Assessing Groundwater Source Yield

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Testing Borehole or Well Yield

There are different ways of testing the yield of a borehole or well to assess how much it can sustainably provide, but they all involve measuring the maximum pumping rate that can be sustained for a reasonable drawdown of the water level (i.e., so that the water level stays above the pump intake).

The following gives a brief summary of testing borehole yield. More details on methods for testing borehole yield, which are particularly appropriate for rural water supply in an African context, can be found in the chapter **Designing and Constructing Water Points** in MacDonald et al. (2005), which can be freely downloaded online.

An initial estimate of borehole yield can be made when the borehole is airlifted after drilling, but this is a very approximate method. It gives no information about water level drawdown in the borehole, and therefore no information about the sustainable yield. However, it can indicate whether a borehole is likely to be productive enough to be worthwhile installing screen and casing, and what size of pump to use for a pumping test.

A short, simple pumping test that is suitable for a relatively low yielding borehole capable of supplying enough water for a hand pump for 250 people, is a bailer test. Water is removed from the borehole with a bailer of known volume for a short time – e.g. 10 minutes – and the water level is measured as it recovers, usually for about 30 to 60 minutes. The equipment needed is a 20 m rope; a stopwatch; a water level dipper; and one or preferably two simple bailers that will fit freely down the borehole. The results can be analysed using sound theoretical principles. The procedure for carrying out and analysing a bailer test is given in the chapter **Designing and Constructing Water Points** in MacDonald et al. (2005).

For higher yielding boreholes, a constant rate test using an electrical pump should be carried out. This involves pumping the borehole at a constant rate for a certain period – usually at least 3 hours – and measuring the change in water level in the borehole during pumping and after pumping stops, as the water level recovers. The test results are analysed to give information about aquifer transmissivity – a measure of how easily groundwater can flow through the aquifer. A constant rate test requires a water level dipper and stopwatch, and an electrical pump of suitable size to match the potential borehole yield. A procedure for carrying out and analysing a constant rate test is given in the chapter **Designing and Constructing Water Points** in MacDonald et al. (2005).

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