



## INSTITUTIONAL SETTING AND PURPOSE

The monitoring of groundwater levels is responsibility of the Groundwater Division at the Department of Water Resources (DWR) under the Ministry of Forestry and Natural Resources. The National Water Resources Authority (NWRA), established by the Water Resources Act 2013, will take over this responsibility when it is adequately operationalised.

The national groundwater monitoring network was established in 2009. The objective of the network is to monitor groundwater quality and quantity in Malawi to enable informed decision-making for the development and protection of groundwater resources. The National Water Resources Master Plan, 2017 includes an Annex on Groundwater that describes the hydrogeology of the country, groundwater monitoring and groundwater development.

## CHARACTERISTICS OF THE NETWORK

The network includes 75 wells with automatic data loggers. 30 of them were drilled in 2009-2010 and started recorded data automatically in 2013. In total, 36 of the wells were drilled in 2015 and had data loggers installed in 2017. Data for these 66 monitoring wells is recorded every 15 minutes. Groundwater monitoring data downloading from the loggers is ad hoc due to resource constraints. Another 10 monitoring wells were drilled in 2017 and data loggers were installed in 2018 for automatic readings at 9 of them (one was vandalised before installation). The loggers for the latter 9 wells record data every hour.

Groundwater levels are firstly stored into Excel which allows easy processing and visualisation. The Ministry uses Windows Interpretation System for Hydrogeologists (WISH) database developed by the Institute for Groundwater Studies (IGS) and the Water Research Commission (WRC) as a groundwater as-

essment tool. The data are also stored in Hydstra (which is the main software used for hydrological data analysis in the Ministry) including groundwater level time-series, but there are challenges in using drilling data in Hydstra. Also, challenges with licence requirements for Hydstra and compatibility with drilling data affect its use.

Data are for Ministry's internal use as well as for external use as requested.

Groundwater level time series are analysed via plotting and identification of outliers, trends and gaps, combining precipitation and surface water data.

## Sources

- **Departments of the Ministry of Irrigation and Water Development** - [http://www.malawi.gov.mw/index.php?option=com\\_content&view=article&id=13&Itemid=99](http://www.malawi.gov.mw/index.php?option=com_content&view=article&id=13&Itemid=99);
- **Feedback from the Groundwater Division at the Department of Water Resources (DWR), Ministry of Forestry and Natural Resources of Malawi** - received on 22-09-20;
- **Government of Malawi, Department of Water Resources, Transboundary Water Resources Management Unit. National Water Resources Authority (NWRA)** - <http://malawi-twrmu.hatfieldgroup.com/en/institutions/national-water-resources-authority>; and
- **SADC country visits** - 2017.