

TERMS OF REFERENCE

HYDROGEOLOGICAL, GEOPHYSICS AND RELATED STUDIES OF SUBSURFACE AND GROUND WATER SOURCES IN THREE DISTRICTS OF NIMROZ AND FARAH PROVINCE, AFGHANISTAN.



1. BACKGROUND TO THE HUMANITARIAN CRISIS IN AFGHANISTAN

The Taliban's takeover in August 2021 marked the end of 45 years of conflict in the country. While it brought relative security for the population, it also ushered in significant challenges, such as the exclusion of half the population from economic and political life due to the authorities' discriminatory policies against women. Furthermore, the country is experiencing a severe economic crisis partly caused by international sanctions and is also heavily impacted by the consequences of climate change, including the increasing frequency of droughts with the current drought having lasted for three years now. The absence of sustainable management of natural resources and the collapse of traditional production systems over the past forty years due to war have greatly increased the population's vulnerabilities. At the same time the effects of the economic and climate crisis are being keenly felt by the Afghan people.

SI was established in Afghanistan in the 1980s, with a continuous presence in the country until 2018. Following the Taliban take over, operations were resumed in the second half of 2021. Since its reopening SI had operations in Kapisa which closed in January 2024 and are currently operational in Bamyan, Kabul, Nimroz and Farah provinces. SI works in 23 countries globally and has developed technical expertise in three sectors: Food Security & Livelihoods (FSL), Water Sanitation & Hygiene (WaSH) and Shelter. In Afghanistan specifically, SI has invested a lot in the FSL and WASH sectors, implementing more than 120 projects in the country between 1980 and December 2018, benefitting approximately 3,200,000 people in 10 different provinces. Since the re-opening of the mission in 2021, SI has conducted several needs assessments, strengthening SI's technical knowledge and understanding of its areas of interventions, while involving the communities as much as possible to build SI's expertise on local practices and the preferred modalities of intervention.

In its current projects, SI's expertise is strong and focuses on integrated WASH and FSL interventions. SI has been providing access to safe water, hygiene and sanitation to the most vulnerable communities, including the construction / rehabilitation of water infrastructures, support to build safe and adapted latrines together with hygiene promotion (HP) sessions in the communities. In addition, recently SI started developing / rehabilitating irrigation infrastructures, and expanded its FSL activities to agriculture with the launch of kitchen gardening and poultry activities in Southwest region (Nimroz & Farah) and Central Highlands region (Bamyan).

In all locations, SI benefits from a very positive reputation at community level, while managing to maintain a good working relation with the De facto Authorities (DfA). Indeed, SI has built constructive and principled relations with the De facto Authorities' administration, which allows implementation of projects with limited interferences. Of course, one of the main challenges since December 2022 remains the ban on Afghan women working for NGOs.

The takeover of power by Talibans has resulted in some areas to be accessible to NGOs (due to security issues). Some districts of Nimroz province were until recently not accessible, which probably explains the poor coverage in water supply services. SI is operating in three districts of Nimroz which are (Khashrod, Chakhansoor and Charburjuk) and 3 districts of Farah (Gulistan,

Bakwa and Bala Buluk) where SI is proposing hydrogeological and geophysics studies to be done. Assessments done by SI in Nimroz and Farah provinces have shown that access to water is a challenge to 73% of the households resulting in negative coping strategies.

2. RATIONALE

Afghanistan has been facing severe climate change effects which have precipitated a widespread water crisis across the country. As cited in the [Humanitarian Needs and Response Plan of 2024](#), the country is in the midst of its third consecutive year of drought-like conditions, following the worst drought in 30 years in 2021/2022. The consequences of the drought will have a long-term impact on the hydro-agrometeorological conditions, aquifers, soil moisture, underlying vulnerabilities, and coping capacities for drinking water at both household and institutional levels as climate data suggest that the droughts will continue in future. A [report by Acacia Water \(2023\)](#)¹ reviewed a decline in groundwater table based on the data from many monitoring wells in all the provinces of the country. The groundwater monitoring network currently in place in Afghanistan is composed of 1 557 points that are monitored monthly by the Ministry of Energy and Water (MEW) and by the Danish Committee for Aid to Afghan Refugees (DACAAR). MEW manages the collection of data from 1 331 boreholes and wells while DACAAR manages 426 wells and boreholes.

At a national level, the compounded effects of climate change and decades of under investment due to conflicts contribute to insufficient coverage of WASH services. Whole of Afghanistan Assessment (WoAA) shows that the impact of drought on water scarcity has escalated barriers for households to access water from 48 per cent in 2021 to 67 per cent in 2023, with the likelihood of further increases of people without improved services. shows that the impact of drought on water scarcity has escalated barriers for households to access water from 48 per cent in 2021 to 67 per cent in 2023, with the likelihood of further increases of people without improved services.

During an assessment that was done by SI WASH team in October 2023 in Nimroz and Farah provinces, KIIs results showed that due to reduced and non-availability of surface water there has been a transition from surface water use for irrigation to over reliance on groundwater. This overexploitation of groundwater as well as the lack of regulation/control over use of water for irrigation from wells and boreholes has subsequently resulted in drying up of groundwater sources in most districts of the province. Historically groundwater was mainly used for domestic purposes while surface water was for agricultural activities. Currently, it is estimated that agriculture uses 90% of groundwater resources. This shift shows the need to understand the availability (recharge, yield, and abstraction) of ground water resources at a local scale and to plan for its sustainable use along with the community in Nimroz and Farah. The Ministry of Water Energy has groundwater monitoring wells in Nimroz and Farah province; however, these wells are mainly concentrated around capital districts (Zaranj and Farah) as shown in the link below. Furthermore, consistency in collection of the data by the Ministry is not known.

¹ Underlined documents are shared with ToRs in a separate folder.

Besides water quantity issues, water quality is also a challenge in Nimroz with its groundwater being mainly characterized by high salinity. Electrical conductivity levels as high as 8980 $\mu\text{s/cm}$ have been recorded in some districts of the province.

According to assessments done by SI, in most parts of Chakhansoor district, groundwater levels are between 10 and 20m deep. It was noted that wells that are deeper than 20m supply saline water which is not acceptable for drinking. However, in Khashrod district, shallow wells of less than 20m provide saline water while wells as deep as 100m provide water with an acceptable taste. This shows that the shallow aquifers in these areas seem to be saline while the deep aquifers may provide fresh water which is palatable. In Farah province, the level of water is increasingly going down, resulting in the need for boreholes (50 meters and above) of different depths depending on the thickness of rocks and availability of ground water. A better understanding and more robust characterization of the hydrochemistry of groundwater resources in the region is needed to support a sustainable water supply strategy.

Due to the absence of groundwater monitoring wells in the districts that SI is operating in, it might be pertinent to establish such wells. The present study will be done involving local communities to understand their current knowledge on groundwater and increase their understanding of the need to better know and manage ground water. Limited or insufficient knowledge might lead to poor practices and management that will negatively affect the system in the medium- to long-term period.

Lack of water and the related negative coping strategies are engendering critical hygienic situations for individuals and increase the risk of epidemic outbreaks. Globally, Afghanistan witnessed the spread of Acute Watery Diarrhea (AWD)/cholera in 333 districts across all 34 provinces, recording more than 195,000 cases and 94 deaths in 2023. Nimroz and Farah are some of the districts that also recorded high cases of AWD in 2023.

3. STUDY AREA

Nimroz and Farah are two of the thirty-four provinces of Afghanistan. They are in the southwest of the country on the borders of Pakistan and Iran. A major part of the provinces is covered by the desert area of Dashti Margo.

Farah province has 10 districts (Anar Dara, Qala-e-Kah, Shibkoh, Lash-e-Juwayn, Khak-e-Safed, Pushtrod, Farah, Bala Buluk, Bakwa, Gulistan), Farah province has a total population of approximately 772,000 (as per HNO 2024), mainly pashto-speaking, with pockets of Tajiks and Hazara (Gulestan).

Nimroz province has five districts which are Chaharburjak, Chakhansoor, Kang, Khashrod and Zaranj. Zaranj is the capital city of the province. The province has a total population of approximately 184 000, mainly Baluch.

The location of both provinces and districts in Afghanistan are shown below, for extra map, please refer to appendix 3.

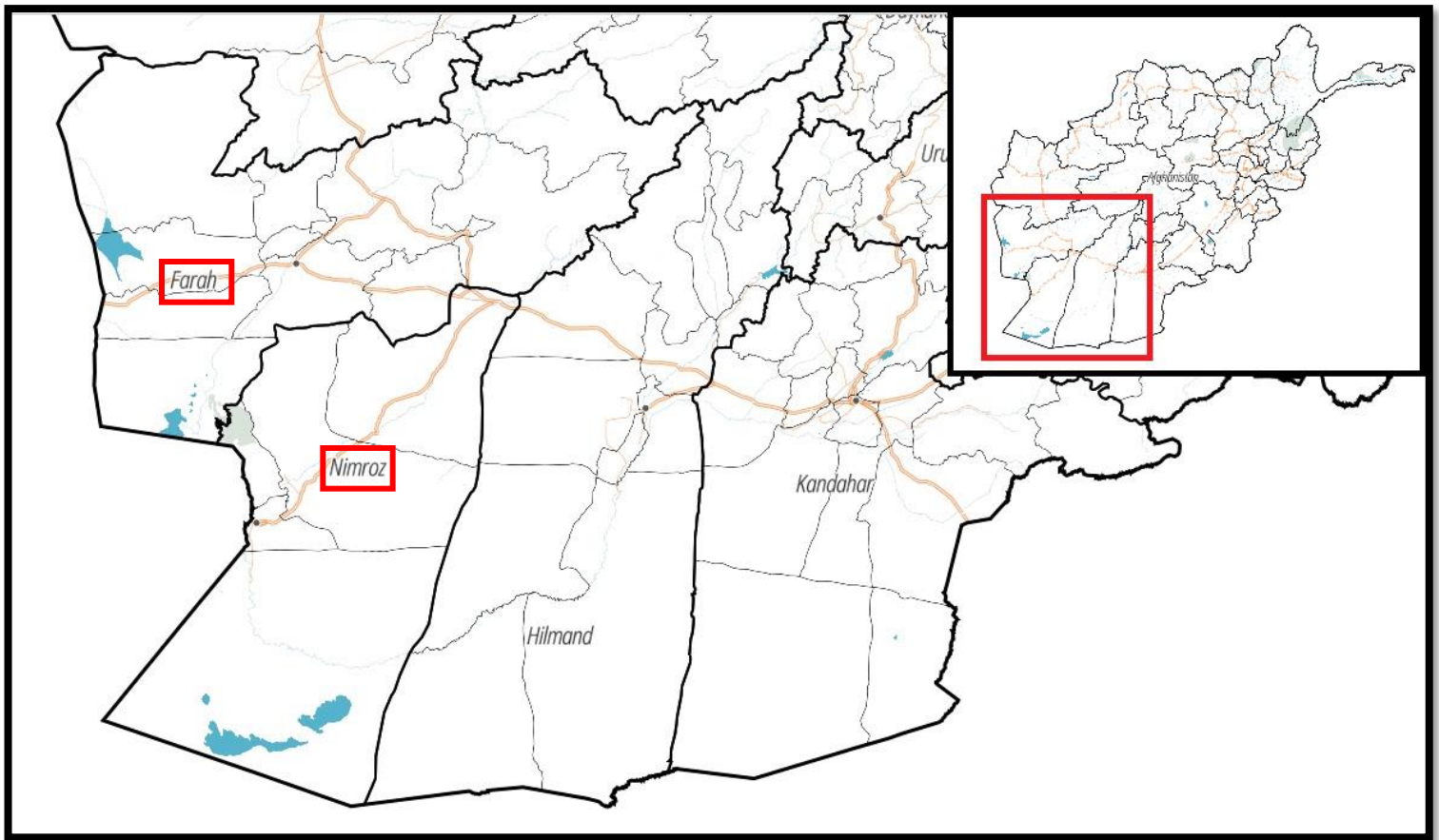


Figure 1: Location of Nimroz and Farah Provinces in Afghanistan

Activities of Solidarités International are in both provinces in the districts of:

- Nimroz : Khashrod, Chakhansur and Char Burjak
- Farah: Bakwa, Bala Buluk, Gulistan

3.1 River Basins of Afghanistan

Afghanistan is divided into five major river basins. These are Kabul, Northern, Helmand, Panj-Amu and Hari-Rod Murghab rivers basins. Four of these river basins are transboundary. Kabul River Basin drains into Pakistan, Helmand River Basin drains into Iran, Panj-Amu River Basin flows to the North-west and joins the Amu Darya in Central Asia. Nimroz and Farah province lies on the Helmand River basin. The Helmand River basin contains the longest Afghan river which forms the Afghan-Iranian border for 55 kilometers. The basin covers 262 341km² which is 41% area coverage of the country. It has a flow contribution of 11% to the annual water flow generated in the country. Water from the Helmand basin is used primarily for irrigation.

For more maps refer to appendix 3.

Within these rivers basins there are several watersheds. The involved districts of Nimroz and Farah province are on five major watersheds which are Farah Rod, Khuspas Rod, Khashrod, and Sistan Hilmand. The link below shows the watersheds, geology, hydrogeology description, rivers, among other water resources data in Afghanistan:

<https://gw4a.acaciadata.com/view?area=Afghanistan>

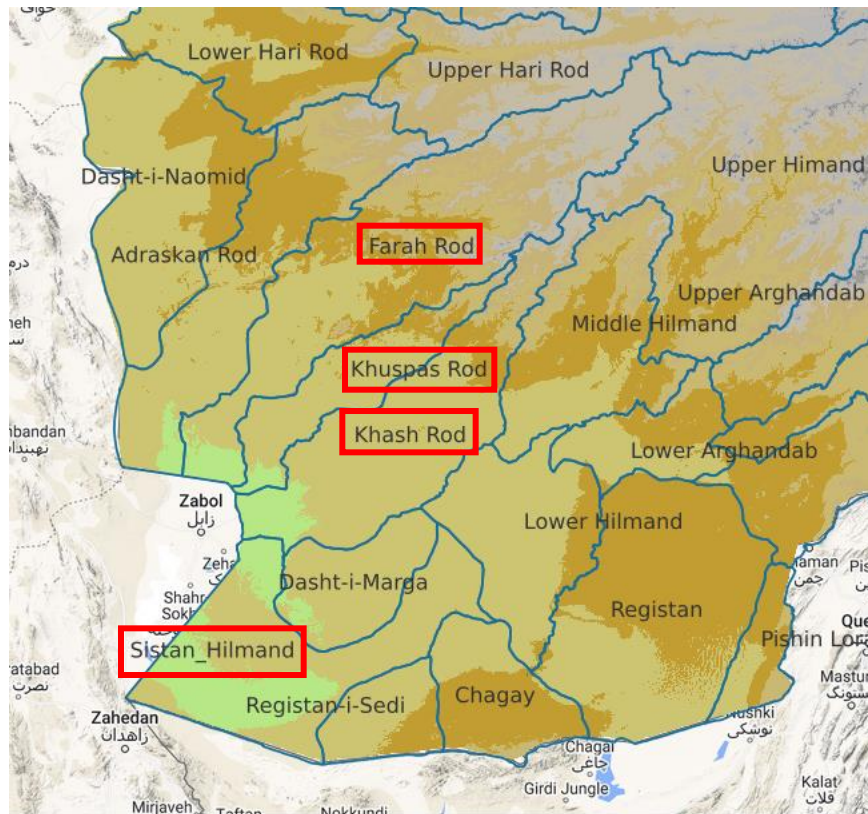


Figure 2: extract of “acaciadata.com”, watershed of the area, involved ones highlighted

4. SCOPE OF WORKS

4.1. Objective of the Study

The main objective of this study is to improve knowledge of the hydrogeological and hydrochemical characteristics of the study area to support the development of a sustainable water supply and water management strategy in Nimroz and Farah provinces, and more specifically where Solidarités International plans to implement activities in future.

This would enable SI to achieve the following specific objectives:

- Improve the siting of groundwater resource development infrastructure.
- Provide operational recommendations for the design, operation and maintenance of groundwater supply systems.
- Support the development of groundwater quality and quantity monitoring systems.
- Increase local knowledge on water resources and support future community-based discussions on sustainable allocation of water between uses and users.

This will be done through a:

- (i) desk top study that can include GIS geological mapping
- (ii) a field level hydrogeological survey in the districts of Farah and Nimroz provinces, where Solidarités International is working, namely:
 - o Khashrod, Chakhansur and Char Burjak (Nimroz)
 - o Bakwa, Bala Buluk, Gulistan (Farah)

Note: After a fast pre-study of the area, through relevant proofs and data he/she got, the expert contracted will propose a list of districts to assess on the field in priority, 3 to 4 districts will be chosen.

The study will update the latest available hydrogeological and related scientific knowledge of studied catchments in the studied locations; recommend practical actions to establish (or input existing) aquifer and hydrochemistry monitoring mechanisms and involve communities as to increase their awareness and knowledge on local groundwater resources availability, use and management.

Proposed activities:

- i. Conduct a desk-based hydrogeological study for Nimroz and Farah provinces, in the districts that SI is operating in.
- ii. Conduct hydrogeological and geophysical field survey in selected areas of Nimroz and Farah (caseload: 3 to 4 districts, depending on where it is more relevant regarding existing data, geology, SI priorities).
- iii. Define the minimum requirements for a ground water quality and quantity monitoring system (identification of monitoring wells, parameters to be monitored, frequency of collection, stakeholders involved, etc.).
- iv. Identify, when possible, suitable water management practices to limit key risks associated with water infrastructures operation and water uses

- v. For international bidders, identify local consulting firms sufficiently skilled to perform sitting operations.
- vi. Propose adapted guidelines to support the training of SI staff and identified stakeholders who will cascade the training to communities. (if feasible) on proper aquifer monitoring and underground water management practices.
- vii. Build (or propose a methodology to support the development of) a simple water balance model including the use of surface water (permanent or seasonal) at the study scale to support decision making process for sustainable water supply.

4.2 Data Collection

4.2.1 Desk Study

The desk study will be undertaken over a period (duration to be determined) prior to fieldwork. The study would include a preliminary report including:

- Literature review.
- Compilation and analysis of any hydrogeological data available
- Development of a conceptual model of the subsurface.

The desk study may be the opportunity to develop an interactive groundwater database if relevant.

4.2.2 Hydrogeological survey

The field survey work plan will be finalized during the preliminary desk study.

It is expected that the field survey work plan will include the following components, where access permit:

- Gather existing data on existing boreholes for the surrounding area, where available.
- Collect and record major water resources data, including water infrastructures and boreholes mapping and capacity, groundwater and surface water characterization, water level and water quality.
- Collect information regarding geological outcrops and key geological/geomorphological features/profile in the area.

Based on the (i) capacity to bring in (by international bidders) or borrow (by international or local bidders) geophysical equipment, (ii) the Desk study and initial field survey findings, (iii) budget available, a geophysical survey will be conducted, the bidder must include it in the quotation.

4.2.3 Geophysical Survey – to be confirmed

In addition to the hydrogeological surveying, a geophysical assessment will be undertaken at locations of interest in the targeted districts.

It is suggested that electrical resistivity tomography (ERT) be carried out on identified sites to reinforce the analysis carried out as part of the field study. Any other relevant technique to support in-depth analysis at the local level, at sites of interest selected jointly by SI and the applicant, may be proposed by the applicant if this improves understanding of the characteristics of groundwater

resources. Where appropriate, the applicant should describe the proposed method, and the objectives of its application.

4.3 Data Interpretation

The geophysical data will be analyzed and interpreted continuously throughout the duration of the survey work. This will enable modifications to be made to the approach where this is considered beneficial to the study outcomes.

The geophysical data will be interpreted against any additional hydrogeological data sourced during the field work (e.g., borehole logs, groundwater data etc.) to allow for suitable calibration.

The activities and methodology described above could be revised by the applicant, and a new one shared later.

5. Timeframe, Deliverables and Reporting

5.1 Projected timeframe

It is estimated that the Consultant field days in the country shall be approximately 33 days (this total is for international bidders, and for local bidders these are field days excluding the arrival and departure days in Table 1). The projections below are tentative indications flexible to modification based on consultant's counter proposal methodology, and subject to change following the preliminary investigation phase. Working days in Afghanistan are Sunday to Thursday 8pm to 5pm. Official work hours are 8 hrs.

Table 1: Activities and projected timeframe

#	Activity	Unit	QTY	ESTIMATED DURATION	Remark
1	Arrival in Kabul & Induction			1 day	
2	Cumulate travels to study sites (for 3 to 4 districts)	Lumpsum		5 days	
3	Field Surveys (including stakeholder briefings, staff training (if necessary), water quality testing & sampling)	District	3 to 4	21 to 28 days (6 to 7 days per districts)	Water sampling and testing will be supported by SI
4	Geophysical surveys (if confirmed)	Unit	3	3 days	
5	Travel back to Kabul			1 days	
	Presentation of preliminary findings to the coordination team			1 days	
	Departure from Kabul			1 day	
15	Estimation of total consultant days in country			33 days	

This timeline only considers the time on the field and does not include the desk review and reporting activities.

This timeframe is an estimated timeframe that will have to be adapted by the applicant based on the proposed methodology and analysis of the ToRs objectives.

5.2 Deliverables/Results from the overall study

Following the desk study and field data collection the consultant shall process all the data and findings and present a draft report featuring revised methodology, findings, discussion of findings, challenges, and recommendations on:

- A technical (hydrogeological and geophysical) report which is a latest addition to the body of knowledge on the hydrogeology of Afghanistan.
- For international bidders, a list of skilled local firms that can perform sitting activities.
- Where field and geophysical survey are implemented, a set of recommended sites for drilling, to obtain adequate water of good quality OR a set of recommended sites for geophysical survey (3 boreholes sites)
- Operational recommendations to design, operate and maintain ground water supply infrastructures.
- A simplified water balance model that considers existing resources, associated risks and constraints, and multiple uses. This would come with practical recommendations for sustainable use of existing resources, taking into considerations existing analysis on water management systems and local governance mechanisms.
- Recommendations to establish local ground water monitoring systems (or at least practices) that take into considerations existing monitoring framework and current constraints. Community based monitoring mechanisms can be investigated. This will be accompanied by training SI and staff and identified stakeholders on groundwater monitoring and decision making on sustainable resources uses. In this respect, a database of wells/BH for long term aquifer and hydrochemistry monitoring can be proposed.
- If appropriate, the applicant may propose the establishment of a set of monitoring sites with a clear monitoring plan. The requirements for the operation of the monitoring system, the potential technical assistance to be provided later (particularly in terms of data interpretation and model development), the cost and the objective of the monitoring system in the short, medium and long term must be clearly set out in the proposed methodology.

5.3 Reporting

5.3.1 Reporting to SI

Upon completion of the study, the preliminary survey findings will be presented to SI coordination team in Kabul.

The final report will be completed within three weeks of completing the survey work. The final report will include details of all the work completed, data interpretation, recommendations and relevant mapping.

Raw data will be presented in the report annexes and can be provided electronically where required.

5.3.2 Stakeholder briefings

The results of the hydrogeological study shall inform not just SI present and future project activities in Nimroz and Farah but will constitute a permanent contribution to the knowledge base of WASH actors in the country and Afghanistan generally. The consultant shall therefore prepare a brief on priority raw findings from the survey at the end of fieldwork and present to a special session to the national WASH Cluster to be requested by Solidarités International. Solidarités International will also share the findings with the WASH sector line ministry (Ministry of Rural Rehabilitation and Development) and the ministry responsible for ground water monitoring (Ministry of Energy and Water). A preview of the presentation to WASH Cluster first be presented to the SI coordination team for comments and input.

6. BIDDING PROCESS

6.1 Summary of bidding Timeline

The entire process from advertisement to reporting is estimated to take 3 months. Below timeline is a tentative and changes might happen.

#	Activity	Timeframe	Duration	REMARK
1	ToR Advertised on websites	26 August- 9 September	3 weeks	
2	Queries from potential bidders	26 August- 8 September		
3	Submission of Proposals	9 September Midnight		
4	Review proposals and select winner	9 September -16 September	1 week	
5	Contracting process	16 September-23 September	1 week	
6	VISA process/Remote work	16 September – 17 October	Duration varies – 4 to 6 weeks (4 weeks mentioned in the planning)	
7	In country mission	17 October – 8 December	33 workdays	
8.1	Preliminary reports/updates	Refer Section 5.2		
8.2	Draft Final Report for comments			
8.3	Final Report			

6.2 Submission of bids

Bids are invited from qualified and reputable national and international consultants (individuals, firms, institutions or organizations including non-profit and non-governmental organizations)

6.2.1 Qualifications and experience levels

- The research team shall include at least a senior Hydrogeologist and Geophysicist with versatile user experience in computer applications and GIS mapping as well as hydrochemistry skills (water quality sampling, testing and analysis).

- The bid is open to national structure and having demonstrated experience of accomplishing similar works and international ones demonstrating capacities around the world in security sensitive, and water scarce and fragile environments, but particularly in Middle East, Asia or Africa. Both need to have more than 8 years experience, and the latest job performed within the past 3 years.
- Experience in the application of hydrogeological and geophysics assessment to propose water facility development, operation and maintenance strategies including determination and siting of ground and surface water sources.
- Good grasp of international, macro, meso and micro level water sector governance issues, as well as experience and skills of conducting climate change and environmental assessments, development of environmental management and water governance frameworks and water safety plans is an added advantage.
- A previous work on Afghan context is an asset

6.2.2 Submission of bids

- The bids shall be in English language delivered electronically via email, and clearly marked in the email subject bar: **“HYDROGEOLOGICAL, GEOPHYSICS AND RELATED STUDIES OF SUBSURFACE AND GROUND WATER SOURCES IN THREE DISTRICTS OF NIMROZ AND FARAH PROVINCE, AFGHANISTAN”**.
- Bids shall be submitted by Midnight Afghanistan time on Monday 9th of September 2024 to (log.bid@solidarites-afghanistan.org) indicating earliest availability for a mission to Afghanistan. The expression of interest should contain:

- (i) a technical offer and
- (ii) a financial and administrative offer:

i. Technical offer, shall comprise of:

- Technical proposal (maximum 15 pages font 11), in professional format, detailing any preliminary research with sources on Hilmand basin beyond what has already been presented in this ToRs and including any preliminary digital or remote mapping that may have already been undertaken by the consultant on the Hilmand basin
- Proposed methodology to respond especially to the content of chapter 4 above and not failing to address among others; the proposed procedures, technologies and instrumentation for field hydrogeological survey, rationalizing why a particular choice or combination of choices is deemed ideal for the Hilmand catchment system, especially in Farah and Nimroz context.
- Tentative work plan presented in say Gantt chart format.
- (NO NEED TO COPY THE WHOLE TOR INTO THE PROPOSAL, ALTHOUGH EXTRACTS AND QUOTES CAN BE MADE)
- Summary outline of at least three jobs undertaken in the past 5 years and attachment of at least one report of such works. Include at least 3 references for those works.
- Attach up to date profile of the organization/principal consultant involved in the survey with *curriculum vitae of the principal hydro geologist/geophysicist or geologist* detailing experience in similar deployments.
- Resources and equipment to be deployed, indicating which ones to be brought by consultant, and which one they expect SI to provide. For example:
 - Scientific equipment: portable water testing lab, GPS, pH meter, conductivity meter, probes, compasses, aerial photographs, geological maps, topographical maps, etc.

- Technical equipment: computers and accessories, photocopier, radio communication equipment, telephones, camp equipment, etc.
- Test pumping set-generator, pump(s) and accessories.
- Any other equipment necessary for the efficient accomplishment of the mission.

As mentioned above, if the bidder cannot bring into the country equipment to conduct a geophysical survey, he/she must still include this service in his offer. With facilitation from SI the equipment can be borrowed from a local company.

ii. Financial and administrative offer, shall comprise of:

- Submit a letter of financial proposal
- A cover of the principal's profile and professional affiliations (or valid registration in the case of business or firm or institution).
- A filled budget template of all expenses expected to be incurred by the consultant/firm/agency, taking account of any legible taxes and deductions - see appendix 1.
- It is anticipated that the consultant shall initially deploy up to 2 experts, one being the principal. MEW/MRRD may assign a geologist (English Speaker) to the consultancy for field visit –which will be coordinated by SI.
- Daily labourers on sites will be engaged directly from locations and paid directly by the consultant/firm/agency. SI can support to identify daily labourers, if required.
- For international consultants, costs of international flight fares (persons and baggage) and transit visas shall be borne by the consultant and incorporated into the financial proposal. International bidders should mention in their offers if they can complete the Entry/exit visas into/out of Afghanistan process by themselves or if SI support will be requested.
- The consultant is responsible for full medical cover of their team (except the in-country expert and daily workers who are expected to have own domestic arrangements).
- Medical pre departure tests from country of origin or transit countries for international consultants shall be advanced by the consultant and reimbursed in-country by SI.
- Local travel and accommodation costs shall be met directly by SI. Before the visit, the service provider will propose a movement plan, which will be validated by SI. All other expenditures will be covered by the service provider (estimated daily costs for food are +/- 10 USD).

6.2.2.1 Queries and clarifications during proposal preparation stage

Preliminary field visits to the proposed area prior to presentation of proposal is not feasible, hence the contractor shall conduct online or other modes of remote literature surveys at their own cost. Any questions for clarification on this TOR or other relevant matter shall be submitted in English to SI via email (log.bid@solidarites-afghanistan.org) citing the title of the consultancy in the subject matter window before 8th of September 2024 at 5PM Afghanistan time and referencing the website from which the advert was accessed. SI's clarifying answers to such questions shall be posted on the referenced website. There shall be no further clarifications to queries reaching SI after the dateline of 8th of September 2024.

6.2.3 SI Code of Conduct

All employees and associates of SI including consultants and contractors working for SI are required to comply with the Code of Conduct (*appendix 2*). The consultant should read and certify the CoC document before proceeding to respond to express interest in the call for bidding.

7. APPENDIX

- Appendix 1 - Consultant Budget template
- Appendix 2- SI Code of Conduct
- Appendix 3 – Extra maps
- Appendix 4 – General technical resources