

TERMS OF REFERENCE (ToR)

Provision of Geophysical and Hydrogeological Survey and Establishment of Irrigation Systems for Large-Scale Climate-Resilient Agriculture Production in Banki Town, Bama LGA, Borno State in Nigeria.

I. Background

The United Nations High Commissioner for Refugees (UNHCR) is partnering with the Borno State Government and private sector to pilot large-scale agriculture projects for the forcibly displaced persons and host communities in Banki town, Bama LGA, Borno State. The main objective of the pilot project is to create sustainable jobs in the selected agricultural value chains, enhance food and nutrition security, and build resilience and self-reliance for the communities affected by forced displacement. One of the key priorities of the pilot project is to establish an effective and efficient irrigation system to enable year-long crop production including dry season farming and build the farmers' resilience to climate change shocks.

The planned irrigation system will facilitate the farmers to optimize the production in various value chains including onions, cucumber, tomatoes, garlic, rice and maize. To know the appropriate sites for installation of irrigation systems, UNHCR is supporting detailed hydro-geophysical surveys aimed at locating suitable sites for ground water exploitation. Identified suitable sites from the survey results will be drilled and the boreholes tested and installed with solar pumps and related water boosters and water distribution network for irrigation of the farmlands.

Therefore, UNHCR is seeking the services of a company specializing in irrigation services to conduct the geophysical/hydrological survey and establish efficient irrigation system to enable year-long crop production in the targeted project location in Banki town, Bama LGA, Borno State.

II. Objective

The objective is to undertake the geophysical/hydrological survey and establish an efficient solar powered irrigation system to irrigate minimum of 200 hectares (ha) of land to enable dry season crop production and achievement of the expected results on food security and households' income.

III. Land location.

The land of approximately 200 hectares is in Banki town, Bama LGA, Borno State as shown below in figure 1 and as per the following GPS Coordinates:

	Decimal Degrees	Degrees, Minutes, Seconds
Point 1	Lat: 11.251963; Long: 14.161062	Lat: 11°15'9.032"N; Long: 14°9'39.823"E
Point 2	Lat: 11.263015; Long: 14.161444	Lat:11°15'46.854"N; Long: 14°9'41.198"E
Point 3	Lat: 11.262694; Long: 14.162110	Lat:11°15'45.698"N; Long: 14°9'43.596"E
Point 4	Lat: 11.257809; Long: 14.175887	Lat:11°15'46.854"N; Long: 14°9'41.198"E



Figure 1 Google Earth Image for the proposed land.

Banki town is a garrison town, with army presence, police, and the immigration services. Due to the security situation in Banki, the overall scope of works will be implemented in areas near to the second tranche in Banki along the Banki-Tarmua axis. UNHCR through the Government will support the Contractor to liaise with the security apparatus to have the necessary permits and escorts to perform the works on the site.

PART I:

Lot 1: Conduct the Geophysical/ Hydrogeological Survey in Banki Town, Bama LGA, Borno State, Nigeria

1.1 Scope of Work

The contractor shall carry out a geophysical/hydrogeological investigation to locate productive borehole sites, delineate aquifers zones and identify horizons vulnerable to saltwater intrusion, before drilling of boreholes in consultation with UNHCR engineer and Government partner.

The scope of work under Lot 1 must be carried out with the perspective of implementing Lot 2, and to identify best locations for testing based on the assumption which site is best to establish the full irrigation system (e.g. consider the land elevation, best gravity flow, etc.).

The scope of this work consists of conducting electrical depth profiling surveys using the Electrical Resistivity Tomography (ERT) technique through the length and breadth of the agricultural lands in the targeted project location in Banki town; and conducting Vertical Electrical Sounding (VES) of the anomalous points for detailed studies, analyses, presentation, and recommendations for drilling of large diameter borehole schemes, provide detailed design of feasible irrigation systems to service the farming activities on 200 Ha.

The study will include:

- Desk Study to review existing data, topographical maps and existing studies and borehole site investigations, geophysical reports, and any relevant information.

- Hydrogeological fieldwork to carry out a detailed reconnaissance survey of the area, physical investigation of geological and structural characteristics of area and verification of existing data. GPS Coordinates, water level measurements, and expected use in the project area should be determined.
- Geophysical Measurements: Geophysical Measurements shall be by vertical electric sounding resistivity profiling and seismic refraction application to confirm the VES interpretation. A minimum of 3 probable sites shall be investigated within a 100m radius of the clinic and number them in order of groundwater potential.
- Analysis and evaluation of geophysical/hydrological data
- Site selection and reporting

The final report shall include:

- Introduction, environmental background, and brief review of previous studies
- Geology and hydrogeology of other boreholes and water points within the area (if any)
- Methods/techniques of geophysical investigation
- Detailed resistivity survey interpretation
- Aquifer Potential yield
- Proposed drilling location and depth and methodology
- Proposed method of drilling, equipment's and environmental impact
- Conclusion and recommendation

1.2 Mobilization

1.2.1. Contractor Personnel

As part of the mobilization, the Contracted company shall be responsible for hiring of its personnel as required during the contract period. The contractor will also be responsible for arranging transport and providing housing for his/her personnel.

1.2.2. Community Entry Process.

Prior to commencement of works, the Contractor will be introduced to the State/Local Government, military, and the local communities by the UNHCR staff before commencing implementation of the contract activities.

1.2.3. Location for the geophysical/hydrological survey

The contractor will work closely with the UNHCR staff, Borno State Irrigation Board, and the community to locate the survey and recommended sites to mark the survey points. It is expected that the Contractor will examine a minimum of 5 survey points best suitable for establishing of the irrigation system within the second tranche in Banki.

1.3 Reports

The contractor shall submit spiral bound hard copies and electronic copies of all Lot 1 activities in a report with appropriate drawings, sketches, pictures etc. as per the Scope of Work described above.

PART II:

Lot 2: Establishment of Solar Powered Irrigation System for Large-Scale Agricultural Production in Banki town, Bama LGA, Borno State.

2.1 Scope of Work

The scope of work for this project consists of the construction of a solar powered irrigation system including drilling of mid-level or low-level boreholes, construction of a water tank and irrigation distribution network at Banki Town, Bama LGA, Borno State. The minimum land size for irrigation is 200 hectares. The water table according to previous surveys in the area is high (between 60 to 120 meters underground). It is expected that the Contractor will design the irrigation distribution network through earthen canals and will guide the farmers on how and where to dig earthen canals.

The ideal irrigation system:

- Should be solar powered and distribute water by gravity.
- Supply underground water from borehole(s) to an overhead storage tank.
- Generate power through photovoltaic solar panels.
- To have mounting structure for the array of solar panels.
- The water tank should have start/stop system to control the supply of the water from the borehole(s);
- The water tank should have an outlet water distribution system (pipes with valves) that will discharge onto the earthen canals irrigation distribution network.
- To have a control room with an inverter and all the associated switches.
- Have fence perimeter around the solar panels and the control room.

The proposed irrigation system can have two options:

- Option A: One borehole supplying water to one smaller tank with capacity from 500m³ to 700m³.
- Option B: Two boreholes supplying water to one bigger tank with capacity from 1,200m³ to 1,500m³.

Based on the results of the Geophysical/ Hydrogeological Survey, the scope of work for Lot 2 comprises of:

- a. Drilling of productive mid-level or low-level boreholes with good and sustainable yield (some 70m³/h per borehole) including borehole pumping test.
- b. Water quality test to confirm suitability for crop irrigation activities.
- c. Construction of water storage tank.
- d. Design of irrigation distribution network (layout of earthen canals).
- e. Outlet connection from borehole(s) to the water tank.
- f. Outlet connection from water tank onto the irrigation distribution network of earthen canals.
- g. Electrical and Mechanical works: Supply and installation of submersible pump(s), Inverter, solar panels. Carry out the required pipe installation and plumbing works using high-quality PPR pipes.
- h. Construction of Solar panel support structure and installation of the panels.
- i. Construction of a control room for the inverter and controlling the irrigation system.
- j. Construction of perimeter fence to enclose the control room and the solar panels grid and the water tank/borehole's structure.
- k. Training (empowerment of farmers and cooperatives) on maintenance of the irrigation system and the irrigation reticulation (earthen canals).
- l. Spare Parts and Operation and Maintenance Plan

For efficient use of solar energy, the solar panels (photovoltaic) system, the groundwater pump and the water distribution system have to be well matched. Furthermore, the irrigation system should be designed in a way to reduce as much as possible losses of energy due to inefficiencies in transferring energy from the solar panels to the load (solar pumps or batteries).

The Contractor is encouraged to provide drawings of the proposed irrigation system.

2.1.1. Drilling of borehole

The contractor shall select the most appropriate drilling method for the geological formation of the allocated land capable of drilling to the required depth. The drilling fluid shall be prepared with uncontaminated water. Drilling additive shall be bentonite-drilling mud. Dangerous or toxic substances shall not be used. The contractor shall ensure that water-bearing formations are protected from contamination. The contractor shall be paid unit prices per meter as in the BOQ. The prices per meter shall include all associated costs.

It is expected that the borehole width will be minimum of 10 inches. However, the contractor is expected to propose in BOQ the best width of the borehole to be able to achieve yield of at least 70m³ per hour.

Based on the Lot 1 report, the contractor will determine the materials for the borehole casing (plastic or steel). Both steel and plastic casing should be considered and specified in the BOQ. The contractor should also make provisions to install artificial gravel pack around the screens.

The Contractor will pay due attention to the protection of the borehole against entrance of water or other pollutants while drilling or after completion. Proper sanitary seal protection built of concrete should be planned. This protection will be placed a minimum of two meters below the ground to 0.25 meter above the ground and will occupy all the annular space between the borehole wall and the outside of the casing/screen.

Once the borehole construction is completed, the well will be developed by treatment with suitable mud dispersant additives (if required) and hydraulic surging (by means of a surging piston/block or compressed air). Immediately after these operations are completed, and the borehole water is certified clean by the UNHCR Engineer, the pumping unit can be introduced into the well.

Water pumping tests should be performed to ensure that the expected yield is sufficient for the purpose of the project. Water quality tests will be also conducted to confirm its suitability for crop irrigation activities. The test will consist of continuously pumping the borehole at the maximum yield specified (or at any other previously defined rate(s), according to the results of the drilling work) between the Contractor and UNHCR. The duration of this test will be 48 hours. Measurement of dynamic water levels will be performed according to the logarithmic time-scale schedule normally used for test pumping water wells.

The Contractor will keep a complete record of the formation samples taken during the drilling operations, in properly packed and identified sample bags, and will make these available to UNHCR upon request. The Contractor will take at least one sample every three meters of drilling, unless a change in geological formations is observed by the driller. In such cases, additional samples should be taken. The minimum weight of each sample should be 500 grams.

Any borehole depths indicated to the Contractor prior to drilling should be regarded as tentative and for guidance only. If the actual characteristics of the boreholes to be drilled justify any change in the planned specifications, the Contractor will request authorization from UNHCR Engineers for such changes to be made.

2.1.2. Procurement and installation of submersible solar pumps

The Contractor will propose the best submersible solar pump with the required capacity to lift water of minimum 70m³ per hour. It is expected that the average depth of one borehole will be between 100 to 150 meters. Considering this, the supplier should propose the best capacity of a pump for lifting water from up to 150 meters depth at yield of 70m³/hr.

In case the borehole is deeper than 150 meters, the Contractor should take this into consideration and provide second offer in the BOQ for alternative best capacity submersible pump with the ability to lift water up to 70m³/hr from over 150 meters of depth.

The pump(s) will be connected to the solar panels using DC produced power. The contractor should consider that depending on the terrain, the borehole might be at up to 100m from the water tank or the solar grid. This should be considered and factored in the BOQ to enable proper cabling to connect the pump to the solar power and proper piping system to connect the outlet pipes from the solar pump to supply water to the water tank.

Depending on the combination of the irrigation system (Option A or Option B), the Contractor should consider the cabling/connectivity to connect the pump(s) to the water tank (Option A: one pump with one tank; and Option B: two pumps with one tank).

2.1.3. Procurement and installation of solar panels and inverter

The Contractor will propose the best capacity of solar inverter/batteries to support the operation of the irrigation system.

The Contractor is expected to procure and install solar panels that will provide enough solar energy to power the solar pumps to continuously operate for at least 6 to 8 hours per day. It is recommended each solar panel to be at least 300W.

The Contractor should explain the array of solar panels in details and specify the number of needed panels, their capacity, and dimensions to power the irrigation system.

Metal support structure should be constructed to support and mount the solar panels. The Contractor is expected to propose a design of the structure and details in the BOQ, including the tilting of the solar panels, size of pipes that will be used for the metal construction and the height of the structure. Contractor should consider concrete base (at least 100mm x 100mm) for the columns to support the structure.

The Contractor will provide BOQ for all electrical interconnections including appropriate size of cables, junction boxes, connectors, and switches. The Contractor will provide earthing kit for safety in case of lighting or short circuit.

The inverter, batteries and switches will be stored in a control room. The Contractor is expected to present in details in the BOQ construction of one roofed control room (not bigger than 10m²) with secure door. The Contractor should also propose the ventilation solution if needed.

2.1.4. Construction of reinforced overhead water tank

The contractor shall propose the most appropriate construction for an overhead water tank with capacity to irrigate a minimum of 200 ha, based on the land formation using gravity and booster pumps, if necessary. The borehole(s) will be the source of the water supply.

The required work includes:

- Construction works preparation of the foundation, excavation, frameworks, construction of the tank with reinforced steel and concrete, cement plastering/coating, and painting.
- Installation of additional equipment: automated water control system (switch on and off).

The tank will be resting on the ground and if needed for better gravity flow, the foundation of the tank can be elevated. The overhead water tank capacity should be in a range from 500m³-700m³ (in case of irrigation system Option A) and from 1,200 to 1,500m³ (in case of irrigation system Option B) depending on the proposed design of the irrigation system by the Contractor. The contractor must ensure that high-quality concrete is used, and the concrete mix is not weaker than M25. The tank should be free of leakage and with no cracks.

The overhead tank shall enable water discharge through valves at the bottom based on gravity. The Contractor will ensure that all inserts, embedded parts (conduits, pipes) and openings are in accordance with standards.

The overhead tank should have an installed automated system for water control to switch on the pumps when the tank is emptied up to 30% and to switch off the solar pumps when the tank is filled to the maximum capacity.

The contractor must ensure that quality materials (cement, reinforced steel, pipes, valves, welding) are used to execute the project including the construction and the finishing.

The Contractor shall provide data on the minimum sacks of cement per cubic meter, maximum water content per sack of cement, admixtures and accessories needed to complete the required work. This will form the basis for the quotations.

The Contractor must include in its proposal tests for compression and strength that will be executed during the project to ensure that the concrete is suitable and in good quality.

The contractor will clear the site to remove any obstructions to the construction, including trees and vegetation. Removed materials will be disposed under the direction of UNHCR Engineer.

In case of excavation, the Contractor must visit the site to examine the site conditions and the exact nature of the ground to be excavated. Failure to do so will not be admitted as the basis for any claims. The Contractor must dispose the excavated material as directed by the Engineer. The Contractor will provide quantities for excavation and disposal and no extra claims will be paid for multiple handling of excavated material due to the Contractor's operation method.

For the hardcore filling and beds, the Contractor shall provide clean, hard, crush stone, gravel or concrete from an approved source, free from fungal spores. Blinding shall be plain concrete thoroughly vibrated and compacted.

For the framing, the Contractor shall use quality boards or plywood to ensure the required concrete surface is produced.

The Contractor is responsible for the design and construction of the concrete formwork. The formwork system shall be adequately braced and have adequate strength and stability to ensure finished concrete within the specified tolerances. The Contractor must have Structural Engineer to supervise the work.

The Contractor will be responsible to deliver, store, protect and handle products to site.

2.1.5. Provide the layout of irrigation distribution network (earthen canals)

Once the site of boreholes and water tank is confirmed, the contractor will design irrigation distribution network/layout of earthen canals which will be connected to the water tank outlets for distribution of irrigation water to 200 ha farmland.

About 400 farmers will utilize the allocated 200ha and they will be involved in digging earthen canals based on the proposed layout by the Contractor. The contractor will provide a detailed canals layout including the length, depth, and provide indicative duration for completion of the canals digging.

UNHCR and Government will facilitate the mobilization of farmers to dig the earthen canals with the supervision of the contractor. The contractor will provide an estimated cost of the layout design for irrigation network and supervision technicians who will guide the farmers in digging the earthen canals.

If needed, based on the soil type, the Contractor should propose erosion control structures to ensure longevity of the earthen canals and less water outflow.

2.1.6. Training

Contractor shall describe a training plan for the farmers and farming cooperatives/water user committee to be conducted upon completion of the construction works and the irrigation network. The training shall last for 5 working days and shall be offered to the farmers' cooperatives.

Bidders are encouraged to involve Government and UNHCR appointed focal persons during the project installation, during the testing and commissioning.

The objective of the training will be to (i) provide the farmers with a basic understanding of the Solar Irrigation System (ii) empower the farmers with the necessary information so that they can read the power system signals (through the PV and battery inverters displays) and identify what part of the power system is malfunctioning or failing at any time, (iv) empower the appointed staff to ensure the proper use of the system and end-of-use of its specific parts, in order to enable the continuity of operation and longevity of the system, and (v) empower the farmers to prevent erosion of the earthen canals by controlling the water level and installing erosion control structures.

Training shall cover design fundamentals of the irrigation pumps and electric panel system installed, technical characteristics including functionalities, operations & maintenance, safety, controlling, monitoring, proper use and care (cleaning), end of life management, and reporting.

2.1.7. Construction of perimeter fence around installed irrigation facilities

The contractor shall construct a wire mesh perimeter fence of 12.5m by 15m with a gate and 75mm diameter galvanized poles as bracing at 2.5m c-c spacing. The substructure shall be constructed with sandcrete blockwork. The fence shall encircle the irrigation system facilities including solar panels grid, water tank, control room, boreholes, and pumps. Depending on the location of these irrigation facilities, the contractor will propose an appropriate fencing structure for the facilities altogether or separately.

2.1.8. Spare Parts and Operation & Maintenance Plan

The contractor will develop a community-based plan and mechanism for the operation and maintenance of irrigation system and build the capacity of the farmers' cooperatives to ensure sustainability of the established irrigation system.

The Contractor shall provide an Operation and Maintenance (O&M) plan for UNHCR approval, including preventing and corrective maintenance, tasks, responsible people, and a list of materials and tools needed for each task.

The contractor will need to factor in the BOQ stock of spare parts and consumables and to train farmers on basic maintenance. Training to farmers/ cooperatives will be provided at the site. All associated costs shall be borne by the Contractor, including at least transport to site, accommodation, meals, and training materials.

Contractor is expected to train farmers on continuous monitoring of borehole(s) performance.

2.1.9. Workplan

The Contractor shall provide a workplan with a timeline of execution of the project. The project is expected to be completed in 16 weeks including 3 weeks for geophysical survey and 13 weeks for establishment of irrigation system.

2.2. Mobilization

2.2.1. Contractor Personnel

As part of the mobilization, the Contractor shall be responsible for the hiring of and the

transfer of his personnel as required during the contract period. He shall be responsible for arranging and providing housing for his personnel.

2.2.2. Community Entry Process.

Prior to commencement of works, the Contractor will be introduced to the local Government, military, and the local beneficiary communities by the UNHCR staff.

2.2.3. Location and drilling of borehole

The contractor base on the results / recommendation of the geophysical/hydrological survey, will determine the sites for installation of irrigation schemes/ drilling of boreholes, in close collaboration with the Government and UNHCR Engineers.

2.3 Reports

The contractor shall submit spiral bound hard copies and electronic copies of all activities in a report with appropriate drawings, sketches, pictures etc.

The report shall comprise but not limited to the following:

- Project completion summary
- Drilling method
- Driller's log
- Rate of penetration
- Drilling bit diameter
- Lithological log
- Mud/additives used
- Materials installed (No of casings etc.)
- Details of geophysical well logging (where applicable)
- Details of borehole design (composite log)
- Pumping test result
- Water quality result
- Pump installation details.
- Solar grid details
- Surface tank details
- Operation and maintenance details
- Farmers training report

2.4. Tests on Completion

The contractor shall submit to the UNHCR designated engineer, not less than 7 days before the date the contractor intends to commence the Tests on Completion, a detailed programme showing the intended timing for these tests.

As soon as the Works have, in the Contractor's opinion, passed the tests on Completion, the contractor shall submit a certified report of the results of these tests to the Engineer. The Engineer shall review such a report and confirm compliance with the contract and notify the contractor in case of any required corrections.

2.5. Final Inspection and Acceptance

Upon completion of the works, the contractor shall request a joint final inspection of the completed works. The Engineer designated by UNHCR will prepare a punch list where necessary upon conducting the final inspection for the contractor to rectify. Once the punch list has been attended to, the engineer will certify completion of the works.

2.6. Defects and Defect Notification Period

A defect in this context is defined as any observance of a physical problem that may cause structural weakness or failure hence less effective for the intended purpose. The defects can either be patent (obvious, easy to fix and often merely aesthetic) or latent (not easy to find and tend to be somehow problematic). Construction defects may arise from the materials used or workmanship during construction.

The works will have a defects liability period of **12 months** within which any defects arising will be documented and the contractor will be instructed to make good of the same unless the defect is due to force majeure.

Failure to attend to the defects without giving any proper reason will result in forfeiture of the retention money withheld by UNHCR.

2.7. Closure

Project closure will be upon completion and certification of the works by the engineer designated by UNHCR Nigeria who will review and sign off on the deliverables. The completed works will be subject to defects liability period as determined in the contract document.

3.0. Basis for Payment

The contractor will be paid in installments following the below payment schedule based on completed deliverables/ milestones.

No	Deliverables	INSTALMENT PAYMENT %
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Lot1	<ol style="list-style-type: none"> 1. Mobilization, demobilization rapid site mapping 2. Electrical Profiling and VES survey conducted, and draft reports submitted. 3. Final Validated Reports submitted. 	Upon completion of the listed deliverables (1 to 3), the contractor will be paid 10% of the total contract amount.
Lot 2	<ol style="list-style-type: none"> 4. Mobilize to the site. 5. Drilling of productive boreholes with good and sustainable yield (~70m³/h per borehole) including borehole pumping test. 	The contractor will be paid 20% of the total contract amount upon completion of the listed deliverables (4 and 5)
Lot 2	<ol style="list-style-type: none"> 6. Supply and installation of submersible pumps, Inverter, solar panels grid. 7. Construction of a control room for the inverter and controlling the irrigation system. 	The contractor will be paid 20% of the total contract amount upon completion of the listed deliverables (6 and 7)
Lot 2	<ol style="list-style-type: none"> 8. Construction of water storage tank. 	The contractor will be paid 20% of the total contract amount upon completion of the listed deliverables (8)
Lot 2	<ol style="list-style-type: none"> 9. Construction of security wire fence around installed irrigation facilities including solar panels grid, water tank, control room, boreholes, and pumps. 10. Training farmers/cooperatives) on maintenance of the irrigation system and the irrigation reticulation (earthen canals). 11. Supply of spare parts 12. Submission of irrigation system project completion report 13. Project acceptance as measured and certified by or on behalf of UNHCR designated technical person. 	The contractor will be paid 20% of the total contract amount upon completion of the listed deliverables (9 to 13)
	<ol style="list-style-type: none"> 14. Final Payment will be made 12 months after practical completion and repairs of any defective works identified within the period and upon final inspection and issuance of final completion certificate. 	The contractor will be paid 10% of the contract amount for retention payment upon completion of the defect liability period.

4.0. Evaluation Criteria

4.1. Minimum Documentation Requirements for the Services

- **Ownership of equipment:** Evidence in form of Purchase Receipts/lease agreement on Headed paper with address and phone numbers and equipment serial numbers for Geophysical/Resistivity meters, Electrical Resistivity Tomography (ERT) and VES accessories and for irrigation systems including drilling boreholes. 5 points (1 point each for list of equipment's provided)
- **Understanding of task:** Writing a proposal showing understanding of key steps to be adopted for the profiling, VES, and interpretation. - 5 points

4.2. Minimum Legal and Administrative Requirements pass or fail.

- Certificate of Incorporation/Registration relevant to the specified service
- Tax Clearance Certificate – *must have validity date of 2022 and 2023.*
- Stamped and signed Audited financial account statement showing financial standing of the bidder for the period of– 2022 and 2023.

4.3. Minimum Experience Requirements of the Supplier

- The supplier must be licensed to operate in Nigeria and have a minimum of three years in existence relevant to the specified service (5 points)
- Provide evidence of at least 3 contract award letters/job completion certificates related to Hydrogeological/Geophysical surveys for ground water exploration and successful exploitation. Provide the client reference, amount, emails, and phone numbers. (5 points)

4.4. Qualification of key project staff:

- **Team Leader/project manager:** Bachelor's degree or equivalent in the field of Rural Engineering (Irrigation), Civil Engineering with expertise in irrigation. He/she must have a minimum of 5 years of experience in managing agriculture irrigation projects. (5 points)
- **A Qualified hydrogeologists/survey engineers** Bachelor's degree in Geophysics/ Hydrogeology/ Geology. At least 5 years of proven experience in conducting and interpreting geophysical surveys and drilling boreholes, and proven records of delivering professional results. (5 points).
- **Environmental Impact assessment expert:** Bachelor's degree in water resources and environmental management and at least (5) years of relevant experience (5 points).
- List of company technical staff, at least one curriculum vitae, and relevant certification and licenses of the above key project team - (5 points)

4.5. Other requirements:

- Detailed work plan with dates and timelines within 16 weeks (maximum) period of delivery of validated reports- 10 points

4.6. Evaluation Criteria Matrix

The evaluation shall follow 2-step criteria: first eligibility checks for administrative documents then technical evaluation.

For clarity, the RFP is divided into two lots. Bidders are required to submit detailed proposals for both lots, aligned with the terms of reference in Annex A and tailored to the specific requirements of each lot, based on their capacity and ability to execute the project. Partial bidding or submission for only one lot is not permitted."

Content of the Commercial/Eligibility criteria mandatory	
1. Corporate affairs Commission CAC certificate of incorporation, year founded minimum three (3) years from submission deadline & status is active on CAC Website	pass or fail
2. Tax clearance Certificate for the last two years 2022 & 2023	pass or fail.
3. Vendor Registration Form: If your company is not already registered with UNHCR, you should complete, sign, and submit with your technical proposal the Vendor Registration Form (Annex D). If your company is already registered with UNHCR, please submit an empty Vendor Registration Form clearly indicating your UNHCR Vendor ID.	pass or fail.
4. Financial audited Statements: your company should submit stamped and signed financial statements of the last two years 2022 & 2023, proving healthy financial standing of the company.	pass or fail.
5. Submit an acknowledgement of UNHCR General Conditions of Contract provided (Annex C) and UN Supplier Code of Conduct (Annex D).	pass or fail.
6. The bidder shall provide the company Profile, year founded minimum (3) three years from submission deadline. Company Profile shall include company history, contact address, and phone number, list of clients, services offered, specialization, and qualifications.	pass or fail.

If any of the above mandatory requirements are not met, the bidder's proposal is automatically rejected.

Criteria	Score/Points
1. Description of the company and the company's qualifications. – Total 20 points	
a. Provide documented evidence of at least three (3) contract award letters or purchase orders, and completion certificates related to Geophysical and Hydrogeological surveys for groundwater exploration and successful exploitation. Client References for the 3 contracts with jobs completed amount, emails, and phone numbers in the last 5 years. UNHCR will further contact the references.	5 points
b. Provide evidence of at least three (3) contract award letters or purchase Orders and job completion certificates related to establishment of	5 points

irrigation systems including boreholes drilling i.e. 3 Client Reference with jobs completed amount, emails, and phone numbers in the last 5 years.	
c. Ownership of equipment: Evidence in form of Purchase Receipts/lease agreement on headed paper with address and phone numbers and equipment serial numbers/specifications for Geophysical/ Resistivity meters, Electrical Resistivity Tomography (ERT) and VES accessories and of irrigation systems including drilling boreholes for irrigation systems. (5 points (1 point each for list of equipment's provided)).	5 points (1 point each for list of equipment's provided).
d. Experience working in the areas with similar climatic, geological, and hydrological conditions	5 points
2. Staff – Total 15 Points	
Qualification of key project staff and professional accreditation: List of company technical staff, at least one curriculum vitae, and relevant certification and licenses of the below team composition (Total of 15 points):	
i. Team Leader/project manager: Bachelor's degree or equivalent in the field of Rural Engineering (Irrigation), Civil Engineering with expertise in irrigation. He/she must have a minimum of 5 years of experience in managing agriculture irrigation projects. (5 points)	5 points
ii. A Qualified hydrogeologists/survey engineers Bachelor's degree in Geophysics/ Hydrogeology/ Geology. At least 5 years of proven experience in conducting and interpreting geophysical surveys and drilling boreholes, and proven records of delivering professional results. (5 points)	5 points
iii. Environmental Impact assessment expert: Bachelor's degree in water resources and environmental management and at least (5) years of relevant experience (5 points).	5 points
3. Organizational Capacity and Understanding of the requirements for services, proposed approach, solutions, methodology and outputs – Total 15 points	
a. Provides a detailed proposal with clear methodology showing understanding of key steps to be adopted for the profiling, VES, and interpretation. (5 points)	5 points
b. Provide a detailed proposal with clear methodology showing understanding of establishment of irrigation systems. (10 points)	10 points
4. Sustainability: Approach to ensuring environmental sustainability and compliance with regulations	5 points
5. Additional Consideration a. Innovation: Proposal incorporating innovative techniques or technologies b. Training and capacity building: provision of training for stakeholders as part of the project (2.5 points each)	5 points

6. Realistic Detailed work plan with dates and timelines (with key milestones and deliverables) within 16 weeks (maximum) period of delivery of validated reports – Total 10 points	10 points
Total Points	70 points

Total 70 points, minimum for the bidder offer to be qualified for financial evaluation is 42 points of 70.

5.0. Indicative BOQ

The below BoQ provides an indicative overview of the requirements, but it is not exhaustive. Therefore, the bidders are expected to provide a detailed BoQ for the geophysical survey and establishment of efficient and sustainable irrigation system as part of their bidding proposals, based on other expertise in irrigation and latest technology and innovations. Kindly use **Annex B - Technical Specification Form**, under the bidder proposal column to provide a detailed breakdown of each component of the Bill of Quantities (BoQ) you intend to propose for the project/item components. Please include specifications, quantities, measurements, solar inverter, panels, pump type, capacity, number of blocks, sand, gravel, roofing sheets, cement, sprinklers, and any other items that will constitute the BoQ for the entire project.

ITEM	DESCRIPTION	UNIT	QTY	RATE	BQ AMOUNT
Lot1					
1	Hydrogeological/Geophysical Surveys				
1.1	Hydrogeological/Geophysical Surveys for mapping Identification of potential drilling sites that can result to high yield and sustainable boreholes. Report to be Submitted and validated before Commencement of Drilling	Sum	1		
Lot2					
1	SURFACE WATER TANK				
1.1	Construction of concrete water tank from 500m ³ to 1,500m ³ depending on the proposed design of the irrigation system by the Contractor. The prices per m ³ shall include all associated costs.	m ³	1		

1.2.	Construction of outlet system for gravity flow irrigation	set			
1.3.	Installation of automated control sensors for switch-on or switch-off the pumps				
1.4.	Coating/plastering	m2	1		
1.5.	Painting	m2	1		
2	BOREHOLE & SOLAR PUMP				
2.1.a	Drilling of borehole including equipment, plastic casing and finishing. Price per meter should include all associated costs.	m	1		
2.1.b	Drilling of borehole including equipment, iron casing and finishing. Price per meter should include all associated costs.	m	1		
2.2.a	Supply and installation of submersible solar pump capable of pumping of 70m ³ /hr (up to 150m depth)	set	1		
2.2.b	Supply and installation of submersible solar pump capable of pumping of 70m ³ /hr (up to 300m depth)	set	1		
2.3.a	Electrical interconnectivity for Option A irrigation system (one borehole to one small tank)	Sum			
2.3.b	Electrical interconnectivity for Option B irrigation system (two boreholes to one bigger tank)	Sum			
2.4.a	Outlet connectivity Option A irrigation system (one borehole to one small tank)	Sum			
2.4.b	Outlet connectivity for Option B irrigation system (two boreholes to one bigger tank)	Sum			
3	SOLAR PANEL GRID				
3A	Option A				

3A.1	Supply & Install Solar mono/polycrystalline panels grid to operate one borehole	piece			
3A.2	Supply & Install Support Structure and frame for panels				
3A.3	Supply & install Inverter to operate one borehole				
3A.4	Electrical interconnectivity for Option A irrigation system	Sum			
3B	Option B				
3B.1	Supply & Install Solar mono/polycrystalline panels grid to operate two boreholes	piece			
3B.2	Supply & Install Support Structure and frame for panels				
3B.3	Supply & install Inverter to operate two boreholes				
3B.4	Electrical interconnectivity for Option B irrigation system				
4	IRRIGATION RETICULATION				
4.1.a	Draw a plan for irrigation through earthing canals grid to irrigate a minimum of 200Ha with Option A irrigation system.				
4.1.b	Draw a plan for irrigation through earthing canals grid to irrigate a minimum of 200Ha with Option B irrigation system.				
5	SECURITY WIRE FENCE				
5.1	Construction of security wire fence around installed irrigation facilities				
6	CONSTRUCTION OF IRRIGATION SYSTEM CONTROL ROOM				
6.1	Construction of roofed control room for controlling the irrigation system (~10m ²).	Sum			
7	TRAINING OF FARMERS				

7.1	Training of farmers on maintenance of irrigation system				
7.2	Training of farmers on establishing irrigation reticulation (earthen canals) and erosion prevention				
8	Labor				
9	Transportation				

Abbreviations

Unit	Abbreviation
Square meter	m ²
Cubic meter	m ³
Hectare	ha
Hour	hr
Kilogram	kg
Lump sum	Sum
Meter	m
Centimeter	cm
Millimetre	mm
Metric ton (1,000 kg)	t