

Afghanistan

Capital city: Kabul
Inhabitants: 38 Million



INSTITUTIONAL SETTING AND PURPOSE

The Hydrogeology Department of the Ministry of Energy and Water (MEW) is responsible for monitoring and managing groundwater in Afghanistan. Additionally, two institutions are involved in groundwater monitoring: The Danish Committee for Aid to Afghan Refugees (DACAAR) and the Afghanistan Geological Survey (AGS), both with different purposes and encompassing different study areas. Since 2003, DACAAR has been conducting groundwater monitoring in 29 provinces of Afghanistan, covering almost 85% of the country's river basins.

The purpose of DACAAR's network is to provide long-term scientific information on groundwater quality and quantity, while the purpose of AGS network is to assess seasonal, areal, and potentially climatic variations in groundwater characteristics in the Kabul Basin, as the most populous region in the country.

CHARACTERISTICS OF THE NETWORK

DACAAR's network consists of 363 monitoring wells that provide information regarding the qualitative and quantitative status of the groundwater resource. This is the only national data source on groundwater in Afghanistan.

The monitoring is made manually through Groundwater Monitoring Teams that visit the wells monthly to measure groundwater levels, electrical conductivity (salinity), pH, temperature and ORP and take water samples for quality analysis on a semi-annual basis. The monitoring wells also have drilled, constructed and modified for long time recording using diver/ data logger. Divers/data loggers are reliable instruments for automatic measurement and registration of the ground water level, salinity and temperature over a long time period. The Divers are installed in tube wells and after a while data are up-loaded to a Diver Mate, then downloaded from the Diver Mate to a PC.

The network from AGS started with 71 wells in the Kabul Basin in 2004, with the assistance of the U.S. Geological Survey. The network was made up exclusively of existing production wells and levels are measured once a month using electric tape water-level meters. Both static and dynamic water levels are recorded. In 2010, AGS established similar groundwater monitoring networks in the cities of Mazar-e-Sharif, Sheberghan and Sar-e Pol.

The figure below shows the distribution of groundwater monitoring wells in Afghanistan.

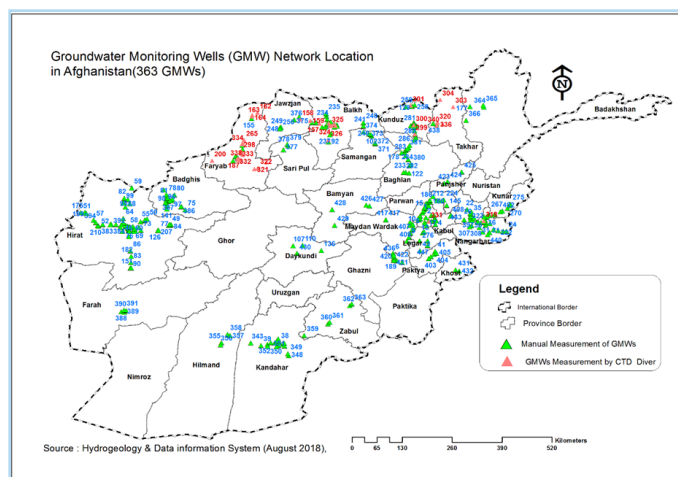
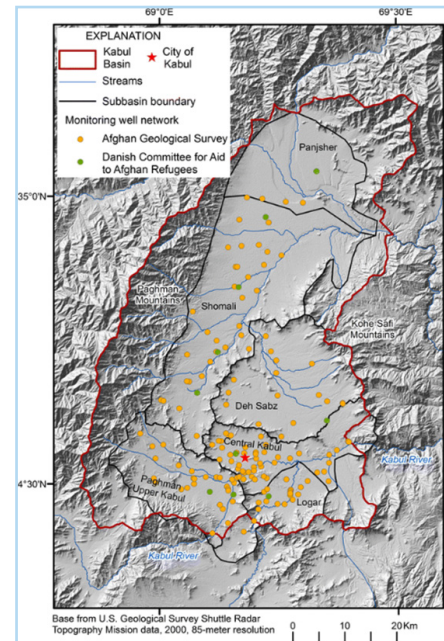


Figure 1 - Distribution of groundwater monitoring wells in Afghanistan (Source: DACAAR)

And the following figure shows the distribution of groundwater monitoring wells in the Kabul Basin, including wells from the monitoring networks of DACAAR and AGS.

Figure 2 – Monitoring wells from AGS and DACAAR in the Kabul Basin, Afghanistan

Static groundwater levels in Kabul city were separately collected by the Hydrogeology Department of MEW from 2007 till 2009 and restarted in 2014 up until now. The measurements are gathered from 104 wells monthly throughout the city. Previously, the department focused only on groundwater monitoring of the major cities: Kabul, Nangarhar, Balkh, Herat, and Ghazni. In 2019, the groundwater monitoring system was created in more than 10 cities of Afghanistan where groundwater static levels are being measured monthly.



PROCESSING AND DISSEMINATION

DACAAR publishes several times a year various reports on groundwater monitoring, mainly on quality and geophysics. The last report on groundwater levels monitoring is the National Groundwater Monitoring Wells Network Finding Challenges and Recommended Solutions in Afghanistan by M. H. Saffi and A. Jawid, 2013. It reports shortly about the National Groundwater Monitoring Wells Network Database (WSG_SWL) that is developed as a part of DACAAR activities.

The long term quantitative and qualitative GMWs data (2003-2019, see figure on last page) were evaluated, mapped and provided in reports and presentations, and findings were presented in national and international conferences. Reports are available in DACAAR's website .

Since the start of their collaboration, AGS and USGS have released more than 40 reports on the quantity and quality of groundwater and surface water resources. For example, the publication 'Groundwater Levels in the Kabul Basin, Afghani-

stan, 2004–2013' presents water-level hydrographs for stations in 5 sub-basins. In a different publication, the Seasonal Kendall test is used to determine trends. In general, a relatively little change in the water-level trend during the period of record is observed in the Kabul Basin using Seasonal Kendall test (publication 3), with exception of the Central Kabul sub-basin where groundwater level has decreased from several meters to about 25 m.

The information recorded on the field form and the water-level measurements are maintained in project databases by the AGS.

The collected data on static groundwater levels in Kabul city is processed by the Hydrogeology Department of MEW. Monthly static water level fluctuation reports are prepared and published on Facebook page "Afghanistan Water Resources and Hydrology Services" for the public awareness.

Sources

- **Afghanistan Geological Survey (AGS)** - <https://www.bgs.ac.uk/afghanminerals>;
- **Afghanistan Water Resources and Hydrology Services, Facebook group** - <https://www.facebook.com/AfghanistanWaterResourcesDepartment>;
- **Danish Committee for Aid to Afghan Refugees (DACAAR)** - <https://dacaar.org>;
- **Feedback from AGS** - received on 01-02-2020;
- **Feedback from DACAAR** - received on 28-01-2020;
- **Groundwater Monitoring System (DACAAR)** - <https://www.dacaar.org/functions/groundwatermonitoring>;
- **Hydrogeology Department of the Ministry of Energy and Water in Afghanistan** - personal communication, November 2019;
- **Jon Campbell, 2015. A dry and ravaged land: Investigating water resources in Afghanistan. Article in Earth Magazine** - <https://www.earthmagazine.org/article/dry-and-ravaged-land-investigating-water-resources-afghanistan>;
- **Mack, T.J., Chornack, M.P. & Taher, M.R. Environ Syst Decis (2013) 33: 457. Groundwater Levels in the Kabul Basin, Afghanistan, 2004–2013** - <https://doi.org/10.1007/s10669-013-9455-4>;
- **Taher, M.R., Chornack, M.P., and Mack, T.J., 2014, Groundwater levels in the Kabul Basin, Afghanistan, 2004–2013: U.S. Geological Survey Open-File Report 2013–1296, 51 p.** - <http://dx.doi.org/10.3133/ofr20131296>
- **USGS Projects in Afghanistan** - <https://afghanistan.cr.usgs.gov/water>