regulated through WARMA is providing key elements for the methodology to control the exploitation

and pollution of Lusaka's groundwater and to assist with the calls for the establishment of protection zones to conserve groundwater for future supply as an alternative resource in case of shortages from surface water supply.