

TERMS OF REFERENCE FOR EMERGENCY (SURGE) MISSIONS

Title:	Hydrogeology Expert
Reports to:	WASH Manager (Water Supply)
Duration:	Six Months (Feb to July 2023)
Location:	Outstation with occasional travel to Kabul and regional offices

BACKGROUND

Most of Afghans depend on groundwater as their primary source of domestic/drinking water. Afghanistan has encountered a scarcity of surface water due to the unequal and spatial distribution of precipitation, poor integrated water resources management, low water storage infrastructure and fragmented institutional arrangements. This is further compounded by the fact that Afghanistan has for decades missed opportunities for development due to both internal and external conflicts. The country is covered by five river basins of which perennial rivers either flow marginally or extremely polluted. Most small rivers/streams are intermittent and only run for only 3-4 months during the wet season. Therefore, groundwater is a strategic storage, and plays a leading role for various purposes such as: domestic/drinking, irrigation, industries and environmental security, while playing a buffering capacity against climate hazards such as droughts and if managed properly could also assist in mitigating some of the detrimental consequences of flooding.

In Afghanistan, a lack of groundwater resources' qualitative and quantitative information exists due to poor data collection, storage, management and sharing between both partners and Ministries. Since March 2005, DACAAR, with the financial support of USGS, DANIDA, Royal Norwegian Embassy (RNE) and UNICEF has selected, constructed and modified 205 groundwater monitoring wells (GMW) in 19 provinces of Afghanistan (wherever security situation allowed) for seasonal and long-term groundwater (qualitative and quantitative) monitoring associated with their own water supply projects nationally. Most importantly, UNICEF has been instrumental in reorganizing the program. This network of monitoring boreholes. It has since been expanded to 375 boreholes in a total of 29 Provinces. The depth of these wells ranges between 12 to 65 m, with most drilled in the more recent Quaternary formation (shallow aquifer).

Similarly, Ministry of Energy and Water (MEW) have also been collecting data for groundwater and surface water monitoring since 2008, through a large network of over 900 monitoring wells of which 260 are dedicated to monitoring, 270 surface water monitoring stations and 30 meteorological stations. Hydrogeology department of MEW is responsible for this and established a platform which require support for continuity.

However, based on extensive discussions with DACAAR, MEW and other stakeholders, it transpired that groundwater monitoring stations consist of both pumped (for water supply) and monitoring boreholes. These may not be suitable for monitoring groundwater resources either because they were designed for actually pumping and/or their spatial extent is inadequate. Similarly, analysis is also needed for surface water monitoring data at a National level to understand the interaction between groundwater and surface water across the watersheds/aquifers.

For this reason, this ToR seeks to request a suitably qualified hydrogeologist to assist in a baseline study on both the national hydrogeology and existing monitoring data to identify gaps and a framework to better manage water resources.

PURPOSE

To support the analysis of existing data available for groundwater monitoring and surface water monitoring and suggest additional measures for strengthening the monitoring of groundwater and surface water in Afghanistan.

MAIN RESPONSIBILITIES AND TASKS

The overall objective of the deployment will be to support the collection of all available existing hydrogeological and hydrological data as part of a baseline study on water resources nationally. The baseline data will result in production of an updated hydrogeological map at the hydrological basin levels and in doing so identify gaps in both knowledge on surface and groundwater monitoring networks and also capacity of partners to allow a comprehensive long term monitoring framework to be developed. This monitoring framework will be intrinsically linked to governance structures from the local level from which water user associations exists to the sub-basin and basin level management authorities inclusive of both Provincial (PRD) and Urban Water Authorities to the national level Miniseries (MRRD, MEWs etc).

Task 1: Baseline Understanding of Surface and Groundwater from Existing data (30 calendar days)

This task will involve:

1. Inventory of all existing hard copy and online reports, papers, thesis' as part of a comprehensive literature research;
2. Review of all relevant documentation with a synthesis report on understanding on surface and groundwater; and
3. Catalogue of all reports to allow open access on any developed information management platform.

Task 2: Collation of all available surface and groundwater information (45 calendar days)

This task will involve collection of:

1. All surface water data such as location of stream gauges, flow data, surface water quality etc.;
2. Meteorological data such as location of climate stations and historical and present data of whatever parameters exist;
3. Groundwater data as location of all boreholes, with lithological logs, test pumping, water chemistry and if possible, any monitoring data on flow, water level and field measured water quality (EC, pH and temperature);
4. Geology maps and cross-sections at any scale; and
5. Hydrogeology maps and cross-sections at any scale.

Task 3: Collation of all available surface and groundwater use information (45 calendar days)

This task will involve:

1. Establishment of approximate water use as a volume (Mm³) at hydrological basin level of both surface and groundwater by all sectors – domestic (rural and urban), agriculture (subsistence and broad scale), industry and groundwater dependent ecosystems, thereby developing a water balance across the watersheds/aquifers;
2. Forecast water demand for each sector; and
3. Document hazards to water supply as part of comprehensive risk analysis – i.e., only high to very high risk. Such information would include land uses and the risk they pose (over abstraction, use of pesticides), urbanisation (over abstraction and unregulated drilling and use of water plus complex contamination to water sources), mining, GUDI wells etc.

Task 4: Catalogue/Map all relevant partners in the water sector (30 calendar days)

This task will involve:

1. Collating all information on both relevant ministries and partners with a vested interest in water;
2. Their respective accountability with respect to water and their roles and responsibilities; and
3. Their respective capacity as both technical and institutional in water assessments, management, monitoring and governance.

Task 5: Develop updated maps, database and report on findings (30 calendar days)

This task will involve:

1. Using GIS develop updated hydrogeological map identifying both location of principal and local aquifers with their type (unconfined, semi-confined or confined) relative productivity (low, moderate or high) and also vulnerability (low, medium or high). The map should also indicate regional flow of groundwater from recharge to discharge areas;
2. A well-structured database which should align with existing ones;
3. Report on findings, gaps, priorities, recommendations and work plan and budget which will provide basis for National level workshop on water scarcity and governance.

KEY DELIBERABLES

The following is a summary of the key deliverables:

1. Updated Hydrogeological map defining aquifers, their productivity and vulnerability both as hard copy and in GIS format;
2. Short executive summary report on findings and recommendations on how to address issues identify.
3. Detailed comprehensive report with links to data;
4. Plan and framework to further develop national level water resource monitoring with budgets and proposals;
5. Capacity development strategy with proposals/ToRs/budgets to implement; and
6. Web based platform to host maps, hydrological and hydrogeological data and monitoring data

MINIMUM QUALIFICATIONS AND COMPETENCIES

- MSc in Hydrogeology with 10 to 15 years of experience
- Experience in handling, analysing and presenting hydrological and hydrogeological data using GIS
- Good programme management skills and ability to communicate and present both verbally and in written form to a wide variety of stakeholders
- Ability to work in a transdisciplinary team and in general be a good team player
- Fluency in English (verbal and written). Good written and spoken skills in the language of the humanitarian operation and knowledge of another UN language is an asset

Initiated/Drafted by:

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Date

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31/01/2023