Terms of Reference
Solar Photovoltaics water pumping for irrigation Supply and Installation for the ACCISI-GEM Project in Ghar El Melh
"Adapting to Climate Change Impacts through Smart Irrigation in Ghar El Melh wetland area, Tunisia"

Implemented by the Global Water Partnership-Mediterranean (GWP-Med)
Funded by the Maltese ministry for Foreign and European Affairs and Trade (MFET)

1. Context of the project

The project "Adapting to Climate Change Impacts through Smart Irrigation in Ghar El Melh wetland area, Tunisia" (ACCISI-GEM) is a practical demonstration of the Water-Energy-Food-Ecosystems (WEFE) Nexus approach in a coastal wetland in Tunisia. It is implemented by GWP-Med and co-funded by the Maltese Ministry for Foreign and European Affairs and Trade (MFET) and the GEF UNEP MedProgramme, within Child project 2.2 "Mediterranean Coastal Zones: Managing the Water-Energy-Food and Ecosystems Nexus" and particularly its Component 3.1.3.: Testing of novel applications and assessment of their replication potential and feasibility.

In particular, this demonstration activity represents a unique initiative that implements a holistic, multi-dimensional, innovative, community-based, gender-sensitive, and partnership-focused approach to coastal conservation agriculture using a WEFE Nexus lens. A key aspect relates to the experimentation of a novel technology for Tunisia, namely an Information and Communication Technologies (ICT)-based smart irrigation system for farming communities in the targeted area, that utilises sensors and data analytics to monitor soil and crop conditions, and water requirements in real time, enabling farmers to optimise the use of available water resources, even in water-scarce environments. Smart irrigation system management can improve crop yields while reducing water consumption and, when supported by renewable energy sources, it can make a positive change in the interface of water, energy, food and the environment.

The project will be implemented in the Commune of Ghar El Melh, in the governorate of Bizerte, located in the northeast of Tunisia (Figure 1). The municipality covers an area of 91.64 km^2 and brings together four (4) delegations (Ghar El Melh, Bejou, Aousja, Zouaouine).

The area of Ghar El Melh is home to one of the country's most precious wetlands. The Ghar El Melh lagoon was designated as a wetland of international importance under the Ramsar Convention in 2018, while the city Ghar El Melh is one of Tunisia's cultural hotspots. Tourism, farming, and fishing are some of the most important economic activities. However, the area's ecological and cultural treasures are facing several pressures having a direct impact on local society's well-being and economic prosperity. In particular, the ecological health of the lagoon

and the related fishing activities are threatened due to the change in the hydrodynamics and water balance as well as the deterioration of water quality and the excessive use of water. Expansion of agricultural land can lead to the loss of natural habitats, a threat to the ecosystem and its associated biodiversity.

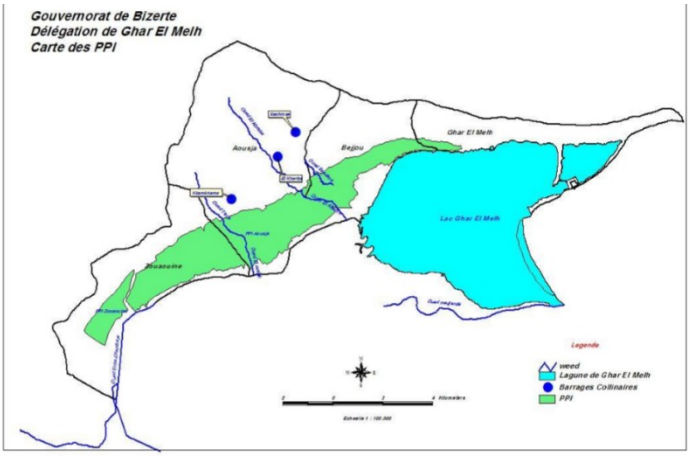

Figure 1. Location of Ghar El Melh area

2. General background of the activity

The Project provides operational decision support to a group of farmers in the area of Ghar El Melh using **Information and communication technology in agriculture** (**ICT in agriculture**) with the objective of optimising the use of irrigation water and energy use. The **ICT solution for Energy and Water Conservation in Agriculture** consists of monitoring various parameters of energy and water consumption at farm level, such as energy consumption for water pumping with an energy meter soil water profile with soil moisture probes, field/plot irrigation water management with pulse water flowmeter and solenoid valve as well as meteorological data (solar radiation, air humidity and air temperature, wind speed and precipitation) through a weather station.

The installation of this ICT **solution for Energy and Water Conservation in Agriculture** aims above all to achieve savings relating to the use of water and energy for irrigation given the strategic importance of these resources and the financial and biological benefits of a poor estimation of irrigation and related energy needs. The system can also increase crop production and water productivity as well as energy productivity in the plots.

The installation of a solar photovoltaic system in some farms aims to reduce energy consumption specifically for water pumping used in irrigation. By harnessing solar energy through photovoltaic panels, with the aim to decrease reliance on traditional energy sources such as electricity for powering water pumps. In addition, the installation of the monitoring system will enable the measurement and the continuous monitoring of the produced energy consumption.

While the installation of a piezometer will enable the measuring of groundwater levels and quality and the continuous monitoring of water and salinity levels and contribute to the conservation efforts of Ghar El Melh groundwater ecosystems made by National, Regional and Local Authorities.

All collected data will be processed using appropriate hardware and software and transformed into messages and recommendations on sustainable irrigation, transmitted to farmers through a platform.

The ICT solutions for Energy and Water Conservation in Agriculture will therefore be composed of:

- A weather station to measure the following parameters: solar radiation, air temperature, air relative humidity, wind speed and precipitation with a system for recording and teletransmitting sensors measurements
- Sensors / probes for measuring soil moisture and soil temperature and salinity profiles. These measurements of soil moisture, temperature and salinity must be done at different depths with a system for recording and teletransmitting sensors measurements

- Pulse water flowmeters and solenoid valves for irrigation management with a system for recording and teletransmitting sensors measurements
- A photovoltaic power system for pumping irrigation water
- Wireless energy meter for recording and teletransmitting energy consumption under photovoltaic electric power as well as under conventional electric power system.
- Sensors for monitoring water level and quality with a system for recording and teletransmitting sensors measurements in phreatic and deep aquifers.
- A real-time data transmission system (Gateway) with recording of data;
- IoT Platform and adapted Gateways: All installed sensors transmit periodically their values via the gateways to a platform for reading, viewing, downloading, configuring data upload, etc. and report with 2 years connectivity. It must be designed to support all the sensors that will be installed as part of the project (see ToRs Piezometers & Irrigation System).

Selection of farmers, plots

The selection of farmers/plots that will benefit from the installation of the **ICT solutions for Energy and Water Conservation in Agriculture** will be the responsibility and ensured by the project team (GWP-Med and INAT team) in collaboration with the local, regional and national authorities. The selection will take into account several parameters such as an authorized private water source (well), the deep of the water table (Phreatic aquifer or deep aquifer), distribution of plots in the field, type of crops, type of soil, irrigation techniques and the representativeness of collected meteorological data (solar radiation, air humidity and air temperature, wind speed and precipitation).

Notes:

1. Data concerning farmers, agricultural areas, crops grown, land use, etc.: will be provided by the Project team.
2. The total number of beneficiary farmers for the photovoltaic energy system will be two (02). The photovoltaic energy system for pumping irrigation water will be installed in two farms only: one whose pumping comes from the phreatic aquifer and the other whose pumping comes from the deep aquifer.
3. The Wireless energy meter for recording and teletransmitting energy consumption will be installed in five (05) farms: two (02) under photovoltaic electric power system and three (03) under conventional electric power system.
4. The Wireless energy meter will be integrated in an IoT Platform (see ToRs Piezometers & Irrigation System).
5. The local authorities and farmers will provide the necessary permits or approval for the installation of the equipment.
6. All the tasks described above will be done in close collaboration with the project team (INAT & GWP-Med) as well as local, regional and national authorities and under the supervision of the GWP-Med Coordinator.

7. Field visits for equipment installation in Ghar El Melh will be planned in advance in coordination with the project team.

3. Description of the assignment: Supplying and installation of the equipment

In this context, the Global Water Partnership - Mediterranean (GWP-Med) is seeking the service of a provider to commission and install a solar photovoltaic water pumping system for irrigation, incorporating an automated monitoring and accounting system for energy consumption at the pumping station. This system will be integrated into the proposed ICT solutions for Energy and Water Conservation in Agriculture. The installation will take place in two farms within the Private Irrigated Perimeter in Ghar El Melh, where personal pumping is permitted by local, regional, and national authorities.

Installation and set of equipment and service is required. If the service provider is not based in Tunisia or have a representative in Tunisia, s/he should partner with local company for the installation of equipment in Ghar El Melh in Tunisia. The local partner to undertake the installation, set up and technical support locally in Tunisia should be indicated in the quotation submitted.

The specific area of installation will be shown to the applicants during the scheduled site visits.

❖ Technical specifications

Power range of installed pumps in Ghar El Melh region:

- A photovoltaic system to cover the operation of a 2.6 kW (3.5 HP), 3ph (380V) pump for 10 hours of irrigation per day
- A photovoltaic system to cover the operation of a 5.6 kW (7.5 HP), 3ph (380V) pump for 10 hours of irrigation per day

Components of the solar photovoltaic water pumping system

Each photovoltaic system will include:

- A photovoltaic generator: made up of several connected photovoltaic modules.
  - The photovoltaic modules shall be half cut monocrystalline PV technology, thin-film and polycrystalline modules are excluded.
  - Only one supplier and one module type (one power class) are acceptable.
  - PV module selected should have 72 Mono cells at least.
  - The Photovoltaic modules should be manufactured before 6 months from the date of delivery on site.
  - The output power of the crystalline module should not be less than 450 Wp at standard test condition (STC).
  - Operating PV temperature ranges between -40 °C & + 85 °C.
  - Modules temperature sensitivity at peak power should not exceed -0.36%/°C.
  - The PV modules frame should be made from Anodized Aluminum.

- The PV modules maximum system voltage should not be less than 1,000 V.
- The PV module string connectors shall be same manufacturer as used by the module manufacturer.
- The PV modules should be PID resistant.
- The PV modules should have a positive power tolerance and measurement uncertainty of +/-3% (manufacturer flasher class AAA according to IEC 60904-9).
- The PV modules shall have individual serial numbers behind each front glass and on the back side of the module.
- The PV modules' aluminum frame must not directly contact any dissimilar metal.
- Electrical connection shall be on a robust terminal block in an IP67 junction box or higher.
- The warranty for module defects after installation should be at least 10 years.
- The Successful Contractor shall provide a manufacture power guarantee for all PV modules that will be installed with their serial numbers that guarantees that the loss of the output is not more than 10% during the first 10 years and up to 20% in total after 25 years. The warranty must state that the malfunctioning solar photovoltaic module must be exchanged by the manufacturer. The replacement solar module must be identical to, or an improvement upon, the original design of the malfunctioning solar module.
- Mechanical stability – IEC 61215: Design qualification and type approval for crystalline silicon terrestrial photovoltaic (PV) modules.
- PV module safety qualification standard: IEC/EN 61730 for safety class II test.
- PV module shall be approved according to IEC 60068-2-68 (Blowing Sand Test) latest edition.
- Along with TUV, CE compliant and UL certification, salt mist/ammonia resistance should be provided.
- Compliant with those of ANME (certificate of approval from the Tunisian National Agency for Energy Management)
- Mechanical load tests up to 5400 Pa, Damp Heat, Thermo Cycle and Humidity and Freeze tests.
- Flash reports of PV modules (SN, Voc, Ipmax,…) shall be provided.
- With the PV plant in operation and in the absence of shades, the PV modules must not exhibit hot spots or hot cells.
- Third party bankruptcy insurance shall be provided.

- A support frame for the solar panels:
  - Made of Hot-Dip galvanized steel.
  - The minimum effective wind speed of 130 km/h shall be considered for the mounting structure design.
  - The steel structure shall be anti-corrosion, anti-rust and can withstand high humidity. Steel shall be galvanized with a galvanization thickness of at least 85 µm.
  - The mounting structure shall be all fitted (no welding).
  - All bolts, nuts, and washers for the PV modules' mounting structure must be made of stainless steel. Stainless steel must not contact the PV modules' aluminum frames.
  - All clamps in contact with the PV modules' aluminum frames must be made of aluminum.
  - The PV modules' aluminum frame must not directly contact any dissimilar metal.

- Anti-corrosion guarantee from the weather conditions.
- All exposed sharp edges in the mounting structure must be covered with an appropriate material.
- Manufacturer's warranty should be at least 10 years.

- DC wiring (cables, connectors, junction boxes, protective sheath, warning mesh),
  - DC cables shall comply with TUV standards.
  - Operation temperature for DC cables should be up to +90 oC.
  - All DC cables shall be copper, single-core cables and double insulated, Aluminum conductor is not allowed.
  - DC main cables shall be underground buried in suitable electrical conduits where needed.
  - DC wires from the connection box to the inverter input must be undergrounded inside PVC conduits where needed.
  - Circuit shall be installed as close as possible in parallel to avoid induction loops.
  - DC cables shall be UV resistant, flame retardant, and with low smoke characteristics.
  - DC cables shall comply with local and international standards. The cables shall not be installed in direct sunlight. Between individual mounting structures, for example, a tube shall be used for protection.
  - All external cables must be installed inside a cable basket PVC Flexible pipes with glands shall be used between the modules and the cable basket or hot dipped galvanized cable tray with minimum thickness of 1.5 mm and minimum galvanization thickness of 30 µm.
  - The cable ties shall be UV resistance.
  - The cable clips shall be used for managing cable under PV modules.
  - All cables shall be marked properly by means of permanent labels at the both ends so that cable can be easily identified.
  - All cables must be fixed. The cables shall not bear any mechanical load on their terminations (strain relief) under any circumstance. Cable straps are not sufficient for the purpose of strain relief. The Successful Contractor shall use red DC cable for positive side and black cable for the negative side. The label shall provide information about the corresponding inverter, combiner box and string number. All cables shall be marked in compliance with IEC 60446-3 category C Basic and safety principles for man-machine interface, marking and identification.
  - PV DC connectors for string interconnection shall be of the same brand and type as used by the PV module manufacturer. Connectors of different brands must never be used in the same connection (male-female). It is not allowed to cut the original connectors of the PV module.

- AC wiring (mounting accessories)
  - AC cables and control cables shall be Copper, XLPE insulated and armored sheathed cables with rated voltage of 0.6/1 kV. These cables shall be UV resistant and flame retardant in case they are not buried.
  - All cables shall be marked in compliance with IEC 60446-3 category C Basic and safety principles for man-machine interface, marking and identification.
  - AC cables shall comply with local and international standards and requirements.

- All external cables must be installed inside an external use or hot dipped galvanized cable tray with minimum thickness of 1.5 mm and minimum galvanization thickness of 30 µm.
- All cables laying in trenches must be separated by cable spacers.
- Reference codes and standards for all cables:
  - IEC 60189-2 Low-frequency cables and wires with PVC insulation and PVC sheath – Part 2: Cables in pairs, triples, quads and quintuples for inside installations.
  - IEC 60228 Conductors of insulated cables.
  - IEC 60502-1 Power cables with extruded insulation and their accessories – Part 1: Cables for rated voltages of 1 kV ((Um = 1, 2 kV) and 3 kV (Um = 3, 6 kV).
  - IEC 60502-2 specifies the construction, dimensions and test requirements of power cables with extruded solid insulation from 6 kV (Um=7.2kV) up to 30 kV (Um=36kV) for fixed installations such as distribution networks.
- Reference codes and standards for cable testing:
  - IEC 60885 Electrical test methods for electric cables
  - IEC 60332 Tests on electric and optical fibre cables under fire conditions

- A DC/AC inverter suitable for the power of the installed pump.
  - The AC power of the inverter must synchronize automatically with the AC voltage and frequency of the grid (3-phase) within the tolerance range specified according to the British Energy Networks Association (ENA) engineering recommendations (G99/G98).
  - The Inverter should be designed to operate the PV array near its Maximum Power Point (MPP).
  - The Inverter should be transformer-less with efficiency at max power of no less than 97% (EURO-ETA / Euro-efficiency).
  - The Inverter shall be provided with integrated DC switch.
  - The Inverter shall be provided with an LCD display to provide instantaneous information about the subsystems and system output data and performance.
  - The Inverter shall have the following protections: reverse current, input over voltage & over current via fuses.
  - Temperature operating range: -20 ºC to 60 ºC
  - Harmonic distortion is less than 3%.
  - Protection degree is IP65 or higher (outdoor).
  - TUV and CE compliant.
  - Warranty after installation should be for 5 years at least for the inverters. The warranty must state that the malfunctioning inverter must be exchanged by the manufacturer. The replacement inverter must be identical to, or an improvement upon, the original design of the malfunctioning inverter.
  - The inverter must be cooled using natural ventilation or forced air-cooling if installed outdoors.
  - The inverter must be installed on a separate hot-dip galvanized steel mounting structure i.e. separate from the PV mounting structure and must be protected from direct sun light and rain (weather conditions).
  - The inverter shall have surge protection SDP on the DC and AC side. If the inverter does not support integrated SPD protection, a separate external SDP must be installed.

- AC Distribution Boards
  - The Distribution Boxes shall be made of hot coated or galvanized steel; dust and vermin proof with a protection degree IP66 at least.
  - The main distribution board shall house the PV energy meter.
  - The terminals and bus bars shall be made of tin coated copper and appropriately sized; the boxes shall have suitable cable entry with suitable glands arrangement for both input and output cables.
  - Suitable markings on the bus bars shall be provided to identify the bus bars.
  - The distribution box shall be grounded and for this purpose a suitable ground terminal is to be arranged.
  - The distribution boards shall be completely factory assembled, pre-wired, and tested.
  - All distribution boards must be equipped with an appropriate SPD device.
  - The distribution boards shall be designed to meet the requirements of applicable part of the following Standard's last edition:
    - IEC 60038 IEC Standard Voltages
    - IEC 60044-1 Instrument Transformers - Part 1: Current Transformers
    - IEC 60044-2 Instrument Transformers - Part 2: Inductive Voltage Transformers
    - IEC 60051 Direct acting indicating analogue electrical measuring instruments and their accessories
    - IEC 60068 Environmental testing
    - IEC 60071 Insulation Coordination
    - IEC 60073 Basic and safety principles for man-machine interface, marking and identification - Coding principles for indication devices and actuators
    - IEC 60085 Electrical Insulation - Thermal Evaluation and Designation
    - IEC 60255 Electrical Relays
    - IEC 60269 Low Voltage Fuses
    - IEC 60445 Basic and safety principles for man-machine interface, marking and identification - Identification of equipment terminals, conductor terminations and conductors
    - IEC 60529 Degrees of protection provided by enclosures (IP Code)
    - IEC 60865 Short-circuit currents - Calculation of effects
    - IEC 60934 Circuit-breakers for equipment
    - IEC 61000 Electromagnetic compatibility (EMC)
    - IEC 61140 Protection against electric shock - Common aspects for installation and
    - equipment.
    - IEC 60664 Insulation Coordination with Low-voltage Systems including clearance and Creepage Distances for Equipment.
    - IEC 61008-1 Residual Current operated circuit Breakers without integral overcurrent Protection

- Earthing system/grounding system (circuit grounded by single-pole copper cable (earth connection made up of 3 copper stakes with all fixing accessories).

Technical Specifications

Photovoltaic modules

Characteristics			Required Value	Proposed Value
General				
	Country of manufacture	=	Either local or Japan, EU, USA	
	Profile	=	Industrial product ready to install	
	Power	≥	Mentioned above	
	Number of modules	=	Minimum number 5 and 13 modules	
	Dimension L x P x H – mm	=	As per respective supplier	
Module specifications				
	Unit Power (Pmax)	≥	450 W	
	Voltage at Pmax (Vmp)	≥	41.5 V	
	Current at Pmax (Imp)	≥	10.70 A	
	Open circuit voltage (Voc)	≥	49.5 V	
	Short circuit current ≥	≥	11.30 A	
	Maximum voltage of system	≥	1,500 V	
	Efficiency / Yield	>	20 %	
	Protection Class		Classe II	
Resistance to climatic conditions				
	Precipitation	=	continuous heavy rain or hail (hailstones < 25 mm)	
	Maximum wind speed	=	130 km/h	
	Temperature	є	-40 °C & + 85 °C	
	Humidity	є	0 – 100%	
Standards				
	Certifications	≥	TUV, CE compliant and/or UL Compliance with those of ANME (certificate of approval from the National Agency for Energy Management)	
Fixing structure				
	Material	=	Hot-dip galvanized steel	
	Protection	=	Yes	
	Protection Layer thickness	≥	Galvanization thickness of at least 85 µm)	
	Wind resistance	≥	130 km/h	
	Assembly	=	Above 30 cm minimum from the ground	
	Reinforcement	=	Concrete anchoring to the ground	

Guarantee				
	Duration	≥	10 years	

Inverter

	Characteristics		Required Value	Proposed Value
	Country of manufacture	=	Either local or Japan, EU, USA	
	Profile	=	Industrial product ready to install	
Output				
	Waveform	=	Sinusoidal	
	Harmonic distortion	≤	3%	
	Phases	=	Three-phase +N	
	Voltage	=	380/400/415 V	
	Frequency	=	50/60 Hz	
	Power Factor	≥	0.99	
	Efficiency	≥	95%	
	Ground fault detection	=	Yes	
	Input overvoltage protection		Yes	
Standards				
	Certifications		TUV and CE compliance Compliance with those of ANME (certificate of approval from the National Agency for Energy Management)	
Environmental conditions				
	Temperature	≥	-20 ºC to 60 ºC	
	Non-condensing humidity	≥	From 0% to 95%	
	Noise		≤50dB	
	Protection Rating		IP65	
Safety				
	Compliance		Low Voltage Directive : 2014/35/EU; EN 50178:1997; EMC Directive : 2014/30/EU; EN 61000-6-2:2005; EN 61000-6-3:2007; EN 61000-3-2:2006; EN 61000-3-11:2000; EN 61000-3-12:2005	
Guarantee				
	Duration		5 years	

Layout, installation, connection, testing and training

To ensure the safety and proper functioning of the photovoltaic system, the installation must be equipped with suitable protection and cut-off devices. These devices must be sized to guarantee effective protection against electrical risks. Here are the main measures to plan:

- DC and AC wiring (cable, connectors, junction box, etc.),
- protection devices (fuses, circuit breakers, etc.),
- cutting device,
- protection of PV modules,
- Earthing,
- DC and AC cabinet junction box,
- AC and DC cable protection,
- Protection against overloads and short circuits,
- Protection against overvoltage.

Type of cables: AC and DC

Cables are sized to minimize the risk of ground fault or short circuit after installation. This precaution is guaranteed by the use of single-conductor cables offering a level of insulation equivalent to class II.
Cables must have the following characteristics:

- Flame Retardant and Fire Resistant Cables,
- admissible temperature on the core of at least 90°C in steady state,
- UV stability,
- Rated cable voltage.

Voltage drop on the DC side: The connections between the most distant PV modules and the inverter must be made with double-insulated single-pole cables of sufficient cross-section to guarantee a maximum overall voltage drop of 3%.

Voltage drop on AC side: Connections between the point of delivery to the network and the inverters must be made with cables of sufficient section to guarantee a maximum overall voltage drop of 3%.

Wireless energy meter

- Three phase system to be installed in the solar photovoltaic water pumping system
- Bi-directional meter to track the two-way energy ("from grid" and "to grid")
- With RS485/LoRa/GPRS/4G/WF
- With open API interface

Additional Specifications:

1. All equipment delivered must be original industrial products and ready to install
2. Energy supply for each equipment must be done by battery or solar panel
3. The sensors / devices must be equipped with all necessary accessories for installation and operation: protective case, mat(s), support(s), an anchoring system, etc.
4. All sensor/device enclosures and accessories must be resistant to water, dust and radiations.
5. Alert system regarding sensor/devices malfunction is required.
6. Access to raw sensor data (in direct or indirect form) is required for validation of field data.

7. All wireless energy meters have to be connected and operate on the Project IOT platform (see ToR's Weather, soil and water and Piezometer). To this end, the company is requested to provide technical support to facilitate the transfer.
8. In addition to the one wireless energy meter, two flow-meters and two multi-depth soil water content, salinity and température sensors will be installed in each plot.
9. Within the 1 year following the contract signature, the connection of all sensors can be transferred to a Local Platform. To this end, the company is requested to provide technical support to facilitate the transfer.
10. Documentation, manual and datasheet of the Technical specifications of all the proposed material is required.
11. Adequacy of the proposed material to the requested technical specifications is required.
12. If the addition of an equipment or an accessory is deemed necessary for the correct functioning of the system, the price must be indicated with the mention EXTRA.
13. Minimum of two days training session on equipment/sensor installation, configuration, and maintenance and data configurating reading, viewing and downloading on the IoT Platform.

4. Duration of the Contract

Delivery of the requested services (supply and installation) should be completed 45 days after the contract signature, the latest 30st of September 2024.
The date of the commencement of the contract execution shall be the last signing of the contract.

5. Contract Price, Schedule of Payments and Performance Guarantee

5.1. Contract Price and Schedule of Payments

The maximum fee for this assignment is **16.000 EUR (including VAT)**. This amount includes all other costs, income taxes and any other amount payable or cost that may be required for the completion of the service.

The schedule of payments is as follows:

- 20% payment in advance upon Contract Signature and submission of performance guarantees
- 80% payment upon satisfactory completion of the works

Each payment will be issued after the quality assessment and approval of each deliverable by the Contracting Authority. Then, the awarded service provider will issue the respective invoices.

The method for measuring completed service for payment must be in accordance with the Contract.

In the event that there are delays in the execution of the contract the contractor shall be liable to pay compensation in the form of a penalty. The amount of the flat rate compensation per day of delay (penalty) shall be of 1% of the net contract value per week up to a limit of 10% of the total contract value. For the calculation of penalties, the number of days of delays shall be converted into weeks by rounding down to the nearest week.

5.2. Performance Guarantee

The successful supplier agrees to submit to the Contracting Authority two Performance Guarantees each of them accounting to 2% of the contract value.

The successful supplier shall, within 10 calendar days of the receipt of the contract, sign and date the contract and return it together with a copy of the Performance Guarantees. The copies of the Performance Guarantees forwarded to the Central Government Authority are to be endorsed by the Contracting Authority prior to submission. The successful participant is therefore obliged to forward the original Performance Guarantees to the Contracting Authority. Any Performance Guarantees issuance expenses bear's the successful participant.

The 1st Performance Guarantee shall be released within 30 days of the completion of works to the satisfaction of the Supervising Authority and the 2nd performance Guarantee shall be released on the completion of the 12-months warranty period.
The Contracting Authority will not affect any payment to the Contractor until the Performance Guarantees have been submitted.

6. Selection Criteria (Pass/Fail)

Successful participants must provide the following:

A. Technical Offer (Annex 2):

- Be enrolled in one of the official professional or trade registries at the country of registration.
- Be licensed to perform works in Tunisia.
- Provide a signed statement of understanding the requested objective, services, and deliverables.
- Provide a signed statement certifying that the equipment is new and unused.
- Provide a Graphic Works Schedule - Program of Works in the form of a Gantt Chart.
- Provide a warranty for good operation for at least 1 year for the equipment which is to be supplied and installed.
- Provide proof of their average annual turnover for the last three (3) fiscal years being at least equivalent to the maximum amount of this Call.
- Provide a statement that at least one certified installer will perform the requested work.

- A list of projects proving at least five (5) years in the field of smart agriculture and support for farmers with a proven experience in the installation of solar photovoltaic water pumping system for irrigation and a wireless energy consumption monitoring systems in the framework of projects.
- Provide a signed certificate or a document supporting the claim that the IOT platform is designed to support all the sensors that will be implemented as part of this project, and which are linked to climate, soil, water, and energy.
- Technical specification leaflets and brochures for the Compliance of the equipment should be provided.
- Have minimum duration of operation of five (5) years. Proof to be provided by the related chamber (date of registration).

B. Financial Offer (Annex 3)

7. Awarding Criterion and Evaluation Process

Award criterion is the Most Economically Advantageous offer with criterion the lowest price for the offers satisfying the selection criteria.

Submission of Offers Please refer to the Call for Offers Document for the proper submission of the Technical and Financial Offer.

8. Monitoring and progress Control

Ms. Sondos Njoumi, Programme Officer at GWP-Med, will be providing oversight and guidance from the side of the Project Team. Services will be rendered and will be considered completed upon approval of the deliverables by the Project Coordinators and the GWP-Med Executive Secretary Mr. Vangelis Constantianos.