



SCOPE OF WORK

AGRO-METEOROLOGICAL WEATHER STATIONS

INTRODUCTION

The Water Innovation Technologies (WIT) project is a five-year initiative funded by the United States Agency for International Development (USAID) and implemented by Mercy Corps (MC). The objective of the project is to increase water conservation in Jordan by focusing on water use efficiency in the agricultural sector, community and household levels. The Project's theory of change states that "if barriers to the adoption of water-saving technologies are systematically broken down at multiple levels, with different groups of water users and market actors through enhancing knowledge, forming partnerships and providing advisory services, in addition to improving access to finance and strengthening institutions that support water-saving, then adoption of water-saving technologies by farmers, households, and communities will increase leading to sustainable management of water and natural resources". The project goal is to save 18.5 MCM of water by addressing market system constraints in the adoption of innovative water-saving technologies in agriculture and household sectors.

During the next phase of the project, WIT will support the implementation of agrometeorological weather stations that will provide weather data which can be used as a tool to contribute in building advisory service system that will support the project objectives.

OBJECTIVE

Provide weather stations that should be designed for agricultural and environmental research needs along with installation, configuration, training and free maintenance for two years.

Weather stations will be installed in Eight (8) different locations in Jordan.

This SOW contains Three (3) sections

❑ SECTION ONE (1):

- WEATHER STATION MAIN COMPONENTS

Install and operate Eight (8) Agro-meteorological weather stations in different locations in Jordan as per below items specifications:

“Each weather station should contain the below components”.

Item No.	Item Name	Qty	Description
All proposed items shall be designed for Agricultural and environmental research needs, to insure provision of the above required type of station: each station to be equipped with Soil Heat Flux Plate and leaf wetness sensor in addition to all other component mentioned in Section one (1) of SOW.			
1	Ultra sonic wind sensor	1	Two-dimensional sonic wind sensor, Designed for agricultural and environmental research applications. Output rate 1-10 min, Wind module sensitivity 0.12 m/s, Wind module dynamic 0.12 to 40 m/s, Direction sensitivity +/-1.5°, Direction resolution 1°, Operating temperature without icing -15° C to +55° C - Above are the minimum requirements, higher requirements are accepted as well
2	High Resolution double tipping bucket rain gauge	1	High Resolution double tipping bucket rain gauge With sensitivity of 1 tip per 0.2 mm or 1 tip per 0.5 mm with Accuracy ±3.5 Magnet mechanic, very fast switching mechanics, resolution =< 0.5 mm, - Above are the minimum requirements , higher requirements are accepted as well
3	Pyranometer for total solar radiation	1	Leveling plate, >2.5m Cable, Stereo connector for use with loggers. Absolute error max. 5%, Operating temperature range - 15°C to 65°C, Operating relative humidity range 0 to 100%, Time to measure 10 µs - Above are the minimum requirements, higher requirements are accepted as well
4	Soil Heat Flux Plate	1	Measurement range -2000 to +2000 W/m ² Sensitivity (nominal) 60 x 10 ⁻⁶ V/(W/m ²) Sensing area 8 x 10 ⁻⁴ m ² Guard width to thickness ratio 5 m/m (as required by ISO 9869 D.3.1)

			<p>Sensor thermal resistance $71 \times 10^{-4} \text{ K/(W/m}^2\text{)}$ Sensor thickness $5.4 \times 10^{-3} \text{ m}$ Uncertainty of calibration $\pm 3 \%$ ($k = 2$) Rated operating temperature range -30 to $+70 \text{ }^\circ\text{C}$ Cable diameter $4 \times 10^{-3} \text{ m}$ IP protection class IP67 Cable length 10 m - Above are the minimum requirements , higher requirements are accepted as well</p>
5	Durable and flexible data logger for all climatic conditions	I	<p>Powered by a rechargeable battery and a solar panel. Built-in modem for direct communication with the Field Climate platform. Can handle up to 600 sensors through the intelligent sensor bus system. The system can store $> 7 \text{ MB}$ of logged data With UMTS/CDMA Support - Data Sim Card Supplied Locally - & Mounting Brackets), - Above are the minimum requirements, higher requirements are accepted as well</p>
6	HygroClip (Air temperature and relative humidity)	I	<p>With Dew point, VPD and delta T calculations Precision adjustment profile $\pm 0.5\% \text{ rh} / 0.1 \text{ }^\circ\text{C}$, Long-term stability $< 1 \%$ rh, $0.1 \text{ }^\circ\text{C} / \text{year}$, Measurement range $0 \dots 100 \%$ rh, $-100 \dots 200 \text{ }^\circ\text{C}$, Electronics operating range -20-$65 \text{ }^\circ\text{C}$ and 0-100% rh - Above are the minimum requirements, higher requirements are accepted as well</p>
7	leaf wetness sensor	I	<p>Operate via transparent Lucite plastic as a holder reduces the warming up of the sensor when it is exposed to direct sunlight, Dry / Wet threshold $220 - 390 \text{ kOhm}$, 5 m Cable length - Above are the minimum requirements, higher requirements are accepted as well</p>
8	Volumetric water content (VWC) soil sensor	3	<p>Range: $0-0.57 \text{ m}^3/\text{m}^3$ ($0\%-57\% \text{ VWC}$) Resolution: $0.0008 \text{ m}^3/\text{m}^3$ ($0.08\% \text{ VWC}$) in mineral soils from $0-0.50 \text{ m}^3/\text{m}^3$ ($0\%-50\% \text{ VWC}$) Accuracy: With standard calibration equation, $0.03 \text{ m}^3/\text{m}^3$ ($3\% \text{ VWC}$) typical in mineral soils that have solution electrical conductivity $< 10 \text{ dS/m}$, Operating temperature -40 to $50 \text{ }^\circ\text{C}$, 5m Cable length range</p>

- Above are the minimum requirements, higher requirements are accepted as well

❑ SECTION TWO (2):

1. Open access to Data track for 10 users at least per each station.
2. Company to provide free access for 3 years for 10 users per station on the uploaded data on the related online platform. By giving a user name and password for the related online platform
3. Company to provide a minimum capacity of online platform to store data for at least 6 months of hourly data
4. Company to provide several sources of data extraction methods using different channels i.e. but not limited to (excel, txt).
5. Each station to be equipped with USB port for data download

❑ SECTION THREE (3):

I. DURATION AND TIMELINE

The Agro-meteorological weather stations are expected to be purchased, delivered and installed in January 2021.

Timeline for Delivery, installation, commissioning of each station and instruction sessions for the end users who are monitoring each station, all shall be delivered in complete shape within 45 calendar days after signing the contract.

- The bidder will be provided with list of locations along with their coordinates for delivery purposes.

2. INSTRUCTION SESSIONS:

Company to provide instruction sessions either physical and/or online for the following topics for the end users per station:

- Witness of installation by each station's representatives
- Data Configuration and utilizing and usage for the transmitted data
- Maintenance for both hardware and software (light station maintenance included with but not limited to: troubleshooting, periodic maintenance on each component)

3. WARRANTY

- Two years warranty must be provided. The bidder should list in details all associated components that are covered under the warranty for all stations (components mentioned in section one (1)) effective immediately after installation and commissioning (handover). This 2-year warranty shall include replacing any component due to manufacturer defects, and all spare parts that might be needed.
- SN number for each station to be provided at the time of contracting

4. SPARE PARTS:

- Availability of a replacement for all station part component covered for 5 years. Company to maintain provision of spare parts for any of the defected parts of the station component within 14 days of the agreed spare part order.
- Company to provide price list for spare parts valid for 5 years beyond the 2-year free warranty period.