

Republic of Yemen

United Nations Office for Project Services

Yemen Emergency Electricity Access Project - Phase 2 (P178347)

Environmental and Social Management Plan

**Supply and Installation Solar Pumping Systems to 21 Water Wells
Hadramout and AlMahrah Governorates**

23 May 2023

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Abbreviations

BoQs	Bill of Quantities
C-ESMP	Contractor Environmental and Social Management Plan
COC	Code of Conduct
COP	Code of Practice
EHS	Environmental, Health and Safety
E&S	Environmental and Social
ESF	Environmental and Social Framework
ESHS	Environment, Social, Health, and Safety
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESSO	Environmental and Social Safeguards Officer
FLAP	Forced Labor Action Plan
GARWSP	General Authority for Rural Water Projects
GBV	Gender Based Violence
GM	Grievance Mechanism
hr	Hour
HSSE	Health, Safety, Social and Environment
km ²	Square Kilometer
kW	Kilowatt
kWh	kilowatt hour
LMP	Labor Management Procedures
m	Meter
m ³	Cubic meter
NWSA	National Water and Sanitation Authority
OHS	Occupational Health and Safety
PPE	Personal Protective Equipment
PV	photovoltaic
SEA	Sexual Exploitation and Abuse
SH	Sexual Harassment
SEP	Stakeholder Engagement Plan
SMP	Security Management Plan
TPM	Third Party Monitoring
TBT	Toolbox Talk
UNOPS	United Nations Office for Project Services
WUA	Well User Association
YEEAP	Yemen Emergency Electrical Access Project

1. Introduction

Yemen Emergency Electrical Access Project Phase 2 (YEEAP 2; P178347), hereinafter the Project, is a World Bank financed project implemented in the Republic of Yemen by the United Nations Office for Project Services (UNOPS). YEEAP 2 is a follow-up to the Yemen Emergency Electricity Access Project (P163777). YEEAP 2 has been approved by the WB in June 2022 and declared effective on 6 of October 2022 with Project Development Objective to improve access to electricity in rural and peri-urban areas within Yemen and plan for the restoration of the Yemen power sector.

Under subcomponent 1.2 of the Project, UNOPS will engage solar suppliers and installers to provide solar energy systems to critical service facilities and water wells to address the humanitarian crisis in rural and peri-urban areas across Yemen.

This subproject aims to supply and install solar pumping systems to 21 water wells, and it is implemented under subcomponent 1.2 of the Project. The targeted sites under this subproject are located in the rural and peri-urban areas across Hadramout and Al Mahrah governorates.

Project Environmental and Social Management Framework (ESMF)¹ was prepared by the UNOPS to meet the requirements of the World Bank's Environmental and Social Framework (ESF), UNOPS requirements and the national laws and regulations. For YEEAP 2 UNOPS has also prepared the following instruments (i) a Stakeholder Engagement Plan (SEP), (ii), a Labor Management Procedures (LMP), (iii) a Security Management Plan (SMP), and (v) a GBV/SEA/SH Plan.

Subproject screening was performed following the Project ESMF requirements and the screening table is available in annex 1. The current Environmental and Social Management Plan (ESMP) for this subproject has been prepared following the Project ESMF requirements, and guidance present in sections 5 and 6 of the ESMF and the proposed ESMP structure in section 6.3.1 of the ESMF.

2. Subproject Description

2.1. Subproject Overview

Building on the success of YEEAP phase 1 where solar systems supplied to schools, health facilities and water wells contribute significantly to maintaining the services across the healthcare and education center, this effort will continue under YEEAP phase 2 in which 21 water wells have been selected as a first rollout to be supplied with solar pumping systems. Additional water wells will be selected and supported under the Project during its lifetime in which dedicated ESMPs will be prepared.

The targeted wells that will be supported under this subproject were nominated by the local governmental authorities and endorsed by the Ministry of Water and Environment. The wells are owned, managed and operated by either Well User Association (WUA) or National Water and Sanitation Authority (NWSA) as clarified in table 1. Further explanation on the WUA and NWSA is below:

- Well User Association (WUA) is a beneficiaries committee that is established for each well and it represents the various groups within the community. The WUA at each well is fully responsible for the whole management, operation and maintenance (O&M) activities of the well. The wells that are under the WUAs were drilled and provided with the required pumping facilities by the General Authority for Rural Water Projects (GARWSP), GARWSP governmental authority under the Ministry of Water and Environment. Once installation was completed, GARWSP handed over fully the wells to the WUAs for the overall management, operation and maintenance.

¹ YEEAP ESMF is available in the link

<https://documents1.worldbank.org/curated/en/099925102162242198/pdf/P1783470ESMF020220020100v40yap.pdf>

- National Water and Sanitation Authority (NWSA) is a governmental authority managing the whole O&M activities for water wells located in the peri urban areas. NWSA is appointing for each well under its management dedicated staff responsible for the O&M.

The intervention will be entirely implemented for existing operational water wells and it will be limited to supply, install, commission, and operate the solar pumping system components as a replacement of existing power generation systems that are dependent on fossil fuel. Estimated timeframe to complete this subproject by contractor/s is 6 months from the date of signing contracts, such period includes the time required for importation of supplies while the time required for actual work at the sites is detailed in section 2.3 hereinafter.

Detailed assessment of each water well under this subproject has been performed by UNOPS in coordination with the local authorities, wells management and committees to evaluate the needs, determine the factors and requirements that should be included in the system design of each well. Such assessment has been carried out by qualified Engineers from UNOPS in which the status, existing/expected power consumption, access, operational arrangements, system components' location and such details are agreed with the local authorities and management teams of each water well. Summary report has been prepared for each well which includes detailed information on the current baseline information as well as the proposed intervention details².

The power generation and water pumping capacity designed for each well under the subproject is calculated in agreement with local authorities based on the targeted number of beneficiaries in each well with a consumption rate of 40 liters per day per person³. Such power generation and pumping water capacity is equivalent to the existing water-pumping rate and should be enough only for pumping the water quantity that is required for drinking and household purposes, i.e., 40 liters per day per person. The designed pumping capacity for each well also considers the existing wells conditions and safe productivity rate, design capacity is lower than the productivity rate. Safe productivity rates of the wells have been determined using pumping tests for all wells. Further information on the existing wells conditions is available in table 1 below which includes the wells depth, water level and safe productivity rate.

The land that will be used for the PV panels installation in each well shall meet the following requirements which were considered and verified during the assessment:

- Land is in a safe location that is not potentially affected by soil erosion, landslides, floods or rainwater accumulation.
- Land is not private and allocated solely for the solar system components installation. Legal evidence validated by relevant authorities should be provided. (Allocated lands for the solar panels installation is currently owned by the wells management in which the ownership is supported by legal documents. The original ownership of lands is public except for 2 wells, HAD-U2-06 and HAD-U2-07, in which the land was private and ownership transferred legally to the wells management as well).
- Land is at a relatively acceptable distance from the wellhead.
- Access road to the land exists to perform leveling and transferring the PV panels and installing mounting structures.
- Land is free of structures or buildings that require removal.

Following the detailed assessment of water wells, solar system design and Bill of Quantity (BoQ) prepared for each water well under the subproject. Solar pumping system design has been verified and reviewed to meet the applicable standards via multiple review levels from UNOPS.

² Sample assessment report that has been prepared for one of the wells under this subproject is available in the link [assessment report sample](#)

³ [WHO - Domestic water quantity, service level and health](#) Table 11 Summary of water access, adequacy and level of health concern provides details on the water consumption rates at various levels

Once all system components are installed, tested, commissioned and all contractor work completed in each site, the whole system will be handed over to wells management in which they will be fully responsible for the system operation and maintenance. System operation will take place by each site existing staff who are familiar with the wells operation using diesel engines or public electricity sources. Existing power generation sources for the wells will be kept as a standby option in case of any operation disturbance that could occur on the solar pumping system.

Training sessions will be conducted by the contractor with close and full supervision from UNOPS side, as part of the contract scope targeting each site workers on the solar pumping system to ensure their full understanding and ability to manage such operation. Furthermore, technical support will be provided to the water well management team from the UNOPS team during the project lifetime.

2.2. Water Wells Summary

Targeted wells under this subproject are 21 in which 11 wells are located in Hadramout governorate and 10 wells are located in Al-Mahrah governorate. All wells under this subproject are used for drinking and household purposes in which the existing power generation and pumping capacity using fossil fuel will be replaced by a solar pumping system. Estimated total beneficiaries under this subproject are 114,790 (52,334 Males and 62,456 Females). Detailed in table 1 and 2 for each well the breakdown of beneficiaries and location distribution across governorates / districts.

Total number of solar panels that will be installed in all sites under this subproject, 21 sites, is 1,800 panels, 550 W each, with an approximate power generation capacity of 990 kW. Design parameters for each well including the installation land area for PV are available in table 2 below. Full details on the wells, site layout, photos and existing conditions are included in annex 6.

Table 1 Summary of wells locations and baseline information

No	Well Code	Well Name English / Arabic	Governorate	District	Coordinates	Ownership - O&M	Well Depth m	Water level m		Raiser length m	Productivity rate m3/hr
								Static	Dynamic		
1.	HAD-U2-01	Al Sawm # 3 / السوم 3	Hadramout	Al Sawm	16.207579, 49.289848	WUA	95	49	52.5	54	50.4
2.	HAD-U2-02	Al Sawm # 4 / السوم 4	Hadramout	Al Sawm	16.206913, 49.289662	WUA	90	43	52.8	66	43.2
3.	HAD-U2-03	Hawarah #2 / حورة رقم 2	Hadramout	Wadi Al Ain	15.706653, 48.296941	WUA	95	76	77.6	84	64
4.	HAD-U2-04	Mnwab # 1 / منوب رقم 1	Hadramout	Al Qatn	15.738409, 48.375663	WUA	100	69	70.15	78	54
5.	HAD-U2-05	Qaeuda # 2 / قعوضة رقم 2	Hadramout	Wadi Al Ain	15.760558, 48.271083	WUA	100	59.5	61	69	57.6
6.	HAD-U2-06	Al Adeia العاديه	Hadramout	Duean	15.355052, 48.347742	WUA	360	120	139	186	36
7.	HAD-U2-07	Al-Alealib العليب	Hadramout	Gail Bin Yamin	15.132503, 49.060003	WUA	290	191	180	200	36
8.	HAD-U2-08	Al Qarn القرن	Hadramout	Gail Bin Yamin	15.131486, 49.109960	WUA	315	170	190	210	54
9.	HAD-U2-09	Raidt Al Jouhi ريذة الجوهي	Hadramout	Gail Bin Yamin	15.206943, 49.020505	WUA	330	160	186	198	79
10.	HAD-U2-10	Abdullah Gharib عبدالله غريب	Hadramout	Gail Bawzir	14.834579, 49.177802	WUA	250	12	23	78	72
11.	HAD-U2-11	Huridah حريضة	Hadramout	Huridah	15.603096, 48.186014	WUA	120	78	79.8	90	57.6

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No	Well Code	Well Name English / Arabic	Governorate	District	Coordinates	Ownership - O&M	Well Depth m	Water level m		Raiser length m	Productivity rate m3/hr
								Static	Dynamic		
12.	MHR-U2-01	Eitab / عتاب	AlMahrah	Sayahut	15.343730,51.469978	WUA	50	20.4	40.4	42	37.8
13.	MHR-U2-02	Rakhawat Al Sharqia رخوت الشرقية	AlMahrah	Sayahut	15.301847°,51.378493°	WUA	50	15.3	45.2	45	14.6
14.	MHR-U2-03	Dabuwt ضبوت	AlMahrah	Al Ghayda	16.075601,52.083369	NWSA	120	45	63	99	55.8
15.	MHR-U2-04	Oman#1 عمان رقم 1	AlMahrah	Al Masila	15.237926,51.101922	NWSA	40	9	17.2	24	54
16.	MHR-U2-05	Oman#2 عمان رقم 2	AlMahrah	Al Masila	15.239960,51.100919	NWSA	50	9	17.2	24	54
17.	MHR-U2-06	Well #2 بئر رقم 2	AlMahrah	Sayahut	15.239183,51.101577	NWSA	40	11	16	22	54
18.	MHR-U2-07	Well #3 بئر رقم 3	AlMahrah	Al Masila	15.235180,51.103679	NWSA	50	10	12	24	54
19.	MHR-U2-08	Well 6 / بئر رقم 6	AlMahrah	Al Ghayda	16.089898, 52.042782	NWSA	120	55	70	90	57.7
20.	MHR-U2-09	Well 7 / بئر رقم 7	AlMahrah	Al Ghayda	16.090205,52.038692	NWSA	120	51	65	96	330
21.	MHR-U2-10	Well 5 / بئر رقم 5	AlMahrah	Al Ghayda	16.090205,52.047424	NWSA	120	40.6	95.8	90	330

Table 2 Summary solar pumping system design parameters

No	Well Code	Well Name English / Arabic	Number of beneficiaries			Design capacity kW	Design flow rate		No of PV panels	PV installation area m2
			M	F	Total		m3/hr	m3/day ⁴		
1.	HAD-U2-01	Al Sawm # 3 / السوم 3	2903	3797	6700	33	50	270	60	186
2.	HAD-U2-02	Al Sawm # 4 / السوم 4	2325	2825	5150	33	38	206	60	186
3.	HAD-U2-03	Hawarah #2 / حورة رقم 2	2715	2885	5600	33	41	225	60	186
4.	HAD-U2-04	Mnwab # 1 / منوب رقم 1	3151	3349	6500	33	50	270	60	186
5.	HAD-U2-05	Qaeuda # 2 / قعوضة رقم 2	3515	3985	7500	49.5	55	297	90	277
6.	HAD-U2-06	Al Adeia العاديه	1400	1700	3100	49.5	23	125	90	277
7.	HAD-U2-07	Al-Alealib العليب	1670	2030	3700	49.5	28	152	90	277
8.	HAD-U2-08	Al Qarn القرن	1921	2179	4100	66	30	162	120	368
9.	HAD-U2-09	Raidt Al Jouhi ريده الجوهي	1968	2092	4060	57.75	30	162	105	323
10.	HAD-U2-10	Abdullah Gharib عبدالله غريب	2383	3117	5500	49.5	40	216	90	277
11.	HAD-U2-11	Huridah حريضة	2946	3854	6800	57.75	50	270	105	323

⁴ Daily design flow rate, m3/day, is calculated on the basis of approximately 5.5 hours operation. However, the quantities here are approximate figures and the operation duration will vary from day to day based on many factors including the weather conditions, consumption rate and needs at local level. Accordingly, the pumping rate might be fluctuated and will be adjusted by the wells management.

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No	Well Code	Well Name English / Arabic	Number of beneficiaries			Design capacity kW	Design flow rate		No of PV panels	PV installation area m2
			M	F	Total		m3/hr	m3/day ⁴		
12.	MHR-U2-01	Eitab / عتاب	2166	2834	5000	33	37	200	60	186
13.	MHR-U2-02	Rakhawat Al Sharqia رخوت الشرقية	918	1042	1960	16.5	14	78	30	95
14.	MHR-U2-03	Dabuwt ضبوت	2470	3230	5700	57.75	42	227	105	323
15.	MHR-U2-04	Oman#1 عمان رقم 1	2426	3174	5600	49.5	42	227	90	277
16.	MHR-U2-05	Oman#2 عمان رقم 2	2470	3230	5700	49.5	40	216	90	277
17.	MHR-U2-06	Well #2 بئر رقم 2	2578	2922	5500	49.5	41	222	90	277
18.	MHR-U2-07	Well #3 بئر رقم 3	2278	2422	4700	49.5	33	180	90	277
19.	MHR-U2-08	Well 6 / بئر رقم 6	3490	3710	7200	57.75	53	287	105	323
20.	MHR-U2-09	Well 7 / بئر رقم 7	3478	3942	7420	57.75	55	297	105	323
21.	MHR-U2-10	Well 5 / بئر رقم 5	3163	4137	7300	57.75	54	292	105	323
	Total		52,334	62,456	114,790	990			1,800	5,547

2.3. Scope of Work

Scope of work under the subproject include the following main elements in which the estimated number of contractor workers and duration required for each site varies between 2 to 3 weeks. Contractor work details, equipment required, and number of workers needed in each stage is with the level of skills required as well the estimated duration are explained in tables 3 and 4 below, The work activities will be carried out in phases at each site.

Annex 2 provides details of the design, contractor work requirements that are considered during the design for the sites under this subproject.

Table 3 Scope of work summary (each site)

Work Type at each site	No of Workers	Duration (Days)
<p>1. Civil Work</p> <ul style="list-style-type: none"> ● Site cleaning, preparation and leveling of PV mounting structure area including excavation (40 cm), cutting in all types of soils, backfilling, compacting, removal of obstacles and building side walls when required to hold the soil. ● Installation of fixed mounting structures suitable for the provided PV panels with concrete foundations including all earthing works such as excavation (40 cm max), compacting and backfilling. ● Installation of chain link fences including earthing works such as excavation, compacting and backfilling. ● Installation of concrete valve chamber, lighting and lightning poles concrete foundations and combiner box foundations. ● Site cleaning and finishing after work completion. ● Installation of street sign board. ● Equipment and tools required for this phase are <ul style="list-style-type: none"> ○ Tractor (rarely required) ○ Concrete mixer mobile machine ○ Hand tools for concrete and excavation work. 	8-11	5-10
<p>2. Mechanical Work</p> <ul style="list-style-type: none"> ● Removal of existing raiser pipes using crane and installation of new raiser pipes with all required fittings and accessories. ● Flushing and cleaning for all new piping components. ● Installation of piping components flanged or threaded fittings, mechanical water flow meter, air release valve, non-return valves and gate valve. ● Installation of piping fittings and accessories required to install the mechanical and piping components. ● Installation of well head cover. ● Equipment and tools required for this phase are <ul style="list-style-type: none"> ○ Mobile Crane with rigging and lifting accessories ○ Truck ○ Hand tools 	5-7	3-6

Work Type at each site	No of Workers	Duration (Days)
<p>3. Electrical Work</p> <ul style="list-style-type: none"> ● Removal of existing submersible pump including power and control cables using mobile crane. ● Installation of solar PV modules, combiner box, solar pump inverter, submersible AC pump set (Motor & Pump) including electrical cables, control cables and accessories. ● Installation of lighting system and lightning system ● Installation of earthing system for all required equipment. ● Installation of control components such as level sensors and pressure switch. ● Installation of electrical and control cables (DC & AC) with all required accessories. ● Installation of AC circuit breaker for external electrical source. ● Set-up inverter parameters and system testing. ● Installation of fire extinguishers. ● Equipment and tools required for this phase are <ul style="list-style-type: none"> ○ Mobile Crane with rigging and lifting accessories ○ Small electrical generator ○ Small welding machines, Drills and Grinders ○ Hand tools 	3-6	3-6
<p>4. Capacity Building and Training</p> <p>The training program by contractor shall be provided to the site's workers including those in charge of the system operation. Training should include but not limited to the following elements and activities:</p> <ul style="list-style-type: none"> ● System safety and Operation: System description including system features, components and their functions, system software and interface; Running PV system safely; System operating procedures; System operating characteristics; System limitations; On-site system operation. ● System Maintenance: System and components and simple troubleshooting; On-site inspection and operation and maintenance; Schedule of maintenance, safety checks and procedures; Types of alarms and notifications. ● Energy Efficiency: Energy efficiency best practices and energy efficient alternatives; Customized basic energy management session for each site to all users on which appliances they can run using the solar system; Printed leaflet should be available in Arabic presenting system on/off operation, simple troubleshooting and basic maintenance. 	1	1
<p>5. System Warranty</p> <ul style="list-style-type: none"> ● System maintenance and after sales services for 2 years including the provision of necessary equipment and components to run the system safely. ● Troubleshooting for the solar system for any faulty case during the maintenance period during the maintenance visit or for any emergency request by the end users. 	-	-
<p>Average in each site</p>	17-25	12-23

Table 4 Breakdown of estimated average number of contractors workers and work duration across sites

Work Type	Civil work			Mechanical work			Electrical work			Capacity building		Total work duration days	Number of workers in site		
Well code	Duration Days	Number of workers		Duration Days	Number of workers		Duration Days	Number of workers		Duration Days	Skilled workers		Skilled	Unskilled	Total
		Skilled	Unskilled		Skilled	Unskilled		Skilled	Unskilled						
HAD-U2-01	5	3	4	4	3	2	3	2	1	1	1	13	9	7	16
HAD-U2-02	5	3	5	3	3	2	3	3	1	1	1	12	10	8	18
HAD-U2-03	6	4	5	5	3	2	4	3	1	1	1	16	11	8	19
HAD-U2-04	6	4	5	5	3	2	4	3	2	1	1	16	11	9	20
HAD-U2-05	8	4	5	5	4	3	5	4	2	1	1	19	13	10	23
HAD-U2-06	8	4	5	5	3	3	5	4	2	1	1	19	12	10	22
HAD-U2-07	8	4	5	5	3	3	5	4	2	1	1	19	12	10	22
HAD-U2-08	10	5	6	6	4	3	6	4	2	1	1	23	14	11	25
HAD-U2-09	9	5	5	5	4	3	5	4	2	1	1	20	14	10	24
HAD-U2-10	8	5	4	5	3	2	5	4	2	1	1	19	13	8	21
HAD-U2-11	9	5	5	5	4	3	5	4	2	1	1	20	14	10	24
MHR-U2-01	5	3	3	3	3	2	3	2	1	1	1	12	9	6	15
MHR-U2-02	4	3	4	3	2	3	3	2	1	1	1	11	8	8	16
MHR-U2-03	9	4	5	6	4	3	5	4	2	1	1	21	13	10	23
MHR-U2-04	8	4	4	5	3	3	4	3	2	1	1	18	11	9	20
MHR-U2-05	8	4	5	5	3	3	5	3	2	1	1	19	11	10	21

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Work Type	Civil work			Mechanical work			Electrical work			Capacity building		Total work duration days	Number of workers in site		
Well code	Duration Days	Number of workers		Duration Days	Number of workers		Duration Days	Number of workers		Duration Days	Skilled workers		Skilled	Unskilled	Total
		Skilled	Unskilled		Skilled	Unskilled		Skilled	Unskilled						
MHR-U2-06	8	4	4	5	3	2	5	3	2	1	1	19	11	8	19
MHR-U2-07	8	4	4	5	4	3	5	3	2	1	1	19	12	9	21
MHR-U2-08	9	5	4	6	4	3	5	4	2	1	1	21	14	9	23
MHR-U2-09	9	5	4	6	4	3	6	4	2	1	1	22	14	9	23
MHR-U2-10	9	5	4	6	4	3	6	4	2	1	1	22	14	9	23
Total	159	87	95	103	71	56	97	71	37	21	21	380	250	188	438

The number of contractors that will be involved in the subproject implementation is not known at this stage and it will depend on the tendering evaluation results.

The contractor work and system installation will be entirely performed in existing operational water wells and the solar panels will be installed at a dedicated land that is allocated by wells operation management and have been evaluated by UNOPS engineers as suitable locations for PV installation.

Estimated number of contractor workers in each site that will be involved in system installation, testing, commissioning and start-up is 17 to 25 workers and the estimated total number of workers in all sites under the subproject is 438 workers. The installation period and actual work within the sites under the subproject is between 12 to 234 working days.

Approximately 8 to 10 workers required for system installation in each site are unskilled and semiskilled responsible for the manual handling, installation and transportation of materials. Approximately 9 to 14 skilled workers are required in each site responsible for the supervision, electrical work, training and maintenance activities. It is expected that women workers will not be involved in the contractor's works at the site level as the work is taking place mainly in rural areas.

Majority of the workers required for the subproject implementation will be from the same work areas in which maximum 5 workers in each site will be sourced from neighboring cities and governorates. Considering the limited number of workers and working days in each site the workers camps are not expected to be provided and workers are expected to leave the work areas at the end of the workday to their residency areas. Those sourced from other cities and governorates, maximum 5 in each site, will be accommodated in the nearest hotels at the district's center in which the contractor will be responsible for managing and providing the workers with such. Following UNOPS guidance, workers accommodation design and equipment should strive to offer workers a maximum of privacy with a minimum area of 4 square meter per person should be provided.

The workers shall use the existing latrine facilities that belong to the wells management during the working day.

3. Environmental and Social Baseline

In 2014, before the conflict erupted, only about 66 percent of the population in the Republic of Yemen had access to public electricity (another 12 percent had access to private electricity solutions), the lowest level in the region. Rural and peri-urban areas, which account for approximately two-thirds of Yemen's estimated 30 million population, suffered disproportionately from a lack of access to modern energy, with rural electricity access rates of only 53 percent.

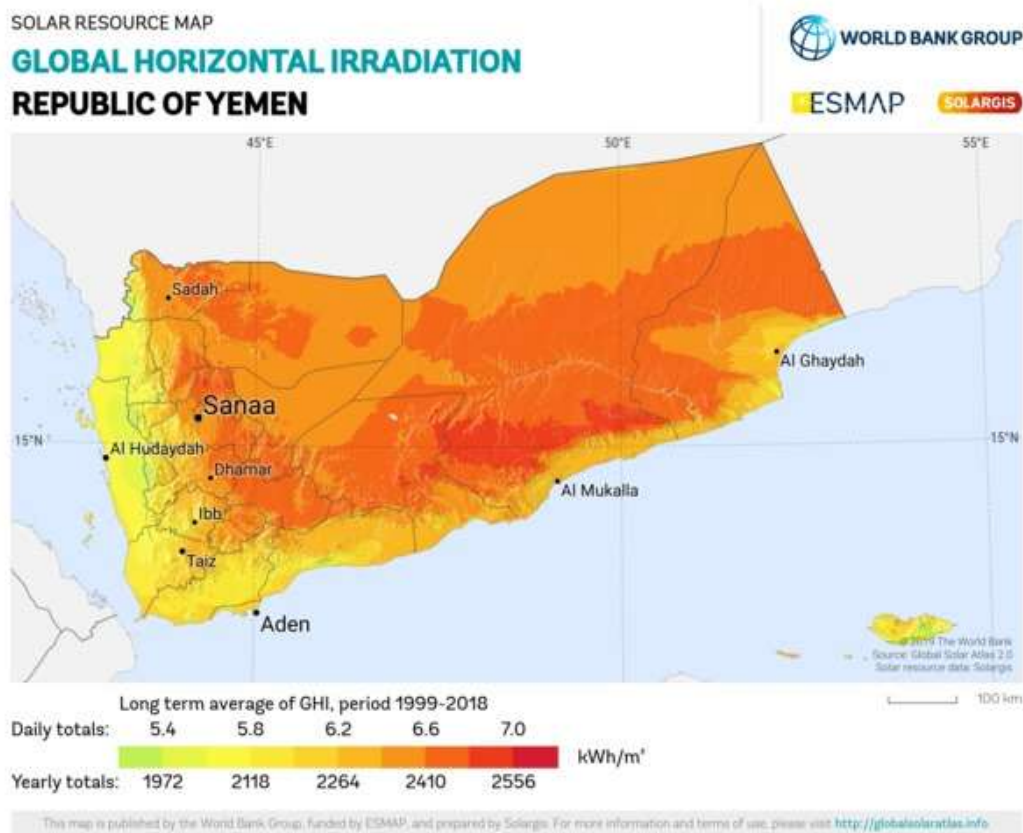
The collapse of electricity and fuel supplies has also severely affected employment and household incomes in rural and peri-urban areas, due to the dependence on agriculture and energy-intensive groundwater extraction for irrigation. It has also increased dependency on scarcely available and expensive liquid fuels.

On 2 October 2022, the UN-mediated truce in Yemen came to an end despite the efforts made to reach an extension agreement. The overall security condition within the country remains stable without conflict escalation post the truce end. The truce had first come into effect on 2 April 2022 and was renewed twice for two-month periods, in June and August. Among other things, it provided for a halt to offensive military operations. Overall, the one year of truce brought several tangible benefits to the Yemeni population, including improved access to humanitarian aid, greater economic opportunities, and a significant reduction in violence and casualties countrywide. The selected sites under this subproject are located in safe locations away from any conflict areas.

Solar PV in Yemen

During the 8 years of war, the conflict has resulted in boosting the PV market in Yemen where PV has penetrated the market with a high growth rate, with access to PV systems reaching around 50% of households in rural areas and 75% in urban areas, translating over one billion USD private sector driven investment in PV systems for residential sector alone over the past five years, with huge untapped potential in many other sectors. This has a positive impact on Yemeni society, not only by improving energy access during the conflict time but also by enhancing socio-economic conditions in both urban and rural areas. PV technology has reached many houses and farms, as well as some health centers and schools. This situation coupled with the dramatic reduction in PV technology prices have opened the doors for a newly emerging market with unique experiences in how the growth occurred and how the labor skills were gained and developed to serve the market needs.

Figure 2 Global Horizontal Irradiation in Yemen



Subproject water wells

Total water wells under this subproject are 21 distributed across 2 governorates and 10 rural and peri-urban districts in which summary on the location, coordinates, estimated number of beneficiaries and system capacity are available under section 2.2. No ecological sensitive zones are available at the vicinity of 21 water wells included under this subproject. The planned support and solar pumping system installation under this subproject shall meet the required pumping capacity for water consumption in drinking and households purposes. Additional details on the location, buildings layout, photos and existing condition as well as the proposed locations for systems installation for each site are included in annex 6.

While no related GBV/SEA/SH issues came to the Project attention within the targeted sites and minor potential risk level is expected, included below the environmental and social details across the subproject

targeted sites categorized by governorate. The Population indicated below is 2023 estimation based on the Yemen Central Statistical Office (CSO) 2004 census, while the IDP is determined based on 2021 estimated figures.

A. Hadramout

Hadramout governorate is located in the southeastern part of the Republic of Yemen, 794 kilometers east of the capital of Sana'a, between Al-Mahra to the east and Al-Jawf, Marib, and Shabwah to the west. Hadramout is the largest governorate in Yemen in terms of area with 187,542 km² and it is divided administratively into 28 districts, with the city of Mukalla as its capital. It borders the Kingdom of Saudi Arabia in the north.

11 water wells will be supported under this subproject in Hadramout, and they are distributed across 7 districts namely Al Sawm, Wadi Al-Ain , Al Qatn, Duean, Gail Bin Yamin, Gail Bawzir and Huridah. Majority of locals in the areas covered by the subproject are relying on the groundwater resources which are managed and fetched by the local water authorities with support of donors and international organizations.

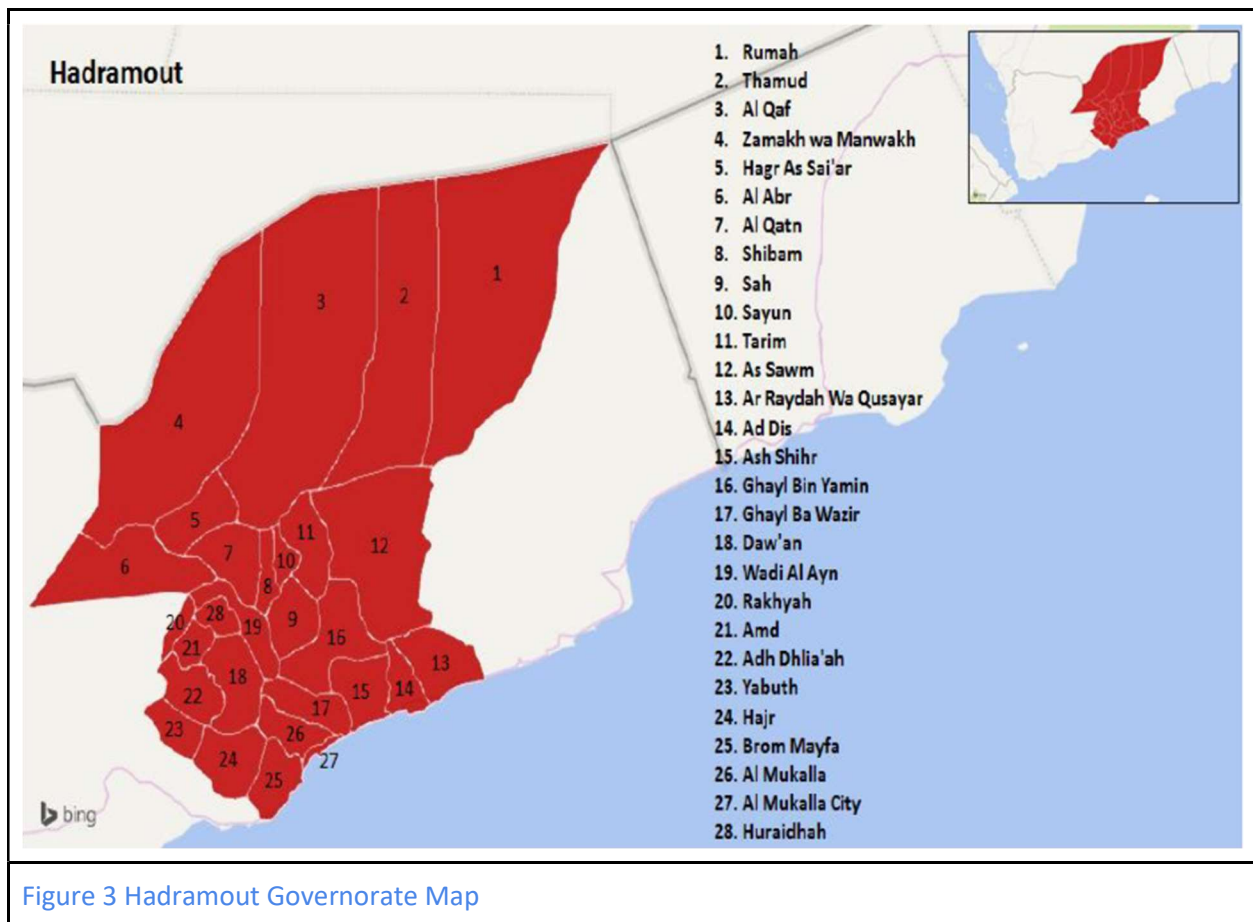


Figure 3 Hadramout Governorate Map

Economical Condition⁵

According to the 2014 Household Budget Survey, the poverty rate in Hadramout was 60% of the total population. This number has likely increased since. Despite the absence of open conflict in the governorate, rapid inflation has eroded purchasing power among the population.

⁵ [Mapping of Local Governance in Yemeni Governorates](#)

Most of the economically active population in Hadramout is engaged in agriculture, fishing, or livestock rearing. The governorate produces around 5% of Yemen’s total agricultural production, notably dates, cereals, and cash crops. Hadramout’s coast includes rich fisheries in the Arabian Sea. Alongside Marib and Shabwah, the governorate is home to the main oil-producing region of Yemen. Other mineral resources, such as gold, are present, but not currently exploited in large quantities. Hadramout has many cultural landmarks, but tourism is very limited. The Al-Wadiyah border crossing with Saudi Arabia generates significant customs revenue. However, Marib currently controls the border crossing.

Despite the disruption of central government subsidies in various governorates, the local authority in Hadramout has kept its local revenues, being far from military confrontations. This has enabled the government to continue regular payment of salaries and to cover the operational costs of the governorate. In addition, the governorate covers the investment budget for services and infrastructure maintenance from oil income⁶, which the governorate currently receives according to a 20%-80% formula. The residents of Hadramout had previously called for a share of oil income. The “all-inclusive Hadramout Conference”, held on 26 April 2017, for example, called for increasing the governorate’s share to 20% for reinvestment in the governorate. Hadramout has also received support from its large diaspora, which has been instrumental for the governorate to continue service provision.

Population

2023 Estimated population in the governorate and the targeted districts under the subproject is below:

	Total IDP	Estimated Population	Total Females	Total Males
Hadramout governorate	42,555	1,684,663	782,818	901,845
Districts (Al Sawm, Wadi Al Ain, Al Qatn, Duean, Gail Bin Yamin, Gail Bawzirand and Huridah)	4,320	414,963	196,114	218,848

Temperature ⁷

In the coastal areas of Hadramout, the summers are hot, oppressive, arid, and mostly cloudy and the winters are short, warm, humid, dry, and mostly clear. Over the course of the year, the temperature typically varies from 20°C to 34°C and is rarely below 17°C or above 37°C. The hot season lasts for 3.3 months, from April 28 to August 6, with an average daily high temperature above 33°C. The hottest month of the year is June, with an average high of 34°C and low of 28°C. The cool season lasts for 2.5 months, from December 14 to February 28, with an average daily high temperature below 29°C. The coldest month of the year is January, with an average low of 20°C and high of 28°C.

In the Wadi areas of Hadramout, the summers are long, sweltering, arid, and partly cloudy and the winters are short, comfortable, dry, and mostly clear. Over the course of the year, the temperature typically varies from 12°C to 39°C and is rarely below 8°C or above 40°C. The hot season lasts for 5.0 months, from April 20 to September 22, with an average daily high temperature above 37°C. The hottest month of the year is July, with an average high of 38°C and low of 26°C. The cool season lasts for 2.3 months, from November 22 to January 31, with an average daily high temperature below 31°C. The coldest month of the year is January, with an average low of 13°C and high of 29°C.

⁶ Current oil production in the country

⁷ Temperature, rainfall, wind and solar energy sourced from: <https://weatherspark.com/y/104568/Average-Weather-in-Su%E1%B8%A9ayl-Shib%C4%81m-Yemen-Year-Round>
<https://weatherspark.com/y/104783/Average-Weather-in-Ghayl-B%C4%81-Waz%C4%ABr-Yemen-Year-Round>

Rainfall

The sliding 31-day quantity of rainfall does not vary significantly over the course of the year, staying within 1 millimeter of 2 millimeter throughout the year.

Wind

In the coastal areas of Hadramout, the average hourly wind speed experiences significant seasonal variation over the course of the year. The windier part of the year lasts for 2.1 months, from June 24 to August 28, with average wind speeds of more than 3.7 meters per second. The windiest month of the year is July, with an average hourly wind speed of 4.4 meters per second. The calmer time of year lasts for 9.9 months, from August 28 to June 24. The calmest month of the year is May, with an average hourly wind speed of 2.7 meters per second.

In the Wadi areas of Hadramout, the average hourly wind speed experiences mild seasonal variation over the course of the year. The windier part of the year lasts for 3.4 months, from February 13 to May 25, with average wind speeds of more than 3.7 meters per second. The windiest month of the year is March, with an average hourly wind speed of 4.1 meters per second. The calmer time of year lasts for 8.6 months, from May 25 to February 13. The calmest month of the year is September, with an average hourly wind speed of 3.3 meters per second.

Solar Energy

In the coastal areas of Hadramout, the brighter period of the year lasts for 2.1 months, from March 9 to May 13, with an average daily incident shortwave energy per square meter above 7.1 kWh. The brightest month of the year is April, with an average of 7.4 kWh. The darker period of the year lasts for 2.2 months, from November 19 to January 25, with an average daily incident shortwave energy per square meter below 6.1 kWh. The darkest month of the year is December, with an average of 5.7 kWh.

In the Wadi areas of Hadramout, the brighter period of the year lasts for 2.6 months, from March 18 to June 6, with an average daily incident shortwave energy per square meter above 7.4 kWh. The brightest month of the year is May, with an average of 7.7 kWh. The darker period of the year lasts for 2.3 months, from November 17 to January 26, with an average daily incident shortwave energy per square meter below 6.2 kWh. The darkest month of the year is December, with an average of 5.8 kWh.

B. AlMahrah

AlMahrah governorate is located in the far southeast of Yemen on the border with the Sultanate of Oman along approximately 500 kilometers of Arabian Sea coast. It is located 1,318 kilometers east of Sana'a. AlMahrah has 68,851 km² and it is the least populous in Yemen. It is divided into nine administrative districts and AlGhaida, its capital, is a coastal town on the Arabian Sea.

10 Water wells will be supported under this subproject in AlMahrah governorate, and they are distributed across 3 districts namely Sayahut, Al Ghayda and Al Masila.

During the past few years, the local water entities in AlMahrah, NWSA and GARWSP, have been expanding population access to potable water with funding from the local authority and donors, including several water projects in various districts funded by the Kingdom of Saudi Arabia.

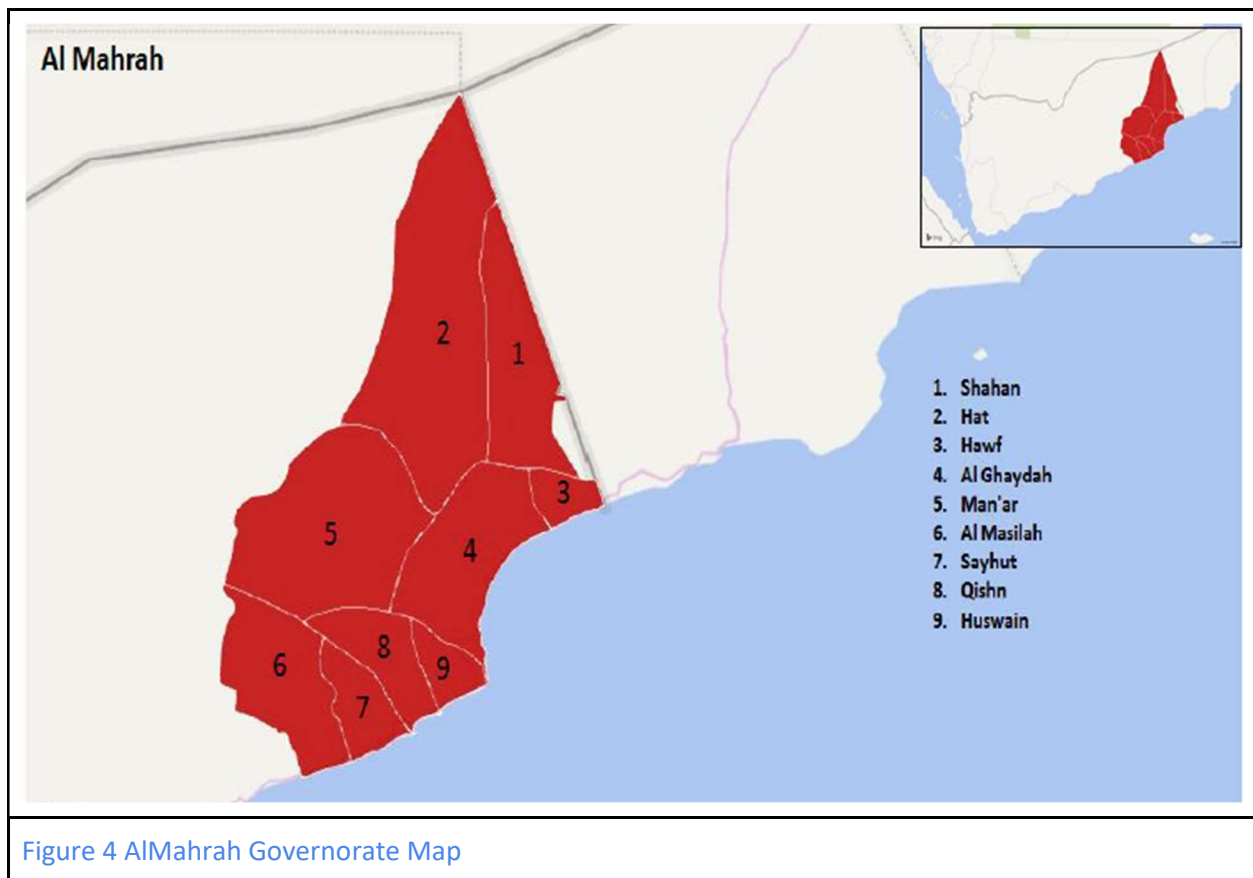


Figure 4 AlMahrah Governorate Map

Economical Condition⁸

The poverty rate in the governorate, according to the Household Budget Survey for 2014, was 57.8%. The central government continues to pay salaries in Al-Mahra, but operational expenses have been cut by 75%. Despite the disruption in central government subsidies, the local authority in AlMahrah has maintained its income from local revenues. The most significant local revenues are local shared resources, revenues from sales of products and services, and taxes, especially on income, profits, and products and services. As AlMahrah is far from the conflict front lines, it has suffered minimal disruptions to economic life and the government continues to pay regular salaries and to cover the operational costs of the governorate. In addition, the governorate covers the investment budget for service provision and infrastructure maintenance, electricity, water and sewage, as well as other public services.

Agriculture, livestock breeding, and fishing are the primary economic activities in AlMahrah. A number of crops are cultivated in the governorate, the most important of which are vegetables. The governorate is located along an approximately 500-kilometer-long stretch of coastline, which provides access to rich fisheries. The Port of Nashtoun, in particular, is an important center of fishing and fish export. Al-Mahra is famous for its myrrh and incense, and aromatic resins remains an important export to the Gulf countries. Preliminary studies show the presence of minerals, including gold, marble, granite, and black sand, in the governorate, though none are currently being exploited.

⁸ [Mapping of Local Governance in Yemeni Governorates](#)

Population

2023 Estimated population in the governorate and the targeted districts under the subproject is below:

	Total IDP	Estimated Population	Total Females	Total Males
AlMahrah governorate	16,878	200,872	86,201	114,671
Districts (Sayahut, Al Ghayda and Al Masila)	13,949	116,390	50,301	66,088

Temperature ⁹

The summers are short, sweltering, oppressive, arid, and mostly cloudy and the winters are short, warm, dry, and mostly clear. Over the course of the year, the temperature typically varies from 19°C to 37°C and is rarely below 16°C or above 39°C.

The hot season lasts for 2.8 months, from May 1 to July 27, with an average daily high temperature above 35°C. The hottest month of the year is June, with an average high of 37°C and low of 28°C. The cool season lasts for 2.5 months, from December 8 to February 24, with an average daily high temperature below 30°C. The coldest month of the year is January, with an average low of 19°C and high of 28°C.

Rainfall

The sliding 31-day quantity of rainfall does not vary significantly over the course of the year, staying within 2 millimeters of 3 millimeters throughout the year.

Wind

The average hourly wind speed experiences significant seasonal variation over the course of the year. The windier part of the year lasts for 2.3 months, from June 18 to August 29, with average wind speeds of more than 3.6 meters per second. The windiest month of the year is July, with an average hourly wind speed of 4.3 meters per second. The calmer time of year lasts for 9.7 months, from August 29 to June 18. The calmest month of the year is October, with an average hourly wind speed of 2.9 meters per second.

Solar Energy

The brighter period of the year lasts for 2.1 months, from March 13 to May 17, with an average daily incident shortwave energy per square meter above 7.1 kWh. The brightest month of the year is April, with an average of 7.4 kWh. The darker period of the year lasts for 2.2 months, from November 17 to January 24, with an average daily incident shortwave energy per square meter below 5.9 kWh. The darkest month of the year is December, with an average of 5.5 kWh.

4. Environmental and Social Risks and Impacts

While significant positive environmental and social impacts will be resulted from this subproject, minor and temporary negative risks and impacts could be resulted. Such negative risks and impacts can be included under two main categories as explained in sections 4.1 and 4.2 below. First category is related to the Pumping system design and operation while the second category is related to the contractors works and systems installation at the targeted sites. The estimated risk level of the subproject is moderate, and it involves temporary and minor impacts resulting mainly from the contractor works during the installation process of the solar pumping system.

The environmental and social risks associated with the civil work implementation is low and mainly related to the dust, noise, minor excavation and waste generation activities. With appropriate management of

⁹ Temperature, rainfall, wind and solar energy sourced from: <https://weatherspark.com/y/105189/Average-Weather-in-Al-Ghayz%CC%A7ah-Yemen-Year-Round>

the contractors' work, coordination with communities and proper waste collection and disposal the negative impacts on the environment and communities is negligible.

Occupational health and safety risks on the contractor workers are estimated to be moderate which could be resulted in workers injuries. Such injuries could be resulted from mechanical activities, electrical activities, movement of equipment, exposure to sharp and hard objects. Implementation of an appropriate OHS management system shall be maintained by the contractors to increase the workers awareness, implement appropriate supervision in addition to maintain close supervision would significantly reduce both occurrence probability and significance.

4.1. Pumping System Design and Operation

Potential risks and impacts associated with the selection, system design and operation included below; management and mitigation measures for such types of risks are included under section 5.1.

- Existing condition of the water wells, water level and productivity rate and the potential use of support in the agricultural and industrial activities
- Potential noncompliance with the local regulations related to the wells operation and management.
- Lands adequacy to withstand the impacts of extreme weather conditions and the impacts of rainwater accumulation, floods, landslide and soil erosion.
- The replacement of diesel generators by solar PV systems for wells providing drinking water could aggravate this situation if solar PV systems are installed at wells that have insufficient recharge.
- Groundwater resources depletion and insufficient well capacity
- Potential poor water quality that could harm human users.
- Poor PV solar system components.
- Generated waste from the system components and improper handling or disposal.
- Fires within the different solar pumping system components, wirings and equipment.
- Electrocution and personnel injuries during the pumping system operation.
- Poor operation of the solar pumping system and lack of or poor qualification of wells operators.
- Potential use of the water for agricultural and industrial purposes.

4.2. Contractor Work and System Installation

Potential risks and impacts associated with the contractor work included below; management and mitigation measures for such types of risks are included under section 5.2, 5.3 5.4. and table 5

Environmental Risk and Impacts

- Solid waste production that could pollute the environment including domestic waste from workers and construction waste including the accumulation of civil work and excavation materials.
- Vegetation removal to make space for solar panels
- Potential contamination of soil, groundwater and surface water, if present, from hazardous substances and wastes that could be used and improperly disposed of. Accidental spills from machineries and equipment used. Dust generation and ambient air pollution and noise pollution from excavation activities and civil work.

Social Risk and Impacts

- Forced labor at the solar system components supply chain and production.
- Damage of existing installation as a result of contractor work.
- Suspension of wells operation and water distribution during the contractor work.
- Security risks and social conflicts due to the contractor work.
- Lack of worker's awareness and knowledge on social issues on gender, SEA/SH and GBV.

- GBV/SEA/SH risk to communities due to the contractor work.
- Child labor.
- Community health and safety and exposure to critical activities (dust, lifting, excavation, electrical work and equipment movement).
- Communities' exposure to diseases and COVID-19 transmission.
- Considering the sites are located in different districts and governorates, labor influx risk is not anticipated or negligible as only maximum 5 workers will be employed in each site from the surrounding cities and governorates, those workers will be present in the sites for approximately 20 days.

Occupational Health and Safety Risks and Impacts

- Serious injuries caused by falling from heights, during the fences and panels installation, or falling objects during the different lifting activities.
- Working during extreme weather conditions such as cold or hot temperatures, rain, etc.
- Equipment and machines operation resulting in collisions, and personal injury.
- Lifting operations of submersible pumps and raisers and the impacts resulted from failure of lifting equipment or falling.
- Hot work including the welding, grinding and cutting activities resulted in personnel injuries and fires.
- Improper working conditions for contractor workers such as lack of insurance, improper GM system for workers, lack of training and lack of hygiene and sanitation premises.
- Risks associated with the excavation works and equipment movement including tripping due to excavated zones and getting hit by a moving load Slip, trip and fall due to bad site arrangements and presence of cables.
- Electricity work impacts including electrocution/electric shock, fire and burns.
- Exposure to dust from excavations and civil work
- Exposure to chemicals (cement) and hazardous substances and wastes (E-waste) such as batteries, cables.
- Manual handling that could result in serious injuries including manual lifting.
- Infection by COVID-19.
- Exposure to sharp objects such as steel pipes, fences components, cable trays and those resulting from grinding and drilling activities. .
- Fire risk.
- Risks from road accidents while transporting materials and equipment.
- Poor emergency response system. Absence of proper emergency response arrangements such as the first aid equipment, transportation means and firefighting means.

5. Risks and Impacts Management and Monitoring

5.1. Pumping System Design and Operation

5.1.1. System Design, Wells Operation Parameters

The following took place by UNOPS as management and mitigation measures for the risks related to wells selection, solar pumping system design and operation:

- All sites under the subproject are already existing and operational wells authorized and licensed by the relevant authorities

- Sites selected under the subproject based on the nomination of authorities and in consultation with the communities benefiting from the wells.
- Detailed assessment conducted by UNOPS for the targeted wells including the determination of productivity rate to ensure adequacy of operation parameters (including the assessment of sustainable extraction levels), sufficient water capacity, and availability of water distribution arrangements. Parameters resulting from the assessment are included in tables 1 and 2 and sample assessment reports included in footnote 2 page 4.
- Targeted wells under the subproject are used for drinking/household purposes and not used for agricultural and industrial purposes. The provided solar system pumping capacity under the subproject is sufficient only for drinking and household purposes for the targeted well beneficiaries. Water wells are managed at local level by the WUA or NWSA, as described in section 2.1, in which such local management is controlling and ensuring the distributed water quantities are used by the targeted beneficiaries for drinking and household purposes
- Assessment of wells included the location selection of various pumping system components including the PV panels installation land. Characteristics that considered for the land that will be used for solar system components installation are:
 - Land is in a safe location that is not potentially affected by soil erosion, landslides, floods or rainwater accumulation.
 - Land is not private and allocated solely for the solar system components installation. Legal evidence validated by relevant authorities should be provided.
 - Land is at a relatively acceptable distance from the wellhead.
 - Access road to the land exists to perform leveling and transferring the PV panels and installing mounting structures.
 - Land is free of structures or buildings that require removal.
- Quality test performed to ensure quality and adequacy of produced water for drinking and household purposes. Such water quality tests are verified and approved by the local authorities and UNOPS team. Once installation activities are completed, all wells operation aspects including the water quality is the responsibility of wells management.
- Solar system pumping capacity designed and will be installed under the subproject for each well is sufficient only for the drinking and household purposes. The design flow rate of each well is lower than the well productivity rate.
- Various engagement activities conducted with the local authorities, communities' leaders, wells operation management and communities benefiting from the targeted wells to ensure no historical conflicts on the wells' operation and production.
- Multiple rounds of visits and stakeholders' engagement will be implemented by UNOPS during the Project lifetime to ensure the wells solar pumping system operation is taking place following the arrangements and preconditions determined by UNOPS.
- Project GM channels detailed in section 5.1.4 will be widely disseminated and made available to receive any concerns from communities related to the wells operation and solar pumping system.

5.1.2. Life and Fire Safety Measures

Life and Fire Safety Measures have been considered by UNOPS during the various stages of this subproject as below:

- **Life and Fire Safety Measures - Assessment Stage**

This stage has been already completed by UNOPS for all sites under this subproject in which the following took place:

- Appropriate selection and determination of the system capacity, components and accessories required for the water wells considering the estimated power consumption needed for water that is used for drinking purposes only.
- Identify the location of system components in safe and adequate areas in coordination with local authorities, wells operations committees and communities.
- Detailed assessment of water wells conducted by UNOPS engineers to ensure integrity and readiness for the system installation and operation.
- Location of panels and associated system components selected by UNOPS engineers after detailed evaluation of the wells premises in coordination with the wells management and communities at the area.

- **Life and Fire Safety Measures - System Specifications and Design**

This stage has been completed by UNOPS for all sites under this subproject in which the following took place:

- UNOPS ensured that high quality equipment and cables standard outdoor and indoor are applied.
- Ensure that high quality circuit breakers, cables, and alarm systems are included in the system design.
- Ensure that the system design and capacity is compatible with the consumptions and expected needs.
- Include in the design the safety aspects and protection including overload, short circuits, alarm and ventilation systems.
- Mounting structure designed to withstand the expected weather conditions and panels load.
- The system design includes various safety aspects including the selection of materials, appropriate load and equipment specification following the international standards, design requirements and guidelines are included in annex 2.

- **Life and Fire Safety Measures - System Installation and Operation**

UNOPS will ensure the following will take place during the contractor work, system installation, test, commissioning, startup and handover:

- Ensure all components installed are meeting the design criteria.
- Close monitoring of the contractor work and ensure the system specifications and installation are meeting the subproject requirements.
- Earthing/lightning system testing and installation.
- Fire-extinguishers to be delivered and installed as part of the subproject scope.
- Security gates installation to ensure access to system components will be restricted to authorized personnel only.
- Conduct comprehensive training for the staff and technicians responsible for the operation on the safety aspects as well as the appropriate operation and maintenance. Contractor work includes detailed training to be conducted to the wells' workers on the safe operation and maintenance as explained in the section 2.3 with close follow up monitoring and evaluation by UNOPS. All training materials and trainers' qualifications shall be reviewed and approved by UNOPS.
- Training sessions that will be conducted with the wells operators and management include detailed explanation on the system components waste generation and recycling requirements. Continued support will be maintained to the wells administration team by UNOPS during the Project lifetime.
- Complete set of the system documentations, as built drawings with detailed information on the various operation and maintenance activities as well as the waste management process will be handed over to the wells administration teams and management.

- The system will be fully handed over to the local authorities and wells management once the system is installed, commissioned, started and tested. Existing wells management entities will be fully responsible for the system operation and assignment of responsible staff. Support including preventive maintenance will be continued during the system warranty period (2 years).
- Product warranty of the system components is up to 12 years in which the wells admin teams and management will be provided with detailed information on the recycling/disposal options at each components' end of life.

5.1.3. Management of System Generated Waste

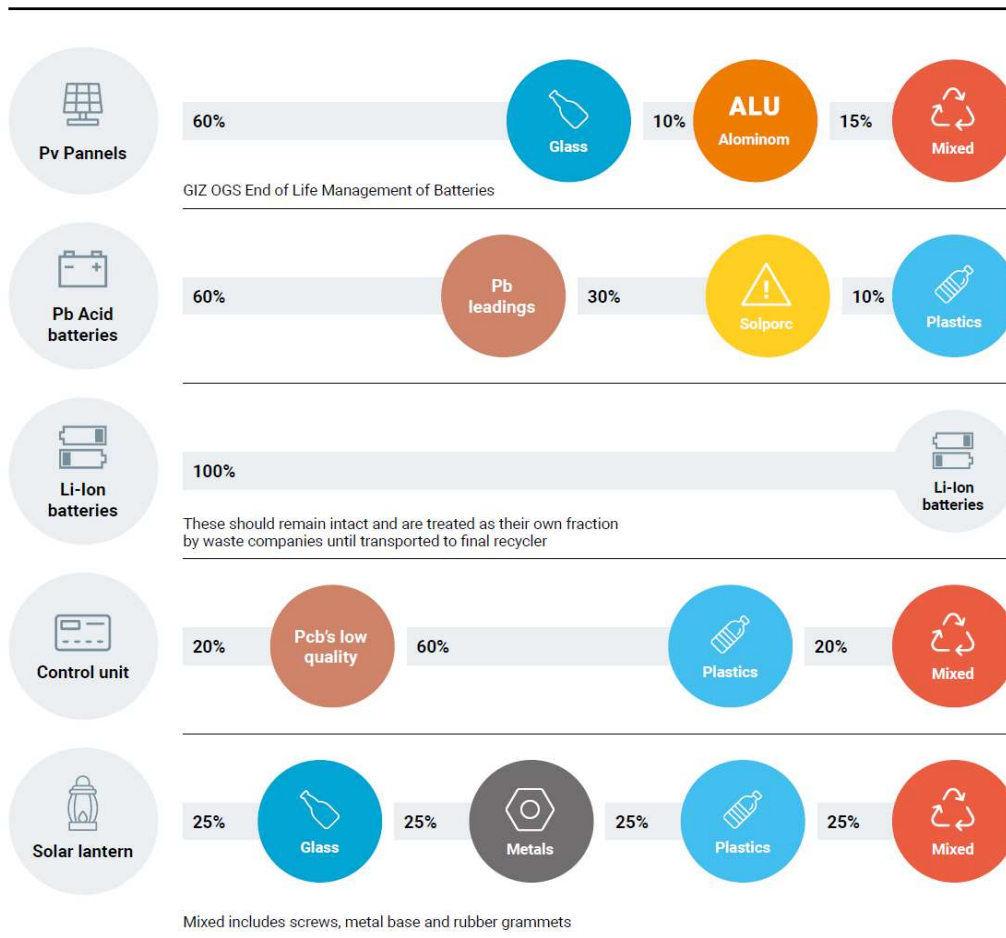
Considering the solar pumping system that will be installed at the targeted sites does include batteries, the main components of an off-grid solar product include PV solar modules, lamps (mainly LED), control units with circuit-board-mounted electronic controls, cables, metal frames and fixtures, (GOGLA, 2019).^{10, 11} After becoming waste, the components of the off-grid solar products are grouped according to fractions such as metal, glass, plastics, paper and cardboard, and cables. Figure 4 provides an overview of fractions of off-grid solar products and the waste components (GOGLA, 2019)¹².

¹⁰ GOGLA (2019a). E-waste Toolkit Module 1 Briefing Note: Technical introduction to recycling of off-grid products. www.gogla.org/e-waste/introductionto-recycling

¹¹ GOGLA is a global association for the off-grid solar energy industry. It chairs an E-waste Circularity Working Group with GOGLA members, companies, investors, manufacturers, universities, and research institutes, which acts as a consultation group for developing learning output and sector guidance, through particular themes (repairability, standardized product labeling for disposal), and sharing best practices, problems, and solutions.

¹² The text and figure 4 are extracted from the Project ESMF page 35.

Figure 5 the waste components of off-grid solar (GOGLA, 2019)



Detailed explanation on the actions needed to manage the various solar system components will be included in the training and awareness sessions that will be provided to the wells management by the contractors with continuous support from the UNOPS during the Project lifetime.

5.1.4. Project Grievance Mechanism

UNOPS has established a GM system for the YEEAP 2 to enable beneficiaries to communicate their concerns regarding the planned activities and what improvement is needed in the scope.

Multiple access points to the GM system are provided for beneficiaries to voice their concerns. These access points will be advertised in Arabic at subproject level and put on the sign boards on each subproject site, and include GM contact information including toll free number, landline, mobile SMS, email and website:

Address	Haddah Street, former European Union Office Building, Sana'a
Toll Free Number	8000190
Landline	01 504914 and 01 504915
SMS and WhatsApp	739888388
Email	grm-yemen@unops.org
Website	www.unops.org

Grievances received by UNOPS GM focal point will be registered by gender, age, and location in a dedicated register. Grievances will be tracked, investigated and promptly resolved within 28 days of its submission by the UNOPS ESSO and Project manager. When a complaint requires an urgent response, as

in the case of an emergency, UNOPS will address as quickly as logistically possible. Further details of the project GM are included in the Project SEP.

5.1.5. GBV/SEA/SH

Although with low magnitude and occurrence probability due to the cultural aspects in the country as well as the limited work intervention under the subproject, UNOPS has already taken the following steps in regards the GBV/SEA/SH issues in which it will be maintained during the subproject implementation:

- The Project GM system is prepared to handle and respond to any GBV/SEA/SH cases that could be reported from the subproject, UNOPS has in place protocol for GM in how to deal with SEA/SH cases with a referral pathway as included in the GBV action plan.
- During the stakeholder engagement activities including the meetings with the potential contractors, the project GBV SEA/SH action plan has been discussed. The consultations highlighted how the GBV GMs is intended to be secured, and confidential with a focus on a survivor-centered approach.
- UNOPS has developed visibility materials to promote awareness for SEA/SH in local language (Arabic) the materials and messages used are adapted to be suitable for the Yemen context and sensitivity of the subject.
- Project GM focal point received specialized training about SEA/SH cases and the way to deal with it using Victim centered approach
- It is expected that no women will be employed under the subproject as the work will take place in rural and peri urban areas, however, the project will ensure women participation in the contractors' head offices and in technical support.
- UNOPS is conducting regular refresher awareness sessions for Project Personnel and retainers' sites engineers on the GBV/SEA/SH.
- UNOPS has prepared risk assessment tools for GBV and will require contractors to fill out a checklist on GBV/SEA/SH and to prepare a code of conduct for their workers/staff.
- As part of the YEEAP GBV SEA/SH action plan UNOPS has rolled out SEA/SH prevention and response plans for contractors, where the contractors need to prepare the action plan as part of the tender documents. UNOPS is supporting to enhance the contractors' capacity in this area. Hence, UNOPS developed a contractors' action plan template, which covers the most priority areas. Moreover, UNOPS conducted an induction session for contractors about this requirement and presented to contractors on how to prepare their own GBV SEA/SH prevention and response plans (GBV Action Plans) using the developed template. In addition, in depth training sessions will follow and will continue during the project life cycle.

5.2. Forced Labor in the Solar System Components Supply Chain

Reference to the Project LMP and Forced Labor Action Plan (FLAP) where specific actions are included to prevent any forms of forced labor during the Project implementation, the following will be included in the bidding and contracting documents of this subproject:

- (i) The bidders shall provide UNOPS with a declaration form on forced labor prevention at the solar system components supply chain, declaration form is available in annex 3.
- (ii) The Contractor shall comply with all applicable laws concerning terms of employment and conditions of work, and any collective agreements to which it is party.
- (iii) The Contractor shall not engage, directly or indirectly, in "Forced Labor," i.e., by exacting work or service from any person under the threat of a penalty and for which the person has not offered himself or herself voluntarily.
- (iv) The Contractor shall not engage, directly or indirectly, in "Trafficking in Persons," i.e., by recruiting, transporting, transferring, harboring or receiving persons by threat or use of force or other forms of coercion, abduction, fraud, deception, or abuse of power.

- (v) Whenever Forced Labor or Human Trafficking occur in the Contractor's operations, including in its supply chain, the Contractor shall, as soon as reasonably practicable, take all reasonable action to address or remove these occurrences, including where relevant, by addressing any practices of other entities in its supply chain.
- (vi) Failure by the Contractor to abide by the provisions of these requirements shall entitle the UNOPS to terminate the Contract or any other contract with the United Nations immediately upon notice to the Contractor, without any liability for termination charges or any other liability of any kind.

5.3. Contractor Works and System Installation in Targeted Sites

Contractors Obligations

The bidders for this subproject will be requested to prepare a Preliminary Environmental and Social Management Plan as part of their offers, outlining the principles and the methodology that they will use to meet ESHS requirements, and that they include the full cost of all the actions necessary to meet ESHS requirements in their submissions. The quality of the provided plans, as well as past environmental and social performance, and capacity to meet ESHS requirements, will be considered when selecting contractors.

Once the contract is awarded, the Contractor shall prepare and submit to UNOPS for approval a Contractor Environmental and Social Management Plan (C-ESMP), including the following sections or subplans:

- ESHS training
- Site management
- Occupational Safety and Health
- Road safety and Traffic Safety
- Emergency Preparedness and Response
- Labor force management, Workers Grievance Mechanism and Code of Conduct
- Stakeholder Engagement
- Contractor Environmental and Social Reporting
- Solar PV Systems
 - Include in the C-ESMP a detailed explanation of how the contractor's performance will meet the ESHS requirements as defined in the contract bidding documents
 - Include in the C-ESMP an organization chart of the personnel assigned to environmental and social management
 - Ensure that sufficient funds are budgeted to meet the ESHS requirements, and that sufficient capacity is in place to oversee, monitor and report on C-ESMP performance.
 - Put in place controls and procedures to manage their ESHS performance
 - Prepare GBV/SEA/SH plan

UNOPS will also require that contractor to:

- Inspect existing wells premises and apply all safety measures to reduce the risk of any injury to the workers during installation or the users during operation, subject to written approval by the UNOPS engineer provided before implementation of work.
- Conduct risk assessment for solar system installation, evaluate the risk, and put the appropriate safety measures in place and submit it for review and approval.
- Fully implement UNOPS permit to work system¹³ (to ensure all hazards / mitigation measures required for tasks implementation are properly identified) method of statement and job safety

¹³ Permit to Work is a system used to ensure the activities are performed safely. Any planned activities by the contractor shall be detailed in a dedicated form that will allow the associated hazards and mitigation measures to be identified and analyzed prior any approval of such activities.

analysis to ensure all tasks are well prepared and follow all necessary safety mitigation and prevention measures.

- Provide safety training to all workers including working at height, lifting operations, electrical shock safety and permit to work before commencing any work.
- Provide fully insulated PPE, isolated installation tools, instruments, and equipment. This is part of the subproject technical requirements that the contractor should comply
- When working on the fences, panels installation (above 2 meters height) ensures proper use of ladders and scaffolds by trained employees in addition to apply regular inspection and testing, use of fall prevention devices.
- The contractor shall sign the UN/UNOPS CoC, and all contractor personnel shall sign and comply with the personnel CoC, annex 4 includes a sample personnel CoC.
- The contractors must also comply with the project LMP, including the establishment and maintenance of a grievance redress mechanism for workers.
- The contractor should understand and agree and sign UNOPS's Code of Practice (COP) for solar PV systems that set requirements for contractors regarding the appropriate handling, recycling and disposal of batteries (present in annex 2 "environmental and social requirements for contractors" in the ESMF)
- The mitigation measures and monitoring plan for contractor work is available in table 5 in which close follow up will take place by UNOPS during the subproject implementation.

Grievance Mechanism for Workers

The Contractor shall put in place a Grievance Mechanism for its workers and the workers of its subcontractors that is proportionate to its workforce. Once the tendering process completed and contract is awarded, the selected contractors shall develop its own GM for workers' and it will be distinct from the Project level Grievance Mechanism for affected individuals and communities. The GM for workers shall adhere to the following principles:

- *Provision of information.* All workers should be informed about the grievance mechanism at the time they are hired, and details about how it operates should be easily available, for example, included in worker documentation or on notice boards.
- *Transparency of the process.* Workers must know to whom they can turn in the event of a grievance and the support and sources of advice that are available to them. All line and senior managers must be familiar with their organization's grievance procedure.
- *Keeping it up to date.* The process should be regularly reviewed and kept up to date, for example, by referencing any new statutory guidelines, changes in contracts or representation.
- *Confidentiality.* The process should ensure that a complaint is dealt with confidentiality. While procedures may specify that complaints should first be made to the workers' line manager, there should also be the option of raising a grievance first with an alternative manager, for example, a human resource (personnel) manager.
- *Non-retribution.* Procedures should guarantee that any worker raising a complaint will not be subject to any reprisal.
- *Reasonable timescales.* Procedures should allow for time to investigate grievances fully but should aim for swift resolutions. The longer a grievance is allowed to continue, the harder it can be for both sides to get back to normal afterwards. Time limits should be set for each stage of the process, for example, a maximum time between a grievance being raised and the setting up of a meeting to investigate it.
- *Right of appeal.* A worker should have the right to appeal to the UNOPS or national courts if he or she is not happy with the initial finding.
- *Right to be accompanied.* In any meetings or hearings, the worker should have the right to be accompanied by a colleague, friend or union representative.

- *Keeping records.* Written records should be kept at all stages. The initial complaint should be in writing, if possible, along with the response, notes of any meetings and the findings and the reasons for the findings.
- Any records on SEA shall be registered separately and under the strictest confidentiality

Installation Solar Pumping Systems to 21 Water Wells

The actions and mitigation measures that should take place by the contractor at each site during the solar pumping system. Most of mitigation measures implementation in each site is included in section 5.5 which should be fully covered by the subproject and BoQ items cost.

Mitigations and monitoring plan

Mitigation Measures and Contractor Obligations	Monitoring Parameters	
	Indicators	Responsibility
Access arrangement		
<p>of the site and maintain safe workers' access</p> <p>g facilities and apply all safety measures to reduce the risk of any injury</p> <p>ion or the users during operation, subject to written approval by the</p> <p>re implementation of work.</p> <p>anguage</p> <p>ape, fencing or barricades, as appropriate, to prevent unauthorized</p> <p>ering holes and by installing barriers around the work areas</p> <p>arrangements with the wells management and communities</p> <p>ot allowed</p> <p>ension resulted from contractor work by proper planning and ensuring</p> <p>ue time</p> <p>administration, ensure that enough water quantities can be supplied</p> <p>mping suspension due to the system installation and contractor work</p>	<ul style="list-style-type: none"> - Safety and security of work location - Presence of signs and barriers around the work area - Water supply suspension period resulted from civil work - Number of complaints on the contractor work 	<p>UNOPS engineer / HSSE officer (weekly)</p> <p>Contractor Supervisor (Daily)</p>
Installations		
<p>gs, structures, works, pipes, cables, sewers, or other services or</p> <p>ance or deterioration during activities</p> <p>ment to identify existing infrastructure that might not be visible</p> <p>he Contractor's activities, in coordination with concerned authorities</p>	<ul style="list-style-type: none"> - Appropriate arrangement of work areas. - Number of damaged / equipment. - Number of grievances related 	<p>UNOPS engineer / HSSE officer (weekly)</p> <p>Contractor Supervisor (Daily)</p>

Mitigation Measures and Contractor Obligations	Monitoring Parameters	
	Indicators	Responsibility
	to damage of existing installations	
1.3. Waste from activities		
<ul style="list-style-type: none"> - Collect and properly manage all solid wastes including soil resulting from subproject activities - Perform waste segregation and the generated waste from the activities shall not be mixed with the communities generated waste - Reduce waste generation and recycle all waste that can be recycled - Properly dispose of solid waste and debris at designated permitted waste disposal sites allocated by the local authorities - Remove all debris and waste after work completion - Separate wastes per type (solid, hazardous and E-wastes) and properly handle and store and dispose hazardous wastes and E-wastes according to their material safety data sheets (MSDSs) properly store solid waste in designated areas and regularly collect them and dispose of them in authorized areas. - All types of wastes must be properly labelled. <p>Minimize littering of roads by ensuring that vehicles are licensed and loaded in such a manner as to prevent falling off or spilling of materials, and by sheeting the sides and tops of all vehicles carrying mud, sand, other materials or debris</p>	<ul style="list-style-type: none"> - Number of findings related to waste accumulation in and around the work area - Lack of waste bins and segregation means - Public grievances and complaints on waste accumulation - Presence of a receipt of waste from the authorized landfill authority - Waste is properly labelled by type - Change in soil color - All rubble and debris are removed at the end of works 	<p>UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (Daily)</p>
1.4. Hazardous substances handling and wastes including cements, oil and hydrocarbon components		
<ul style="list-style-type: none"> - Train workers regarding the handling of hazardous materials and provide appropriate PPE for workers dealing with such materials - Store, handle and dispose hazardous wastes according to their MSDSs and manufacturer's guidelines - Label using easily understandable symbols, and provide material safety data sheets, for chemical substances and mixtures according to the Globally Harmonized System (GHS) of classification and labeling of chemicals - Store hazardous materials as per the statutory provisions of the Manufacturer's guidelines - Treat hazardous waste separately from other waste 	<ul style="list-style-type: none"> - Workers' training records and number of workers trained vs total number of workers - Appropriate storage is maintained for hazardous substances - Presence of a receipt of waste from the authorized landfill 	<p>UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (Daily)</p>

Mitigation Measures and Contractor Obligations	Monitoring Parameters	
	Indicators	Responsibility
<ul style="list-style-type: none"> - Avoid the storage or handling of toxic liquid adjacent to or draining into drainage facilities - Keep absorbent materials or compounds or spill prevention kits on Site in sufficient quantities corresponding to the extent of possible spills - Select disposal sites of solid waste in coordination with the relevant authorities - Ensure all hazardous wastes including batteries and chemicals if any are stored away from soil and runoff zones and wells in insulated areas to avoid soil and groundwater and surface water contamination 	<ul style="list-style-type: none"> - authority - Waste is properly labelled by type - Change in soil color 	
2. Occupational Health and Safety		
2.1. Working at heights		
<p>The contractor shall implement fall prevention and protection measures whenever a worker is exposed to the hazard of falling more than two meters, during fences and panels installation. The Contractor shall:</p> <ul style="list-style-type: none"> - Provide stable and protected work platform for the workers where feasible - Install guardrails with mid-rails and toe boards at the edge of any fall hazard area - Train workers on the proper use of ladders and scaffolds - Train workers in the use, serviceability, and integrity of the necessary PPE - Include rescue and recovery plans, and equipment to respond to workers after an arrested fall 	<ul style="list-style-type: none"> - Workers' training records - Near misses or injuries resulted from work at height - Number of findings related to work at height areas are well secured and protected - Distribution records of PPE related to work at height 	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (Daily)
2.2. Slip, trip and fall		
<ul style="list-style-type: none"> - Implement good house-keeping practices, such as the sorting and placing loose materials or debris in established areas away from footpaths - Clean up excessive waste debris and liquid spills regularly - Locate electrical cords and ropes in common areas and marked corridors - Ensure that workers use slip retardant footwear - Restrict access, barricade or implement any equivalent measure to limit workers access to areas where sharp or hard objects exist 	<ul style="list-style-type: none"> - Site cleanliness, tidiness and overall condition - Access restriction maintained to authorized personnel - Record of worker injuries 	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (Daily)

Mitigation Measures and Contractor Obligations	Monitoring Parameters	
	Indicators	Responsibility
2.3. Manual handling and transportation of materials		
<ul style="list-style-type: none"> - Avoid manual handling activities to the possible extent - Reduce the load risk by using lighter weights or more stable containers - Inform workers on proper lifting techniques to avoid back injuries - Reorganize the activity to further reduce the risk on the individual(s) - Utilize mechanical lifting aids or equipment as appropriate - Ensure appropriate rest breaks with water provision and adequate rest times and training for workers - Provide PPE to the workers on a regular basis (e.g. gloves, foot protection, and non-slip footwear) 	<ul style="list-style-type: none"> - Availability and implementation of the mechanical lifting - Workers' injuries due to manual handling 	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (Daily)
2.4. Working on electrical appliances and equipment		
<ul style="list-style-type: none"> - Apply electrical isolation prior to the work on any electrical equipment - Workers shall use electrical PPE including the appropriate gloves and face protection. - Carry out tests prior the implementation of any work on electrical equipment - Ensure all equipment or tools used in the activities' implementation are maintained, certified and in good condition. - Ensure all connections and equipment are secured - Apply earthing when using the portable electrical equipment - Only authorized and certified workers shall implement electrical related activities - Provision of training to all workers on the electrical risks, impacts and mitigation measures. - Avoid working in rainy seasons or during extreme weather conditions or wet conditions 	<ul style="list-style-type: none"> - Worker qualified - Workers' training on electrical hazards, risks and impacts - Incidents related to the work on electrical appliances. - Electrical PPE availability, distribution and adherence 	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (Daily)
2.5. Lifting of raiser and pumps using mobile cranes		
<ul style="list-style-type: none"> - Usage of certified and inspected equipment that is capable of handling the loads. Ensure the loads are well secured during lifting operation - Lifting equipment to be mounted on stable and protected ground - Ensure the areas around lifting operation are free of personnel, obstacles with restricted access - Ensure all appliances used during lifting operation are in good condition without any visible defect - Ensure the qualified personnel are carrying out the lifting operations - Arrange the operation with the UNOPS area engineer and the wells management 	<ul style="list-style-type: none"> - Certified lifting devices - Presence of qualified personnel - Incidents that are resulted from lifting activities. 	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (Daily)

Mitigation Measures and Contractor Obligations	Monitoring Parameters	
	Indicators	Responsibility
<ul style="list-style-type: none"> - Avoid working in extreme weather conditions and at high wind speed - Ensure workers are standing at a safe distance from the lifting equipment and load. 		
2.6. Noise and air pollution exposure		
<ul style="list-style-type: none"> - The use of hearing protection should be enforced actively for any noisy work - Rotate staff to limit individual exposure to high levels - Install practical acoustical attenuation on equipment, such as mufflers - Use low noise generation equipment, vehicles and power generators - Shut down equipment when not directly in use - Provide advance notice to occupants if an activity involving high level impact noise is in close proximity to buildings - -Ensure proper maintenance of equipment used - Dust generation to be controlled using water spraying or physical barriers where feasible - Workers shall be provided with adequate PPE including the dust mask, goggles and face shield. 	<ul style="list-style-type: none"> - Nuisance environment - Number of Public complains - Number of Workers grievances and type and number of solved grievances - Ear protection availability and workers adherence to PPEs (ear mufflers) 	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (Daily)
2.7. Equipment and machines failure lead to collision and personnel injuries		
<ul style="list-style-type: none"> - All equipment, machines and tools used for contractor work shall be tested and certified prior any operation at the work sites - Work area to be restricted to authorized personnel - All equipment, machinery and vehicles introduced at the subproject shall be fully checked, inspected and tested in addition to be provided with the necessary safety requirements. - Daily checklist shall be performed for all equipment, machinery, tools and vehicles - Drivers and operators need to be experienced, licensed and certified. Regular training, Toolbox Talks (TBT) and awareness shall be provided - Movement control and banks man shall be assigned for all heavy vehicles' movement. The site routes and areas will be designed to avoid or minimize the need for reverse movements 	<ul style="list-style-type: none"> - Number and type of Incidents and injuries related to equipment/machinery - Maintenance records - Workers' qualification - Training / awareness records - Equipment checks records 	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (Daily)

Mitigation Measures and Contractor Obligations	Monitoring Parameters	
	Indicators	Responsibility
2.8. Excavation		
<ul style="list-style-type: none"> - Excavation activities to take place after consultation with the communities, responsible engineer and wells management - Underground structures and services to be identified, assessed and to be avoided during any excavation work - An approved excavation permit must be in place prior to excavation work commencing - The excavation areas must be inspected each day prior to entry, and after rain or other events that could affect safety and stability - All excavation waste shall be transported and disposed into authorized landfill, no waste shall be kept at roadsides or within the private assets - Soil, excavation waste and other materials, vehicles, and plant must be kept a safe distance away from the edge of the excavation to ensure that the weight does not affect the stability of the excavation - Excavation areas shall be protected by hard barriers with clear identification and signs to avoid falling 	<ul style="list-style-type: none"> - Number of Incidents and injuries related to excavation works - Presence of Excavation areas protection - Accumulation of excavation waste 	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (Daily)
2.9. Welding and hot work		
<ul style="list-style-type: none"> - Provide high quality and certified equipment that are appropriate for the task - Ensure the welders are competent and trained on the use of welding machines - Ensure fire extinguishers are available at the work site and workers are trained on the use of such - Provide proper eye protection such as goggles and/or a full-face eye shield, heat resistant gloves, for all personnel involved in any hot work operations. Additional methods may include the use of barrier screens around the specific workstation (a solid piece of light metal, canvas, or plywood - Work area to be restricted to authorized personnel and no hot work to take place near any combustible substances - All equipment and tools shall be inspected prior carrying any work at the site 	<ul style="list-style-type: none"> - Incidents and injuries related to hot work - Equipment checks and inspection records 	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (Daily)
2.10. Lack of or Improper Personal Protective Equipment		
<ul style="list-style-type: none"> - Identify and provide at no cost appropriate PPE to workers, the workers of subcontractors, as well as to visitors, which gives adequate protection without incurring unnecessary inconvenience to the individual, including helmets, safety boots, gloves, goggles, safety jackets, and N95 masks, as well as 	<ul style="list-style-type: none"> - PPE availability at work area - All workers are aware of and use the PPE as recommended 	UNOPS engineer / HSSE officer (weekly)

Mitigation Measures and Contractor Obligations	Monitoring Parameters	
	Indicators	Responsibility
<ul style="list-style-type: none"> - body coverall, gloves, respirators with filters, and goggles in the case of contaminated sites - Ensure that the use of PPE is compulsory - Provide sufficient training in the use, storage and maintenance of PPE to its workers and workers of its subcontractors - Properly maintain PPE, including cleaning when dirty and replacement when damaged or worn - Determine requirements for standard and/or task-specific PPE based on Job specific Safety Analysis - Consider the use of PPE as a last resort when it comes to hazard control and prevention, and always refer to the hierarchy of hazard controls when planning a safety process 	<ul style="list-style-type: none"> - PPE distribution records - Training records on the PPE usage 	Contractor Supervisor (Daily)
2.11. Covid-19 transmission among workers and communities		
<ul style="list-style-type: none"> - Ensure face masks are available and used by all workers. - Ensure awareness sessions are conducted on COVID-19 with all workers. - Ensure availability of hygiene kits, soap, clean water 	<ul style="list-style-type: none"> - Number of workers using PPEs and masks and/or type of PPE - Awareness session records on the COVID-19 - COVID-19 infections cases among workers 	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (Daily)
2.12. Provision of water and sanitation premises for the workers		
<ul style="list-style-type: none"> - Ensure adequate lavatory facilities are arranged in coordination with the well management that is suitable for the number of people expected to work at the sites - Provide toilet facilities with adequate supplies of running water, soap - Provide adequate supplies of potable drinking water - Ensure that water supplied meets drinking water quality standards 	<ul style="list-style-type: none"> - Complaints from the communities and workers grievances - Regular water tests show drinking water quality within legal limits 	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (Daily)

Mitigation Measures and Contractor Obligations	Monitoring Parameters	
	Indicators	Responsibility
3. Labor Force Management		
3.1. Labor and working conditions		
<ul style="list-style-type: none"> - Provide all workers with terms and conditions that comply with Yemeni labor legislation, LMP and applicable regulations - Hire workers through transparent process and recruitment offices, where feasible, and avoid hiring “at the gate” to discourage spontaneous influx of job seekers - Put in place workplace processes for workers to report work situations that they believe are not safe or healthy, and to remove themselves from a work situation which they have reasonable justification to believe presents an imminent and serious danger to their life or health - Avoid all forms of forced or compulsory labor, i.e., all work or service which is exacted from any person under the threat of a penalty and for which the person has not offered himself or herself voluntarily - Develop and adopt a Gender Action Plan following the Project requirements and template 	<ul style="list-style-type: none"> - Workers’ grievances present - Number of grievances from workers and type and number of solved complaints - Appropriate working conditions are provided - Number of workers signed Code-of-Conduct vs total number of workers - Gender Action Plan adopted prepared and used 	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (Daily)
3.2. Insurance		
<ul style="list-style-type: none"> - Provide insurance for all employees involved in the subproject as indicated by Yemen’s Labor Law and LMP during the whole employment period - The insurance coverage for workers, despite the type, is the responsibility of the contractor. The insurance cover should be applicable during the whole employment period and subproject implementation. - Provide insurance and compensation for workers' death or injury during their engagement in the subproject implementation 	<ul style="list-style-type: none"> - Workers insurance evidence - Workers’ complaints and grievances 	UNOPS engineer / HSSE officer (at the start of the work)
3.3. Grievance Mechanism for workers		
<ul style="list-style-type: none"> - The Contractor shall put in place a Grievance Mechanism for its workers and the workers of its subcontractors that is proportionate to its workforce 	<ul style="list-style-type: none"> - Visible / known channels - Register of grievances with the resolutions - Number of grievances 	UNOPS engineer / HSSE officer (weekly)

Mitigation Measures and Contractor Obligations	Monitoring Parameters	
	Indicators	Responsibility
	received, and number resolved, number outstanding resolution.	
3.4. Child labor prevention		
<ul style="list-style-type: none"> - Verify that workers are older than 18 when hiring and exclude all persons under the age of 18 - Review and retain copies of verifiable documentation concerning the workers age 	<ul style="list-style-type: none"> - Presence of child labors - Workers register with age documentary records 	UNOPS engineer / HSSE officer (weekly)
3.5. Sexual harassment, abuse, gender-based violence, and discrimination		
<ul style="list-style-type: none"> - Provide regular training and awareness raising to the workforce about refraining from unacceptable conduct toward local community members, specifically women - Inform workers about national laws that make sexual harassment and gender-based violence a punishable offence which is prosecuted - Prohibit its employees from exchanging any money, goods, services, or other things of value, for sexual favors or activities, or from engaging in any sexual activities that are exploitative or degrading to any person 	<ul style="list-style-type: none"> - Training records on the GBV/SEA/SH - GBV/SEA/SH grievances received through the project GM system - Contractor GBV/SEA/SH plan is in place and implemented - Report cases of SEA and GBV to WBG 	UNOPS engineer / HSSE officer (weekly)
3.6. Code of Conduct		
<ul style="list-style-type: none"> - The Contractor shall ensure that all employees, including those of subcontractors, are informed about and sign the personnel Code of Conduct 	<ul style="list-style-type: none"> - Workers' training records on CoC - Number of workers signed CoC 	UNOPS engineer / HSSE officer (weekly)

Mitigation Measures and Contractor Obligations	Monitoring Parameters	
	Indicators	Responsibility
4. Road safety and traffic safety		
<p>The contractor shall ensure the below aspects are included in the C-ESMP:</p> <ul style="list-style-type: none"> - Ensure all work activities are not affecting the traffic and vehicles movement in the area - Emphasize safety aspects among contractor drivers including maintaining speed limit - Improve driving skills and requiring licensing of drivers - Institute defensive driving training for all drivers prior to starting their job - Avoid dangerous routes and times of day to reduce the risk of accidents - Require that drivers and co-passengers wear seatbelts, and duly sanction defaulters. - Regularly maintain vehicles and use manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure - Ensure coverage of the trucks to prevent materials from falling 	<ul style="list-style-type: none"> - Vehicle maintenance records - Drivers' qualification and number of drivers without license - Number of traffic incidents at the work area - Drivers' adherence to the safe driving rules 	<p>UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (Daily)</p>
5. Emergency preparedness and response		
<ul style="list-style-type: none"> - Ensure that qualified first aid by qualified personnel is always available. Appropriately equipped first-aid stations should be easily accessible throughout the place of work - Details of nearest hospital is present on site with appropriate vehicle that can be used for transportation - Provide workers with rescue and first-aid duties with dedicated training so as not to inadvertently aggravate exposures and health hazards to themselves or their co-workers - Provide dedicated and appropriately equipped first-aid equipment where the scale of work or the type of activity being carried out so requires - Reporting any major incidents injuries to the WBG within 48 hours - Equip first aid stations and rooms with gloves, gowns, and masks for protection against direct contact with blood and other body fluids - Make widely available written emergency procedures for dealing with cases of trauma or serious illness, including procedures for transferring patient care to proper medical facilities - Immediately report to UNOPS all accidental occurrences with serious accident potential such as major equipment failures - Immediately investigate any serious or fatal injury or disease caused by the progress of work by the Contractor, and submit a comprehensive report to UNOPS 	<ul style="list-style-type: none"> - First aid kits availability - Emergency response plan availability - Drills records - Training records on the emergency preparedness - Incidents reported within 48 hours to the world bank if any 	<p>UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (Daily)</p>

Mitigation Measures and Contractor Obligations	Monitoring Parameters	
	Indicators	Responsibility
<ul style="list-style-type: none"> - Establish and maintain an emergency preparedness and response system, in collaboration with appropriate and relevant third parties including to cover: (i) the contingencies that could affect personnel and facilities under the subproject; (ii) the need to protect the health and safety of workers; (iii) the need to protect the health and safety of the Affected Communities. The emergency preparedness and response system shall include: <ul style="list-style-type: none"> o Identification of the emergency scenarios o Specific emergency response procedures o Training of emergency response teams o Training of workers on the actions to be taken in emergency situations o Emergency contacts and communication systems/protocols (including communication with Affected Communities when necessary) o Procedures for interaction with responsible authorities (emergency, health, environmental authorities) o Permanently stationed emergency equipment and facilities (e.g., first aid stations, firefighting equipment, spill response equipment, personal protection equipment for the emergency response teams) o Protocols for the use of the emergency equipment and facilities o Emergency drills and their periodicity based on assigned emergency levels or tiers o Decontamination procedures and means to proceed with urgent remedial measures to contain, limit and reduce pollution within the physical boundaries of the subproject property and assets to the extent possible. 		
6. Stakeholders engagement		
<ul style="list-style-type: none"> - As part of the overall Project Stakeholder Engagement, the Contractor shall undertake a process of stakeholder engagement before and during the work execution with wells administration representatives and communities directly affected by the activities it undertakes - Consultations shall be meaningful and inclusive of all groups and gender - The Contractor shall also maintain throughout the implementation good relations with local communities and will give these communities prior notice of plans and schedules as they might affect local people 	<ul style="list-style-type: none"> - Stakeholders' engagement activities records, outcomes - Number of consulted individuals - Number of men and women participants 	UNOPS engineer / HSSE officer (weekly)

Mitigation Measures and Contractor Obligations	Monitoring Parameters	
	Indicators	Responsibility
7. Solar system management		
<ul style="list-style-type: none"> - Ensure that solar PV systems are installed by qualified and experienced trades people, in order to avoid or minimize electrocution and other health and safety issues associated with working with hazardous materials - Training sessions to be conducted to the wells workers on the safe operation and maintenance of the solar pumping system by qualified personnel - Training sessions to include the appropriate mechanism for management and disposal of pumping solar system generated waste to ensure appropriate recycling is maintained 	<ul style="list-style-type: none"> - Presence of qualified staff among the contractors - Effectiveness and implementation of training sessions the workers - Workers' awareness and knowledge on the system operation, maintenance and applicable precautions 	<p>UNOPS engineer / HSE officer (weekly) and after work completion</p>

5.4. Contractor Environmental and Social Reporting

The Contractor shall report major work-related incidents, accidents or loss of life to UNOPS **within 24 hours** of their occurrence and within 48 hours to the WBG.

The Contractor shall monitor, keep records and report to UNOPS on weekly and monthly basis on the following environmental and social issues:

- Safety: first aid cases, high potential near misses, and remedial and preventive activities required (for example, revised job safety analysis, new or different equipment, skills training, and so forth).
- Environmental incidents and near misses: environmental incidents and high potential near misses and how they have been addressed, what is outstanding, and lessons learned.
- Major activities: those undertaken and completed, progress against implementation schedule, and key work fronts (work areas).
- ESHS requirements: noncompliance incidents with permits and national law (legal noncompliance), commitments, or other ESHS requirements.
- ESHS inspections and audits: by the Contractor—to include date, inspector or auditor name, sites visited, and records reviewed, major findings, and actions taken.
- Workers: list of workers at each site, confirmation of ESHS training, indication of origin (expatriate, local, nonlocal nationals), gender, age with evidence that no child labor is involved, and skill level (unskilled, skilled, supervisory, professional, management).
- Training on ESHS issues: including dates, number of trainees, and topics.
- Footprint management: details of any work outside boundaries or major off-site impacts caused by ongoing activities—to include date, location, impacts, and actions taken.
- Stakeholder engagement: highlights, including formal and informal meetings, and information disclosure and dissemination—to include a breakdown of women and men consulted and themes coming from various stakeholder groups, including vulnerable groups (e.g., disabled, elderly, children, etc.).
- Details of any security risks: details of risks the Contractor may be exposed to while performing its work—the threats may come from third parties external to the project.
- Worker grievances: details including occurrence date, grievance, and date submitted; actions taken and dates; resolution (if any) and date; and follow-up yet to be taken grievances listed should include those received since the preceding report and those that were unresolved at the time of that report.

5.5. ESMP Estimated Implementation Budget

The contractors shall cover the cost of their workers, training, PPE provision and mitigation measures implementation as part of the overall subproject BoQ items implementation cost. Estimated budget is available below.

Table 6 ESMP Estimated Budget

Item	Cost per site US\$	Cost for all sites US\$
1. Travel of UNOPS team to the subproject areas for monitoring and supervisory.	300	6,300
2. Mitigation measures implementation estimated cost	1,000	21,000
Total	1,300	27,300

6. Consultation Details

Various levels of consultations were conducted by UNOPS under the YEEAP 2 that include the authorities at central and governorate level in addition the local councils, partners working in the solar system supply, civil society organizations, contractors and representatives of water supply alliance. Such consultation and engagement focused on the activities implemented under the stage one of the project and the interventions that will be undertaken within the scope of YEEAP 2.

Further consultation took place at local level for all sites included under this subproject in which the local authorities, wells administrations/workers, community leaders and communities neighboring and benefiting from the targeted water wells. The consultation on the system components, installation process, requirements and timeframe took place by the UNOPS Engineers during the assessment stage. Moreover, further consultations conducted by the Project Female Social Facilitators at site level in January and February 2023 targeting the neighboring communities and beneficiaries from the wells. The consultation process takes the form of semi-structured discussions by phone calls, interviews with both males and females, and feedback was collected by questionnaire, form is available in annex 5. The interviews started with a brief explanation of the nature and objective of the subproject and potential impacts with proposed mitigation measures. Summary of the participants in the consultation activities is available in the table below in which the designation and number of consulted people is included. The participants are from the villages and districts around the targeted wells; examples of consultation records gathered during the consultation are available in annex 5.

Table 7 Consultation Participants Summary¹⁴

	Wells Admin		Public Workers		Private Sector Workers		Community Leaders		Unemployed		Total consulted		
	M	F	M	F	M	F	M	F	M	F	M	F	Total
Total consulted in all wells under subproject	38	-	95	39	92	14	27	-	35	58	287	111	398

The aspects covered during the consultations process at sites level include:

- Inform participants about the activities to be undertaken and the subprojects timetable including clarification that the support is limited to water production for drinking and household purposes.
- Discussion and evaluation of the associated risks and impacts as well as the required control measures.
- Discuss the subproject positive impacts that will be resulted from the subproject including the sustainable energy source that will result in availability of water supply that can be used for their household purposes.
- Ensure full participation of subproject beneficiaries and neighboring communities and provide them with awareness on the GM contact channels, anonymous complaints and escalation of grievances if not satisfied with the resolution and action taken.
- Provide awareness to the participants on their rights to raise any concerns related to the subproject' implementation during the various phases including during the solar pumping system operation.

The participants appreciated the support of supplying and installing solar pumping systems that will result in a sustainable and clean source of energy and help in the improvement of quality of lives for

¹⁴ Consulted groups are from the communities around the wells and benefiting from the water production

communities benefiting from the water wells. The participants have emphasized on the importance of providing high quality system components in addition to maintaining the operation of services during the system installation. Summary of the main outcomes, feedback of the consultation participants at site level include:

- Participants complain from the delay in implementing the intervention in their areas considering the initial evaluation and selection process conducted in the second half of 2022. Project team explained to the participants that the design process, review, preparation of subproject documents is the main reason
- Participants appreciated the intervention and emphasized on the importance of providing high quality equipment that can withstand all weather conditions and can be operated for a relatively long period of time.
- Questions raised on the time frame for implementation and whether the support can be expanded to include implementation of water network pipes targeting their villages and houses. Project team explained that the intervention is limited to supply, install and operate solar pumping systems in the targeted wells without any expansion of the piping networks.
- Participants emphasized on the importance of avoiding any disturbance of the water supply in which the Project team clarified that appropriate measures would take place in coordination with local authorities and wells administration to ensure limited or no water supply suspension. The contractor shall ensure to minimize the water suspension period in addition to coordinate with authorities to ensure that enough water quantities will be supplied to the communities.
- Participants highlighted the importance of providing after sales services and training to the well operation staff. The participants were informed that the subproject support and scope of work includes such aspects.
- Clarification requested on whether the solar pumping system capacity can meet the beneficiaries demand and Project team clarified that the pumping capacity is designed based on the targeted number of individuals benefited from the wells.

Table 8 Breakdown of consultation participants at site level¹⁵

No	Well Code	Well Name	Wells Admin		Public Workers		Private Sector Workers		Community Leaders		Unemployed		Total consulted		
			M	F	M	F	M	F	M	F	M	F	M	F	Total
1.	HAD-U2-01	Al Sawm # 3 / السوم 3	3	-	6	4	5	1	2	-	2	-	18	4	22
2.	HAD-U2-02	Al Sawm # 4 / السوم 4	2	-	6	4	6	2			2		16	6	22
3.	HAD-U2-03	Hawarah #2 / حورة رقم 2	3	-	6	2	4	1	2	-	2	1	17	4	21
4.	HAD-U2-04	Mnwab # 1 / منوب رقم 1	2	-	5	-	4	1	3	-	2	1	16	2	18
5.	HAD-U2-05	Qaeuda # 2 / قعوضة رقم 2	3	-	3	-	4	-	-	-	1	3	11	3	14

¹⁵ The consultation conducted within the targeted sites in January and February 2023

ESMP for Supply and Installation Solar Pumping Systems to 21 Water Wells

No	Well Code	Well Name	Wells Admin		Public Workers		Private Sector Workers		Community Leaders		Unemployed		Total consulted		
			M	F	M	F	M	F	M	F	M	F	M	F	Total
6.	HAD-U2-06	العاديه Al Adeia	1	-	3	1	2	-	1	-	2	2	9	4	13
7.	HAD-U2-07	العليب Al-Alealib	2	-	4	-	4	-	2	-	5	4	17	4	21
8.	HAD-U2-08	القرن Al Qarn	1	-	5	2	9	-	1	-	2	5	18	7	25
9.	HAD-U2-09	ريدة الجوهي Raidt Al Jouhi	3	-	5	2	7	-	2	-	1	4	18	6	24
10.	HAD-U2-10	عبدالله غريب Abdullah Gharib	2	-	4	3	5	1	1	-	-	4	12	8	20
11.	HAD-U2-11	حريضة Huridah	1	-	5	2	2	1	-	-	1	3	9	6	15
12.	MHR-U2-01	عتاب / Eitab	2	-	3	1	3	1	2	-	2	2	12	4	16
13.	MHR-U2-02	رخوت الشرقية Rakhawat Al Sharqia	2	-	5	3	6	1	2	-	2	2	17	6	23
14.	MHR-U2-03	ضبوت Dabuwt	1	-	5	2	6	1	1	-	1	3	14	6	20
15.	MHR-U2-04	1 عمان رقم 1 Oman#1	2	-	4	3	7	-	1	-	1	3	15	6	21
16.	MHR-U2-05	2 عمان رقم 2 Oman#2	2	-	3	2	2	1	2	-	2	2	11	5	16
17.	MHR-U2-06	2 بئر رقم 2 Well #2	1	-	5	2	2	-	1	-	-	3	9	5	14
18.	MHR-U2-07	3 بئر رقم 3 Well #3	2	-	4	1	3	1	1	-	1	4	11	6	17
19.	MHR-U2-08	6 بئر رقم 6 Well 6 /	1	-	5	2	2	1	-	-	2	3	10	6	16
20.	MHR-U2-09	7 بئر رقم 7 Well 7 /	1	-	4	1	3	1	2	-	2	5	12	7	19
21.	MHR-U2-10	5 بئر رقم 5 Well 5 /	1	-	5	2	6	-	1	-	2	4	15	6	21
Total			38	-	95	39	92	14	27	-	35	58	287	111	398

Annex 1 Subproject Environmental and Social Screening Form

Subproject name	Supply and Installation of Solar Pumping Systems to 21 water wells
Subproject location	21 water wells in rural and peri-urban districts across Hadramout and AlMahrah governorates
Subproject Risk Level	Moderate
Was the site visited beforehand	Yes
Estimated Start/Completion Date	1 July 2023 to 31 December 2023
Observations/Comments	Indicated in the conclusion below
ESSO Name	Ayad Omar
Project Manager Name	Ziad Jaber

Questions	Answer		Due Diligence / Action
	Yes	No	
Is the subproject likely to generate large to medium scale adverse risks and impacts on human populations or the environment?		X	An ESIA and ESMP must be prepared
What is the nature of these risks and impacts and what standards must an ESIA and ESMP would have to take into account	NA		
Does the subproject involve civil works including the rehabilitation of buildings ¹⁶ ?	X		
Is the subproject located in the vicinity of any known cultural heritage sites?		X	
Does the subproject have adverse risks and impacts on human populations or the environment that are not likely to be significant, do not involve activities that have a high potential for harming people or the environment, and are located away from environmentally or socially sensitive areas.	X		A proportionate ESMP must be prepared
Does the subproject have potential adverse risks to and impacts on human populations or the environment that are likely to be minimal or negligible?	X		The SEP, LMP, and the SEA/SH Prevention and Response Plan

Conclusion

- **Estimated risk associated with the subproject implementation is moderate.**
- **The ESMP preparation is required for the subproject. Project SEP, LMP, FLAP, GBV/SEA/SH Action plan are applicable on this intervention.**

¹⁶ The civil work is included under the subproject however no rehabilitation of buildings is included

Annex 2 Design Requirements and Guidelines

The UNOPS will carry out the detailed design works for the PV solar system as per the following requirements:

1. PV and Electrical

1.1. PV Modules

- Module capacity should not be less than 550 W @STC.
- The PV manufacturer should be approved as tier-1.
- Module efficiency: should not be less than 21.0%
- The PV modules junction box not less than IP67
- Module Voltage: Not less than 1000 VDC.
- VOC: -0.30% /C° or less.
- Nominal operating cell temperature (NOCT): Not less than 45°C.
- Must conform to IEC 61215, 61730, 61701, and UL 1703.TUV, UL certificates or equivalent;
- Certificates and Data sheet of PV module that contains the P-V & I-V Curves, all electrical and mechanical Data, Dimensions, Module area should be provided by the bidder.
- Performance warranty: Nominal power output 90% for 10 years, 80% for 25 years.
- Product warranty shall be at least 12 years.

1.2. Solar Pumping Inverter Controller

- Three phase output, voltage range 380-420 V;
- Efficiency: Not less than 90%;
- Output Frequency: 30 - 55Hz;
- Enclosure classes should be not less than IP55 or equivalent.
- Maximum input voltage (Voc): not less than 750 VDC
- Operating temperature: not less than 40 °C
- Such device should have built in data loggers
- The device shall allow hybrid operation with external power source, where solar power should be configured as the primary power source.
- Solar Pumping inverter should have the ability to work in different modes like Soft Starter, V/F Speed Control, Auto/ Manual Speed Control during solar radiation changes and auto wake up after hibernation time in cloudy day
- Solar Pumping Inverter should be equipped with Programmable inputs to be used for Discharge pressure switch to protect the pump against high discharge pressure, well water level sensor to protect pump against dry running, Tank level switch for overflow protection and closed pipeline
- Solar Pumping inverter should be equipped with programmable outputs to be programmed for any required actions
- Protection: Over-Voltage, pump Over-Current, pump Overload, Over-Temperature, pump Phase Loss, pump Short-Circuit, ground fault, solar low power, DC Input Anti-reverse, AC output unbalance (3 Phase);
- Display content: PV status (Current, Voltage, Power, Energy), AC input voltage, AC output voltage, Load, Running Status, RPM, and Frequency.
- Product warranty should be at least 2 years.

1.3. PV Combiner Box

- Enclosure materials: Powder coated metal with lockable door.

Enclosure protection: not less than IP65 or equivalent.

- Fuse rating for each string:1000V, not less than 15 A.
- Built in surge protection device;
- Anti-backflow diodes.
- Operational Environment Temperature: not less than 40 °C
- Product warranty shall be at least 2 years.

1.4. System Cables:

3 phase, AC Submersible Pump Cable

- Voltage rating:450/750VAC, Type of Conductor: copper, flexible, finely multi stranded,
- Insulation: black poly chloroprene, HO7RN -F or equivalent material.
- Electrolytic annealed copper conductor, class 5 according to IEC 60228.
- Thermosetting rubber insulation type EI7 and outer sheath type EM2, according to EN 50363-1 and EN 50363-2-1.

DC Cables

- Made of double insulation material and jacket, TUV certified, 1000VDC, Sheath colors: black, red, Type of Conductor: tinned copper, flexible, finely multi stranded

Water level Cable with Sensor

- Submersible cable, 3 ×1.5 mm², HO7RN double sheath.
- Electrolytic annealed copper conductor, class 5 according to IEC 60228.
- Thermosetting rubber insulation type EI7 and outer sheath type EM2, according to EN 50363-1 and EN 50363-2-1.
- Dry running electrodes

1.5. Earthing and Lightning Systems

AC and DC Earthing

- The Earthing System shall comply with IEC/BS EN 62305-3.
- Earthing installation in accordance with the IEE Wiring regulations BS 7671.
- Grounding and lightning protection equipment shall include SPD, earth pits and rods
- All PV modules shall be grounded in accordance to the manufacturer instruction
- Each array structure of the PV modules should be grounded properly.
- Earthing Bonding should be applied for all metal structure, cover and shields
- Earthing clamps shall be used.
- Grounding resistance should be not more than 5 ohm.

1.6. Lightning System

- Lightning System shall comply with IEC/BS EN 62305-3.
- Minimum height of lightning arrester is 1.5 m.
- Lightning arrester should be provided.
- Lightning arrester shall be installed with height to protect all PV arrays.
- System resistance should be not more than 5 ohm.

1.7. Moulded Case Circuit Breaker (MCCB) and Enclosure

Moulded Case Circuit Breaker (MCCB)

- Operating voltage up to 400V AC, 3P.
- Different range of tripping characteristics: D Curve
- High breaking capacity throughout the range 25KA

- High quality breakers preferably Schneider, ABB or equivalent.
- Conform to BS EN 60947-3 and UL 1008 Listed.

Enclosure

- NEMA 3R enclosure and powder-coated steel construction.
- Lockable front door, wall mounted type, and Protective plates.

1.8. Stand-alone/ All In One Solar Street Light

- 60W, 18V Mono-crystalline PV Module
- 12VDC, more than 30Ah Li/Ion Battery
- MPPT Charger, Lighting Controller with Multi-stage operation capability
- More than 8000 Lm LED light with the required drive
- Hot-dip galvanized, 6 meters with 75 mm minimum diameter Lighting Pole
- IP65 Ingress protection
- Rigid frame and enclosure that withstand worst weather condition
- Motion sensor

2. Mechanical

2.1. Submersible Pump and Motor:

Pump

- Pump Efficiency at Duty Point: Not less than 65%
- allowable sand: minimum 100 gr/m³.
- Casing (Pump Bowl), Impeller, Wear Rings, Pump delivery and Housing , Check valve (Non Return Valve) , Inlet strainer should comply with: (AISI 304 or equivalent) or higher specification materials.
- Shaft and coupling, Shaft sleeve, bearing bush, Guide bearing, Screw, stud, nut, washer, etc. should comply with: (AISI 304 or equivalent) or higher specification materials.
- Coupling: according to NEMA.

Motor With Cooling Sleeve

- Insulation rating is compatible with AC VFD operation
- Rated Voltage:380/400 VAC
- Insulation Material and Class, PE2+PA
- Ambient water temp: not less than 40 C°
- IP: not less than 68
- Motor Efficiency: Not less than 80%
- Motor Speed:1850 rpm – 2850 rpm
- Stainless steel Cooling sleeve suitable for well internal diameter
- Shaft, Motor Sleeve, Motor Housing, bolts, Nuts, Studs, screws, Washers etc. should comply with: (AISI 304 or equivalent) or higher specification materials.
- Shaft Seal (Mechanical Seal) Tungsten carbide/ceramic- Diaphragm Nitrile Rubber Radial Bearing (Guide Bearing) Graphite or superior Axial Bearing (Thrust Bearing) Graphite/ S.S Pads superior, Rubber Parts NBR or equivalent
- Product warranty should be at least 2 years.

2.2. Well Raiser

GI Carbon Steel Riser Pipes

- Materials: Hot dip galvanized Carbon Steel according to BS 1387 or equivalent

- Joint Type: Coarse Threaded or Flanged
- Thickness / Schedule: Heavy Schedule as per BS 1387 standard or equivalent.
- Single Piece Length: 6 m, or 3m.
- Pipes package shall include all required adaptors and accessories

Vertical Raiser Non-Return Valve (Check Valve).

- Nominal Diameter (DN): Shall be selected according to raiser line diameter.
- Nominal Pressure (PN): Shall be more than TDH of the system.
- Body Material: Stainless steel 304 or higher grade
- Connection Type: According to the raiser pipes.
- Standard: BS5153 or Equivalent
- Complete with all required accessories

2.3. Wellhead Piping Equipment

Mechanical Water Flow Meter

- Inline, Flanged, Magnetic type, Dray dial, turbine flow meter with all needed accessories such as threaded flanges, gaskets and bolts.
- Nominal Diameter (DN): Shall be selected according to output pumping line diameter.
- Nominal Pressure (PN): Shall be selected according to output pressure on the beginning of the pumping line.
- Body: Cast Iron
- Standard: EN14154, ISO4064
- Transient Flow Qt: Shall be less than 50% of Pump flow rate.
- Accuracy: $\pm 2\%$ of Nominal flow
- Measuring Units: cubic meter m³

Horizontal Pumping line Non-return Valve.

- Nominal Diameter (DN): Shall be selected according to pumping line diameter.
- Nominal Pressure (PN): Shall be selected according to output pressure on the beginning of the pumping line.
- Connection Type: Flanged.
- Type: Swing
- Standard: BS5153 or Equivalent
- Body Material: Cast Iron (Gg25)
- Spindle: Stainless steel
- Complete with flanges, gaskets, bolts and nuts

Gate Valve

- Nominal Diameter (DN): Shall be selected according to pumping line diameter.
- Nominal Pressure (PN): Shall be selected according to output pressure on the beginning of the pumping line.
- Connection Type: Flanged.
- Standard: BS BS6163 or Equivalent.
- Operator: Hand Wheel
- Resilient Seated.
- Body Material: Cast Iron (Gg25)
- Stem: Stainless Steel

- Complete with flanges, gaskets, bolts and nuts

Pressure Switch

- High-pressure Low-pressure setting function
- Pressure Switch should be adjustable in range below and above the operating pressure
- Regulating range: Shall be selected according to output pressure on the beginning of the pumping line
- NO/NC electric connection
- NPT thread connection to pipe
- Manual trip function
- IP44 to EN 60529 / IEC 60529
- Shall be equipped with an isolation Stainless steel 1/2-inch Ball valve of the same pressure rating.

Analogue Pressure Gauge

- Reading range: Shall be specified according to the pressure on the installation point.
- Process connection: NPT connection 1/2" or 1/4".
- Pressure gauge should be equipped with an isolation Stainless steel 1/2-inch Ball valve of the same pressure rating.
- Casing: Stainless steel, 4 inches

Well Cap / Cover

- Material: made from A36 or equivalent CS plate
- Min. thickness: 18 mm for borehole wells caps
- Min. thickness: 3mm for wide opening well's covers
- Painted by Anti-corrosion Paint at least two coats (premier and finishing layer)
- Diameter: Shall be more than well diameter
- Fabricated with stiffeners and holes for pump and sensor cables
- Stiffeners shall be holed for lifting purposes

3. Safety

3.1. Solar Outdoor Lighting

- Minimum capacity 60 Wp lamp compact type (All in one) or separated module (battery shall be built-in with the lamp)
- Lamp luminous efficacy: not less than 100 lm/w.
- Working lifetime: not less than 30,000.
- The color temperature range: 3000K – 5000K.
- The LED lamps are outdoor designed with IP 65 protection.
- Operating Temperature range: up to 60°C.
- Certification: All related certificates shall be provided such as CE, RoHS.
- PV module and Battery capacities shall cover all energy consumption by lamp for 12 Hr. at least.
- Provided with mounting support and all required accessories.
- Fence supports cannot be facilitated for the installation of lighting
- Shall be distributed to light all areas of PV modules and well-head rooms.
- Warranty: at least two years.

3.2. Fire Extinguishers

- A portable fire extinguisher shall be provided, 2 extinguishers for each facility should be supplied near the solar inverter unit.

- Powder / CO2 extinguishers.
- Approved to EN1866.
- 5- 6 kg capacity.
- Made of high strength steel cylinders with a red epoxy polyester paint finish.
- Warranty: at least two years.

4. Mounting Structure and Fence

4.1. Mounting Structure

Material Specification

- All elements' sections shall be A36 steel, dimensions and thicknesses as per typical shop drawings.
- The HSS purlins shall be hot dipped galvanized steel

Welds And Connections

- Welds to steel for mounting shall be full depth fillet welds unless otherwise stated in the shop drawings.
- The Bolts shall be approved with nuts of various diameters and lengths, Class 8.8 .
- Type for joining of various Structural components like Column, Rafters, Beams, Purlins etc., complete as shown in the drawing and as directed by the Consultant and Engineer IN Charge.
- The length of bolts shall be such that the threaded portion of each bolt projects through the nut by at least two threads and by not more than five threads.
- All fasteners (nuts, bolts and washers) shall be of Stainless Steel or galvanized steel.

Coating For Structural Steel Works

- The first coat shall be from approved zinc chromate primer which is applied by using mechanical spaying as well as final two coats of synthetic enamel paint over mounting elements except the galvanized elements as directed.
- Weld and steel elements surfaces shall be clean and flush before application of the protective coating.
- Steel shall not be welded after coating unless permitted by the Engineer and if permitted, the welded areas shall be free of scale and slag and shall be treated with an alternative galvanizing or zinc coating system approved by the Engineer.

4.2. Security Fence (Chain Link Fabric)

- The Mesh Wire and the Line Wire of the Fabric shall be manufactured from galvanized steel wire.
- The Mesh Size must be not less than 50 mm x 50 mm (wire dia 3.15mm, hole 50x50mm) as figures below.
- HDG (Hot Dip Galvanized) and if adding the PPC (Polyester Powder Coated), it will be preferred.
- Fittings, including eye bolt strainers, cleats, winding brackets, stretcher bars, extension arms, hook bolts and base plates, shall be galvanized mild steel.

Annex 3 Forced Labor Declaration Form

Part 1 - Forced Labor Performance Declaration

[The following table shall be filled in by the Bidder, each member of a Joint Venture, each Subcontractor/ supplier/ manufacturer providing solar panels and/or solar panel components proposed by the Bidder]

Bidder's Name: *[insert full name]*

Date: *[insert day, month, year]*

Joint Venture Member's or Subcontractor's/supplier's/manufacturer's Name: *[insert full name]*

RFQ No. and title: *[insert RFQ number and title]*

Page *[insert page number]* of *[insert total number]* pages

Forced Labor Performance Declaration Evaluation and Qualification Criteria

We:

(a) have not been suspended or terminated, and/or other contractual remedies applied including calling of performance security by an employer, for reasons of breach of forced labor obligations in the past five years. *[if (a) is declared, state N/A for (b) below]*

(b) have been suspended or terminated, and/or other contractual remedies applied including calling of performance security by an employer, for reasons of breach of forced labor obligations in the past five years. Details are provided below:

Year Contract identification	Name of Employer	Reasons for suspension or, termination, and/or other contractual remedies applied including calling performance security
------------------------------	------------------	--

(c) *[If (b) above is applicable, attach evidence demonstrating that adequate capacity and commitment to comply with Forced Labor obligations.]*

We declare that all the information and statements made in this Form are true, and we accept that any misrepresentation contained in this Form may lead to our disqualification by the Employer and/or sanctions by the UNOPS.

Name of the Bidder/ JV member/ Subcontractor/ supplier/ manufacturer _____

Name of the person duly authorized to sign on behalf of the Bidder/ JV member/ Subcontractor/ supplier/manufacturer _____

Title of the person signing on behalf of the Bidder/ JV member/ Subcontractor/ supplier/ manufacturer _____

Signature of the person named above _____

Date signed _____ day of _____, _____

Countersignature of authorized representative of the Bidder (for forms submitted by a JV member, Subcontractor/ supplier/ manufacturer):

Signature: _____

Date signed _____ day of _____, _____

Part 2 - Forced Labor Declaration

Date: _____

RFQ No.: _____

Alternative No.: _____

Contract Title:

To:

We, the undersigned, declare that, if awarded the Contract, we, including our Subcontractors and suppliers/ manufacturers, are required to comply with the contractual Forced Labor obligations. In this regard, we:

- (a) accept that there will be no Forced Labor among the staff, employees, workers and any other persons employed or engaged by us;
- (b) accept that staff, employees, workers and any other persons employed or engaged, will be hired under employment conditions that meet the contractual obligations set out in the Contract;
- (c) will include in our contracts with Subcontractors/ suppliers/ manufacturers of *[solar panels] [solar panel components]* obligations to prevent Forced Labor among the staff, employees, workers and any other person employed or engaged by the Subcontractor/ supplier/ manufacturer;
- (d) will include in our contracts with Subcontractors/ suppliers/ manufacturers of *[solar panels] [solar panel components]*, that the Subcontractors/ suppliers/ manufacturers include an obligation to prevent Forced Labor in all contracts that they execute with their suppliers/ manufacturers of *[solar panel][solar panel components]*;
- (e) will monitor our Subcontractors/ suppliers/ manufacturers of *[solar panels] [solar panel components]* on implementation of obligations to prevent Forced Labor among the staff, employees, workers and any other person employed or engaged by them;
- (f) will require our Subcontractors to monitor their suppliers/ manufacturers of *[solar panels] [solar panel components]* on implementation of obligations to prevent Forced Labor among the staff, employees, workers and any other person employed or engaged by them;
- (g) will require our Subcontractors/ suppliers/ manufacturers to immediately notify us of any incidents of Forced Labor;
- (h) will immediately notify the Employer any incident of Forced labor on the site, or premises of Subcontractors/ suppliers/ manufacturers of *[solar panels] [solar panel components]*;
- (i) will include in periodic progress reports submitted in accordance with the contract sufficient details on our, including our Subcontractors/ suppliers/ manufacturers, compliance with Forced Labor obligations; and we
- (j) confirm that the Subcontractors/ suppliers/ manufacturers for *[solar panels] [solar panel components]* for this contract are (or likely to be):

[Provide each firm's name, address, primary contact, e-mail address, and the link to the firm's website]

OR

confirm that you have not yet finalized the Subcontractors/ suppliers/ manufacturers of solar panels/components, but when known the firm/s name(s), address(es), primary contact(s), e-mail address(es) and website link(s) will be provided to the Employer, prior to signing the contract, with documentation demonstrating compliance with forced labor obligations to the Employer for approval].

THEN

If (c) above is applicable, attach evidence of how these contract obligations are/will be made.

If (d) above is applicable, attach evidence of how these contract obligations are/will be made.

If (e) above is applicable, please attach evidence of how this monitoring/due diligence is/will be undertaken (such as your inspection protocols, use of inspection agents, frequency of inspections, examples of previous factory/labor inspection reports etc.).

If (f) above is applicable, please attach evidence of how this monitoring/due diligence is/will be undertaken by Subcontractors (such as their inspection protocols, use of inspection agents, frequency of inspections, examples of previous factory/labor inspection reports etc.).

We declare all the information and statements made in this Form are true, and we accept that any misrepresentation contained in this Form may lead to our disqualification by the Employer and/or sanctions by the UNOPS.

Name of the Bidder* _____

Name of the person duly authorized to sign the Bid on behalf of the Bidder** _____

Title of the person signing the Bid _____

Signature of the person named above _____

Date signed _____ day of _____, _____

*: In the case of the Bid submitted by joint venture specify the name of the Joint Venture as Bidder

**.: Person signing the Bid shall have the power of attorney given by the Bidder attached to the Bid

[Note: In case of a Joint Venture, the Forced Labor Declaration must be in the name of all members to the Joint Venture that submits the Bid.]

Annex 4 Personnel Code of Conduct Sample Form

Contractors shall ensure that all employees, including those of subcontractors, are informed about and sign Code of Conduct. Code of Conduct sample is available below in which the contractor shall adopt and include all provisions in their own Code of Conduct:

We the Contractor [enter name of Contractor] have signed a contract with UNOPS for [enter description of the activities]. These activities will be carried out at [enter the Site and other locations where the activities will be carried out]. Our contract requires us to implement measures to address environmental and social risks related to the activities, including the risks of sexual exploitation and assault and gender-based violence.

This Code of Conduct is part of our measures to deal with environmental and social risks related to the activities. It applies to all our staff, including laborers and other employees at all the places where the activities are being carried out. It also applies to the personnel of every subcontractor and any other personnel assisting us in the execution of the activities. All such persons are referred to as “Contractor’s Personnel” and are subject to this Code of Conduct.

This Code of Conduct identifies the behavior that we require from all Contractor’s Personnel.

Our workplace is an environment where unsafe, offensive, abusive or violent behavior will not be tolerated and where all persons should feel comfortable raising issues or concerns without fear of retaliation.

Required Conduct

Contractor’s Personnel shall:

1. carry out his/her duties competently and diligently;
2. comply with this Code of Conduct and all applicable laws, regulations and other requirements, including requirements to protect the health, safety and well-being of other Contractor’s Personnel and any other person;
3. maintain a safe working environment including by:
4. ensuring that workplaces, machinery, equipment and processes under each person’s control are safe and without risk to health;
5. wearing required personal protective equipment;
6. using appropriate measures relating to chemical, physical and biological substances and agents;
7. following applicable emergency operating procedures.
8. report work situations that he/she believes are not safe or healthy and remove himself/herself from a work situation which he/she reasonably believes presents an imminent and serious danger to his/her life or health;
9. treat other people with respect, and not discriminate against specific groups such as women, people with disabilities, migrant workers or children;
10. not engage in any form of sexual harassment including unwelcome sexual advances, requests for sexual favors, and other unwanted verbal or physical conduct of a sexual nature with other Contractor’s or Employer’s Personnel;
11. not engage in Sexual Exploitation, which means any actual or attempted abuse of position of vulnerability, differential power or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another. In Bank financed projects, sexual exploitation occurs when access to or benefit from Bank financed Goods, Works, Consulting or Non-consulting services is used to extract sexual gain;

12. not engage in Sexual Assault, which means sexual activity with another person who does not consent. It is a violation of bodily integrity and sexual autonomy and is broader than narrower conceptions of “rape”, especially because (a) it may be committed by other means than force or violence, and (b) it does not necessarily entail penetration.
13. not engage in any form of sexual activity with individuals under the age of 18, except in case of pre-existing marriage;
14. complete relevant training courses that will be provided related to the environmental and social aspects of the Contract, including on health and safety matters, and Sexual Exploitation and Assault (SEA);
15. report violations of this Code of Conduct; and
16. Not retaliate against any person who reports violations of this Code of Conduct, whether to us or the Employer, or who makes use of the Grievance mechanism for Contractor’s Personnel or the project’s Grievance Mechanism.

Raising Concerns

If any person observes behavior that he/she believes may represent a violation of this Code of Conduct, or that otherwise concerns him/her, he/she should raise the issue promptly. This can be done in either of the following ways:

1. Contacting the Individual designated by the Contractor [enter name of Contact]
2. In writing at this address []
3. By telephone at []
4. In person at []
5. Calling [] to reach the Contractor’s hotline and leave a message (if available)

The person’s identity will be kept confidential, unless reporting of allegations is mandated by the country law. Anonymous complaints or allegations may also be submitted and will be given all due and appropriate consideration. We take all reports of possible misconduct and will investigate and take appropriate action. We will provide warm referrals to service providers that may help support the person who experienced the alleged incident, as appropriate.

There will be no retaliation against any person who raises a concern in good faith about any behavior prohibited by this Code of Conduct. Such retaliation would be a violation of this Code of Conduct.

Consequences of Violating the Code of Conduct

Any violation of this Code of Conduct by Contractor’s Personnel may result in serious consequences, up to and including termination and possible referral to legal authorities.

For Contractor’s Personnel

I have received a copy of this Code of Conduct written in a language that I comprehend. I understand that if I have any questions about this Code of Conduct, I can contact [enter name of Contractor’s contact person with relevant experience in handling gender-based violence] requesting an explanation.

Name of Contractor’s Personnel: [insert name]

Signature: _____

Date: (day month year): _____

Countersignature of authorized representative of the Contractor:

Signature: _____

Date: (day month year): _____

A copy of the code shall be displayed in a location easily accessible to the community and affected people. It shall be provided in languages comprehensible to the local community, Contractor’s personnel (including subcontractors and day workers), and affected persons.

Annex 5 Consultation Records Samples

Questionnaire below was used during the consultation process:

المشروع الطارئ لتوفير الطاقة في اليمن - المرحلة الثانية استبيان حول تشغيل الآبار باستخدام الطاقة الشمسية				
التاريخ			اسم الباحثة	
المحافظة			المديرية	اسم المنشأة (البئر)

من أهداف المشروع الرئيسية توفير الطاقة المطلوبة لتشغيل الآبار المستخدمة لتوفير مياه الشرب للسكان في المناطق الريفية وشبه الحضرية في اليمن واستخدام الطاقة الشمسية كمصدر مستدام للطاقة وتقليل استخدام الوقود التقليدي وبالتالي تخفيف التأثيرات المناخية الناجمة عن استخدامه. سينتج عن هذا التدخل تحسين حياة ومعيشة السكان في المناطق المستهدفة وتوفير مياه الشرب بشكل مستمر والتغلب على العوائق المتعلقة بتوفر الوقود وتذبذب أسعاره. وعلى ضوء ما تقدم تم ترشيح البئر المذكورة أعلاه كأحد المشاريع الفرعية والتي سيتم فيها توفير منظومة طاقة شمسية لتشغيل البئر لغرض توفير مياه الشرب وخدمة سكان المنطقة. وعليه يرجى إكمال الاستبيان أدناه لما فيه المصلحة العامة ويمكن عدم كتابة أي بيانات غير مرغوب في تضمينها.

بيانات الشخص المشارك في الاستبيان (جميع البيانات اختيارية)							
							الاسم
أكثر من 46	<input type="checkbox"/>	25 إلى 46	<input type="checkbox"/>	15 إلى 24	<input type="checkbox"/>	أقل من 15	<input type="checkbox"/>
				الفئة العمرية	<input type="checkbox"/>	ذكر	<input type="checkbox"/>
القرية.....العزلة.....المديرية.....							العنوان
				رقم الهاتف (اختياري)			
							المهنة

رقم	الآثار الإيجابية المتوقعة من تنفيذ التدخل المخطط, ما مدى موافقتك على ما يلي:	موافق	غير موافق	لا أعرف
1.	استخدام الطاقة الشمسية سيقول من الكلفة المادية المستخدمة لضخ المياه المتمثلة في قيمة الوقود (الديزل)			
2.	يساعد استخدام الطاقة الشمسية في ديمومة ضخ المياه خصوصا اثناء انقطاع المشتقات النفطية أو ارتفاع أسعارها			
3.	يساعد استخدام الطاقة الشمسية في الحفاظ على البيئة والحد من التلوث			
4.	سيساهم المشروع في التخفيف من معاناة النازحين والفقراء والسكان بشكل عام			
5.	يشكل المشروع أولوية اقتصادية واجتماعية لسكان المنطقة			

رقم	الآثار الإيجابية المتوقعة من تنفيذ التدخل المخطط, ما مدى موافقتك على ما يلي:	موافق	غير موافق	لا أعرف
6.	يساعد المشروع في تخفيف المعاناة المتمثلة في التنقل لمسافات كبيرة من أجل الحصول على مياه الشرب			
7.	تنفيذ المشروع سيساهم في رضا المجتمع بشكل عام وبالتالي يجري دعمه من كافة فئات المجتمع			
8.	أي آثار إيجابية أخرى تتوقعها			

رقم	المخاوف المتوقعة من تنفيذ التدخل المخطط, ما مدى موافقتك على ما يلي:	نعم	لا	لا أعرف
1.	هل سيخلق المشروع نزاعاً اجتماعياً حول توزيع المنافع أو الموارد أو كميات المياه؟ اذكر الاسباب حال كان الجواب نعم أو كانت هناك حوادث مماثلة؟			
2.	من الممكن أن ينتج عن أعمال المقاول وحركة العمال ازعاج للسكان بشكل عام؟			
3.	هل سينتج عن المشروع كميات كبيرة من المخلفات أو النفايات والتي قد تتسبب في تلوث المنطقة؟			
4.	من الممكن أن يتوقف ضخ المياه في حال عدم وجود صيانة للمنظومة وتوابعها وبالتالي يجب أن تقوم لجنة التشغيل بعمل الصيانة اللازمة؟			
5.	هل ستزيد أنشطة المقاول أثناء التنفيذ من معدلات الانبعاثات الضارة في الهواء؟ ومستويات التلوث الضوضائي؟			
6.	عدم الاستجابة لشكاوى الأهالي في حال حدوث مخالفات في فترة التنفيذ من قبل المقاول؟			
7.	سيتسبب المشروع بعنف مجتمعي (ضد النساء- الأطفال - المهمشين- النازحين)؟ اذكر الاسباب حال كان الجواب نعم			
8.	أي مخاوف أخرى يمكن إضافتها			

أي ملاحظات أو احتياجات أخرى يمكن تضمينها

1.
2.
3.

يمكن إرسال الملاحظات والاستفسارات بخصوص هذا المشروع (المشروع الطارئ لتوفير الطاقة في اليمن - المرحلة الثانية) عبر القنوات التالية والتي تقع تحت مسؤولية مكتب الأمم المتحدة لخدمات المشاريع (يونوبس):

Toll Free Number
Landline
SMS and WhatsApp
Email

8000190
01 504914 and 01 504915
739888388
grm-yemen@unops.org

رقم مجاني
رقم هاتف أرضي
رسائل نصية أو واتساب
بريد إلكتروني

Samples only, full list of consultation records is very long and it will significantly increase the number of papers and document size.

المشروع: النظام الشمسي لتوفير الطاقة في اليمن - المرحلة الثانية استكمال حفر تشغيل الآبار باستخدام الطاقة الشمسية			
اسم الهيئة:	خالد سالم عبد الله بالبحراني	التاريخ:	16 يناير 2023
اسم المنشأة (القرى):	باز الصوم 3	المنطقة:	حضرية

من أهداف المشروع الرئيسية توفير الطاقة المتجددة لتشغيل الآبار المستخدمة لتوفير مياه الشرب للسكان في المناطق الريفية وكيفية المحمية في اليمن واستخدام الطاقة الشمسية كمصدر مستدام للطاقة وتقليل استخدام الوقود التقليدي وبالتالي تخفيف التأثيرات المناخية الناتجة عن استخدامه. يستجيب عن هذا التدخل تحسين حياة ومجتمعات السكان في المناطق المستهدفة وتوفير مياه الشرب بشكل مستمر والتغلب على العراقيل المتعلقة بتوفير الوقود وتثبيت أسعاره.

و على ضوء ما تقدم تم ترشيح البئر المذكورة أعلاه كأحد المشاريع الريفية والتي سيتم فيها توفير منظومة طاقة شمسية لتشغيل البئر لتعرض توفير مياه الشرب وخدمة سكان المنطقة.

و عليه يرجى إكمال الاستبيان أدناه لما فيه الصلحة العامة ويمكن عدم كتابة أي بيانات غير مرغوب في تضمينها.

بيانات الشخص المشارك في الاستبيان (جميع البيانات اختيارية)			
الاسم:	علي يونس كرامية حيدر		
الجنس:	ذكر	العمر:	من 15 إلى 24 • 25 إلى 46 • أكثر من 46
العنوان:	القرية: الصوم - العزلة: الحامضة - المحافظة: الحديدة		
الهاتف:	777371774	رقم الهاتف (اختياري):	

رقم	الآثار الإيجابية المتوقعة من تنفيذ التدخل المقترح ما مدى موافقتك على ما يلي:	موافق	غير موافق	لا أعرف
1.	استخدام الطاقة الشمسية سيقلل من تكلفة العمالة المستخدمة لصنع المياه المنقاة في قرية الوارد (القرى)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	يساعد استخدام الطاقة الشمسية في توفير مياه الشرب خصوصاً أثناء الفترات الجافة أو ارتفاع أسعارها	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	يساعد استخدام الطاقة الشمسية في الحفاظ على البيئة والحد من التلوث	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	يساهم المشروع في التخفيف من معدلة الفلاحين والفراء والسكان بشكل عام	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	يساهم المشروع في توفير المياه المنقاة في التلوث المسببات كبراً من أجل الحصول على مياه الشرب	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	تقلل المشروع يساهم في رضا المجتمع بشكل عام وبالتالي يحسن من كفاءة خدمات المجتمع	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	أي آثار إيجابية أخرى تلاحظها	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

المشروع: النظام الشمسي لتوفير الطاقة في اليمن - المرحلة الثانية استكمال حفر تشغيل الآبار باستخدام الطاقة الشمسية			
اسم الهيئة:	خالد سالم عبد الله بالبحراني	التاريخ:	16 يناير 2023
اسم المنشأة (القرى):	باز الصوم 3	المنطقة:	حضرية

من أهداف المشروع الرئيسية توفير الطاقة المتجددة لتشغيل الآبار المستخدمة لتوفير مياه الشرب للسكان في المناطق الريفية وكيفية المحمية في اليمن واستخدام الطاقة الشمسية كمصدر مستدام للطاقة وتقليل استخدام الوقود التقليدي وبالتالي تخفيف التأثيرات المناخية الناتجة عن استخدامه. يستجيب عن هذا التدخل تحسين حياة ومجتمعات السكان في المناطق المستهدفة وتوفير مياه الشرب بشكل مستمر والتغلب على العراقيل المتعلقة بتوفير الوقود وتثبيت أسعاره.

و على ضوء ما تقدم تم ترشيح البئر المذكورة أعلاه كأحد المشاريع الريفية والتي سيتم فيها توفير منظومة طاقة شمسية لتشغيل البئر لتعرض توفير مياه الشرب وخدمة سكان المنطقة.

و عليه يرجى إكمال الاستبيان أدناه لما فيه الصلحة العامة ويمكن عدم كتابة أي بيانات غير مرغوب في تضمينها.

بيانات الشخص المشارك في الاستبيان (جميع البيانات اختيارية)			
الاسم:	علي يونس كرامية حيدر		
الجنس:	ذكر	العمر:	من 15 إلى 24 • 25 إلى 46 • أكثر من 46
العنوان:	القرية: الصوم - العزلة: الحامضة - المحافظة: الحديدة		
الهاتف:	777371774	رقم الهاتف (اختياري):	

رقم	الآثار الإيجابية المتوقعة من تنفيذ التدخل المقترح ما مدى موافقتك على ما يلي:	موافق	غير موافق	لا أعرف
1.	استخدام الطاقة الشمسية سيقلل من تكلفة العمالة المستخدمة لصنع المياه المنقاة في قرية الوارد (القرى)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	يساعد استخدام الطاقة الشمسية في توفير مياه الشرب خصوصاً أثناء الفترات الجافة أو ارتفاع أسعارها	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	يساعد استخدام الطاقة الشمسية في الحفاظ على البيئة والحد من التلوث	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	يساهم المشروع في التخفيف من معدلة الفلاحين والفراء والسكان بشكل عام	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	يساهم المشروع في توفير المياه المنقاة في التلوث المسببات كبراً من أجل الحصول على مياه الشرب	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	تقلل المشروع يساهم في رضا المجتمع بشكل عام وبالتالي يحسن من كفاءة خدمات المجتمع	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	أي آثار إيجابية أخرى تلاحظها	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

المشروع في إطار توفير الطاقة المتجددة في اليمن - المرحلة الثانية استكمال جدول الأعمال واستخدام الطاقة الشمسية			
اسم البوابة	خالد سالم عبد الله بالبحرول	التاريخ	16 يناير 2023
اسم المنشأة (القرى)	بئر السوم 3	البلدية	مديرية السوم
حضرية	محافظة	محافظة	حضرية

من أهداف المشروع الرئيسية توفير الطاقة المتجددة لتشغيل الآبار المستخدمة لتوفير مياه الشرب للسكان في المناطق الريفية وشبه الحضرية في اليمن واستخدام الطاقة الشمسية كبديل مستدام للطاقة ونقل استخدام الوقود التقليدي وبالتالي تخفيف التكاليف التشغيلية والتلوث عن استخدامه. يتلخص من هذا العمل تحسين حياة ومعيشة السكان في المناطق المستهدفة وتوفير مياه الشرب بشكل مستمر وتقليل على العراق المتحللة بتوفر الوقود وتلوث أسوأ.

على ضوء ما تقدم تم تزويد البئر المشكورة أعلاه كأحد المشاريع القرية والتي سيتم فيها توفير منظومة طاقة شمسية لتشغيل البئر لغرض توفير مياه الشرب وخدمة سكان المنطقة.

ويطلب يرجى إكمال الاستبيان أدناه لما فيه المساعدة العامة ويمكن عدم كتابة أي بيانات غير مرغوب في تعبئتها.

بيانات الشخص المشارك في الاستبيان (جميع البيانات اختيارية)	
الاسم	خالد سالم عبد الله بالبحرول
الجنس	ذكر
العنوان	قرية السوم - عزلة الغدول - مديرية حيفر موريت
الهاتف	رقم الهاتف (اختياري) 77 9029888

رقم	الآثار الإيجابية المتوقعة من تنفيذ العمل المتخطط ما مدى موافقتك على ما يلي:	موافق	غير موافق	لا أعرف
1	استخدام الطاقة الشمسية سيقلل من تكلفة المياه المستخدمة لتصبح المياه المتوفرة في قبة الوقود (البترول)	✓		
2	يساعد استخدام الطاقة الشمسية في تيسير حياة مزارعي المنطقة من خلال توفير مياه الشرب في المناطق النائية أو ارتفاع أسعارها	✓		
3	يساعد استخدام الطاقة الشمسية في الحفاظ على البيئة والحد من التلوث	✓		
4	يساهم المشروع في التخفيف من معدلات التآكل والقران والسكان بشكل عام	✓		
5	يشكل المشروع أولوية اقتصادية وإحصائية لسكان المنطقة	✓		
6	يساعد المشروع في تخفيف العبء الاقتصادي في التكاليف الكبيرة من أجل الحصول على مياه الشرب	✓		
7	تقلل المشروع ويساهم في رضا المجتمع بشكل عام وبالتالي يعزز من دعمه من قبل أفراد المجتمع	✓		
8	أي آثار إيجابية أخرى لتوقعها	✓		

المشروع في إطار توفير الطاقة المتجددة في اليمن - المرحلة الثانية استكمال جدول الأعمال واستخدام الطاقة الشمسية			
اسم البوابة	خالد سالم عبد الله بالبحرول	التاريخ	16 يناير 2023
اسم المنشأة (القرى)	بئر السوم 4	البلدية	مديرية السوم
حضرية	محافظة	محافظة	حضرية

من أهداف المشروع الرئيسية توفير الطاقة المتجددة لتشغيل الآبار المستخدمة لتوفير مياه الشرب للسكان في المناطق الريفية وشبه الحضرية في اليمن واستخدام الطاقة الشمسية كبديل مستدام للطاقة ونقل استخدام الوقود التقليدي وبالتالي تخفيف التكاليف التشغيلية والتلوث عن استخدامه. يتلخص من هذا العمل تحسين حياة ومعيشة السكان في المناطق المستهدفة وتوفير مياه الشرب بشكل مستمر وتقليل على العراق المتحللة بتوفر الوقود وتلوث أسوأ.

على ضوء ما تقدم تم تزويد البئر المشكورة أعلاه كأحد المشاريع القرية والتي سيتم فيها توفير منظومة طاقة شمسية لتشغيل البئر لغرض توفير مياه الشرب وخدمة سكان المنطقة.

ويطلب يرجى إكمال الاستبيان أدناه لما فيه المساعدة العامة ويمكن عدم كتابة أي بيانات غير مرغوب في تعبئتها.

بيانات الشخص المشارك في الاستبيان (جميع البيانات اختيارية)	
الاسم	لويزم فخرين سالم عبيد
الجنس	نكر
العنوان	قرية السوم - عزلة الغدول - مديرية حيفر موريت
الهاتف	رقم الهاتف (اختياري) 77 9029888

رقم	الآثار الإيجابية المتوقعة من تنفيذ العمل المتخطط ما مدى موافقتك على ما يلي:	موافق	غير موافق	لا أعرف
1	استخدام الطاقة الشمسية سيقلل من تكلفة المياه المستخدمة لتصبح المياه المتوفرة في قبة الوقود (البترول)	✓		
2	يساعد استخدام الطاقة الشمسية في تيسير حياة مزارعي المنطقة من خلال توفير مياه الشرب في المناطق النائية أو ارتفاع أسعارها	✓		
3	يساعد استخدام الطاقة الشمسية في الحفاظ على البيئة والحد من التلوث	✓		
4	يساهم المشروع في التخفيف من معدلات التآكل والقران والسكان بشكل عام	✓		
5	يشكل المشروع أولوية اقتصادية وإحصائية لسكان المنطقة	✓		
6	يساعد المشروع في تخفيف العبء الاقتصادي في التكاليف الكبيرة من أجل الحصول على مياه الشرب	✓		
7	تقلل المشروع ويساهم في رضا المجتمع بشكل عام وبالتالي يعزز من دعمه من قبل أفراد المجتمع	✓		
8	أي آثار إيجابية أخرى لتوقعها	✓		

رقم	المخاوف المتوقعة من تنفيذ العمل المتخطط ما مدى موافقتك على ما يلي:	موافق	غير موافق	لا أعرف
1	هل سيقلل المشروع من زراعتهم اعتماداً على توزيع المياه أو الموارد أو كميات المياه المتوفرة؟	✓		
2	هل سيقلل المشروع من إنتاجهم من المحاصيل أو حركة العمل في مجال الزراعة بشكل عام؟	✓		
3	هل سيقلل المشروع من إنتاجهم من المحاصيل أو الفواكه والتي قد تسبب في تدهور المنطقة؟	✓		
4	هل سيقلل المشروع من إنتاجهم من المحاصيل أو الفواكه والتي قد تسبب في تدهور المنطقة؟	✓		
5	هل سيقلل المشروع من إنتاجهم من المحاصيل أو الفواكه والتي قد تسبب في تدهور المنطقة؟	✓		
6	هل سيقلل المشروع من إنتاجهم من المحاصيل أو الفواكه والتي قد تسبب في تدهور المنطقة؟	✓		
7	هل سيقلل المشروع من إنتاجهم من المحاصيل أو الفواكه والتي قد تسبب في تدهور المنطقة؟	✓		
8	أي مخاوف أخرى يمكن تصورها	✓		

رقم	المخاوف المتوقعة من تنفيذ العمل المتخطط ما مدى موافقتك على ما يلي:	موافق	غير موافق	لا أعرف
1	هل سيقلل المشروع من زراعتهم اعتماداً على توزيع المياه أو الموارد أو كميات المياه المتوفرة؟	✓		
2	هل سيقلل المشروع من إنتاجهم من المحاصيل أو حركة العمل في مجال الزراعة بشكل عام؟	✓		
3	هل سيقلل المشروع من إنتاجهم من المحاصيل أو الفواكه والتي قد تسبب في تدهور المنطقة؟	✓		
4	هل سيقلل المشروع من إنتاجهم من المحاصيل أو الفواكه والتي قد تسبب في تدهور المنطقة؟	✓		
5	هل سيقلل المشروع من إنتاجهم من المحاصيل أو الفواكه والتي قد تسبب في تدهور المنطقة؟	✓		
6	هل سيقلل المشروع من إنتاجهم من المحاصيل أو الفواكه والتي قد تسبب في تدهور المنطقة؟	✓		
7	هل سيقلل المشروع من إنتاجهم من المحاصيل أو الفواكه والتي قد تسبب في تدهور المنطقة؟	✓		
8	أي مخاوف أخرى يمكن تصورها	✓		

Annex 6 Site Specific Data and Wells Details

To reduce the ESMP file size and number of pages; the wells details, layout and photos can be accessed via the below link:

[Water Wells Solar Pumping Systems ESMP - Annex 6 Site Specific Data and Wells Details](#)