

METHODS IN KALAHARI GROUNDWATER INVESTIGATION OF KAVANGO

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With the passage of time things known to be "true" are often found not to be quite so. Initial understanding of geological and sedimentary processes becomes modified as successive layers of information are "peeled" off and with each so the truth also is transformed. With geology there are very few absolutes and all of our understanding of genesis is through inference. With this cast body of tertiary (cretaceous) to recent terrestrial sediment the earliest workers relied on scattered exposures of elements of the stratigraphy. With the passage of time scattered drilling revealed more, and understanding of the unit increased. When we were appointed to carry out a groundwater investigation in Kavango and Bushmanland the understanding with which we approached the Kalahari has undergone a metamorphosis as newer information has presented itself and enabled the evaluation of earlier concepts. Basically we have been shown - in no uncertain terms - that we did not know that much to start with and the further we go the more profoundly different the emerging picture.

As mentioned the reason for our involvement in the Kalahari of this area was primarily the EEC funded groundwater investigation awarded to Namibian Groundwater Development Consultants by the Department of Water Affairs. The project has basically comprised 2 phases, the first a compilation of available information of the occurrence and utilization of groundwater in the area supplemented by a field reconnaissance survey aimed at determining the status quo of supply and demand. This first phase survey resulted in the formulation of a pretty clear picture of the Kalahari in Kavango and Bushmanland.

Unfortunately we were also asked to design and implement a more practical second phased investigation in which the wonderfully clear (and simple) understanding achieved during Phase 1 could be both tested and added to - this quietly scrambled several fundamental concepts but also presented an explanation for

certain obscured phenomena. In a nutshell - we were chastised for presuming to know the truth regarding the Kalahari of our study area!

Levels of knowledge

We will now take a look at the Phase 1 exercise and the manner in which we were lulled into such a sense of false security.

Our TOR called for a compilation of available information regarding groundwater in the Kalahari. For this we accessed the Department of Water Affairs' database - for borehole and groundwater information - and carried out a fairly extensive literature survey. This was compiled in the form of a report in which we took the liberty to reach some conclusions. During the field survey that followed we visited 90% of the waterpoints in the area and established certain physical parameters while recording other socio-economic data. Pumping rates, water rest levels, physical location and physiography were recorded at each water point, in addition to collecting water samples for hydrochemical analysis. At the completion of this a final report (Phase 1) was put together. From this most of the conclusions reached in the desk study were confirmed.

1. Geology and Isopachs
2. Surface of bedrock
3. Bedrock structures (Aeromag?)
4. Piezometric surface
5. Rest levels
6. Hydrochem (TDS, HARD, F)

In essence the Phase 1 survey had shown the following:

1. The Kalahari (aquifer) was a relatively homogeneous sandy to silty body that reached in excess of 350 m along the basin axis, tapering eastwards to the bedrock high on the Botswana border.
2. Borehole yields did vary due to changes in permeability resulting from the distribution of layers of differing grain size matrix content.
3. Groundwater chemistry reflected the influence of bedrock.