

# Can groundwater be successfully implemented as a bulk water resource within rural Limpopo Province? Analysis based on GRIP datasets

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## Abstract

Groundwater is a strategic water resource in rural Limpopo Province and it accounts for almost 70% of rural domestic water supply. The resource is available throughout the Province in varying quantities and qualities depending on the hydrogeological properties of the underlying aquifer. These properties are mostly secondary in nature and are constrained by the processes of weathering, faulting, fracturing and the influence of intrusive rocks. These properties define typical fractured aquifers in which the selection of drilling sites requires a thorough scientific approach to locate a successful productive borehole. While most water service authorities in the Province have been randomly developing new boreholes with limited success rates, the analysis of datasets in the newly established groundwater data repository, the Limpopo Groundwater Resource Information Project (GRIP) demonstrates that large quantities of groundwater can be obtained and used for bulk supply if the drilling sites are scientifically selected. The GRIP dataset contains 24 922 entries of which 4 000 were tested. The pumping test results indicate that an estimated 576 000 m<sup>3</sup>/d (210 Mm<sup>3</sup>/a) can be sustainably abstracted from boreholes in approximately 2 500 villages that are dispersed throughout the Province. However, more than 50% of these boreholes are unequipped of which 3 000 can provide a combined yield of 109 Mm<sup>3</sup>/a based on a 24 h abstraction rate. These results show that groundwater can be developed as a potential viable bulk-water supply source. This paper attempts to demonstrate, using the existing GRIP dataset, that groundwater is an underutilised resource that can be viably and cost-effectively developed as an alternative bulk water source or conjunctively with surface water.

**Keywords:** groundwater, GRIP, bulk water supply, information variability, borehole productivity, conjunctive use, well-field development cost, well-field yield