



Project Name	Scope of Work	Duration	Name of Client & Country of Assignment
<p>Consultancy Services for Assessing and Managing the Use of Groundwater Resources and Developing a Strategy and Policy for Sustainable Development and Management of Groundwater Resources in Uganda</p>	<ul style="list-style-type: none"> • Undertake a detailed assessment of the availability (quantity and quality), distribution and demand for groundwater resources in different hydrogeological terrains in Uganda; • Identify threats and pressures and assess potential impacts of human activities and climate change on groundwater resources, both spatially and in time, including mapping of hot spot locations where key extreme pressures are likely to be experienced • Propose strategies to address the identified threats and pressures so as to ensure sustainable development, protection and management of groundwater resources in Uganda to support various activities • Develop guidelines, strategy and policy for holistic and sustainable development, protection and management of groundwater resources in Uganda. 	<p>Oct.2021 - ongoing</p>	<p>Ministry of Water and Environment Uganda</p>
<p>Assessing the National Groundwater Resources through Data Collection and Field Assessment Campaign of Groundwater resources across Lebanon</p>	<ul style="list-style-type: none"> • Conducting a comprehensive survey of all public and private wells of Lebanon; • Establishing a nationwide database of Hydrogeological data including wells; • Conducting a 1-year well monitoring programme; • Reassessment of the country's groundwater resources by basin in light of the recent studies performed in the last forty years (i.e. since UNDP assessment of 1970); • Conducting a preliminary assessment of the potential for artificial recharge in Lebanon; and • Constructing a groundwater flow model for Akkar Quaternary Aquifer. 	<p>Oct.2011 Apr.2014</p>	<p>United Nations Development Programme (UNDP) Lebanon</p>
<p>Hydrogeological Study and Groundwater modelling – Strategic Water Storage and Recovery Project – Liwa, Abu Dhabi, United Arab Emirates</p>	<p>The Project Consisted of establishing a water reserve of about 25 MCM in the aquifer (by constructing an ASR system), to supply the city of Abu Dhabi for a period of 90 Days in case of an emergency. The project includes the installation of three recharge basins, 315 recovery wells, and 120 monitoring wells. ELARD involvement covers the hydrogeological study and the numerical groundwater simulations required for the overall hydrogeologic assessment of the ASR system. The ultimate aim of the hydrogeological study and numerical groundwater simulations is to optimize the efficiency of the recharge,</p>	<p>May.2011 May 2020</p>	<p>ADWEA (Abu Dhabi Water and Energy Authority)/ United Arab Emirates</p>

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	<p>storage, and recovery operations. The hydrogeological and modelling studies are being carried on both during the Plant Construction and Plant Operational Phases. Key objectives of the hydrogeologic and modeling studies are:</p> <ul style="list-style-type: none"> • the proper characterization and conceptualization of the hydrogeological system before any storage and recovery operations • evaluation of the all the groundwater system related information that will be produced during the ASR Project, • Building and updating the numerical groundwater model as a tool for the identification of the impact of the ASR activities, in terms of groundwater level changes, expansion/contraction/migration of the desalinated sea-water (DSW) plumes • Evaluation of the mixing processes, and groundwater quality changes • Optimization of the groundwater recharge and recovery schemes • Environmental Impacts Assessment of the SAR. 		
National Water Sector Strategy Update - Irrigation Sector	<ul style="list-style-type: none"> • The scope of work of the Consultant is to study the irrigation sector and conclude the prioritized action plans in line with the Ministry's strategic objectives, in the following Mouhafazat: • Aakkar and North Lebanon, • Mount Lebanon, and • Beqaa and Baalbek-Hermel. • The scope of work entails the following actions: • Data collection of executed, ongoing and planned projects related to irrigation through the past 10 years (infrastructure, water resources, storage structures..) • Data collection about irrigation schemes (agricultural and irrigated areas, agricultural types, water resources, network) • Assessment of the water balance of schemes by the estimation of water supply and irrigation requirements, • Recommending the priority projects per scheme and the Capital Investment till the horizon 	May 2019 Dec 2019	KREDO / UNICEF (Funding Agency)-Lebanon
Water resources management (IWRM) analysis and inventory of 12 Palestine	<ul style="list-style-type: none"> • This study is based on a review of existing studies and data provided by UNRWA, stakeholder meetings, and site visits. 	Mar.2017 Sep.2017	UNRWA



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refugee camps and adjacent areas of Nahr El Bared	<p>The objectives of the assessment, which were defined at the proposal stage and further refined during client meetings, are summarized as follows:</p> <ul style="list-style-type: none"> • Characterize the existing water resources in terms of quality and quantity; • Characterize the existing infrastructure; • Identify current and future water requirements of the 12 Palestinian Camps; • Check potential polluting sources; • Assessment of the potential use of renewable energies as part of green solutions application to the water sector such as PV; • Propose scenarios for addressing the identified needs. 		
Irrigation Master Plan for the Beqaa Water Establishment (BWE)	<ul style="list-style-type: none"> • Conduct Initial Investigations and Schedule Review • Review and Update Existing Agricultural and Irrigation Information • Update and Complete an irrigation Assets survey • Estimate Irrigation Water demand and Water Balances • Recommend Specific Improvements, Take-Over Action Plans and Estimated Capital Costs • Develop and Asses Strategic Alternatives for BWE Irrigation Water Sector Management • Prepare Irrigation Water Master Plan and Conduct Reviews 	Feb.2018 Oct.2019	DAI-LWP-Lebanon
Hydrogeological study to Locate Groundwater Resources for the Area of Tripoli	<p>Phase 1</p> <ul style="list-style-type: none"> • Delineate the study area covering the Tripoli Caza and Hraiche village (part of the Koura Caza) and Beddaoui village (part of the Minnieh-Dannieh Caza) as neighboring villages; • Assess the status of existing public wells and springs supplying the study area with water; and • Assess groundwater resources through geological and hydrogeological field and desk work. <p>Phase 2</p> <ul style="list-style-type: none"> • Analyze the population distribution within the study area collected from previous studies and compare it with various sources of data; • Prepare a water demand study covering all zones to assess 	Dec.2017 Sep. 2019	North Lebanon Water Establishment (NLWE)-Lebanon



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	<p>sustainability of the current water sources on the short, medium and long term. This means demand forecasting over at least 15 years;</p> <ul style="list-style-type: none"> • Assess water storage needs and their geographic distribution for all terms for zones experiencing shortage in water; • Prepare Phase 2 report, which includes the results of the population survey and water demand. This report will then provide recommendations on proposed groundwater exploitation scenarios to satisfy water demand in the water deficient zones as well as estimates on the expected yields from wells in those areas; • Propose well locations and suitable reservoirs and rank them based on relative priorities for each term. It should be noted that proximity to roads and public lands is taken into consideration when positioning new water network features; and • Propose suitable changes to the connections between existing reservoirs, sources and distribution lines. <p>Phase 3</p> <ul style="list-style-type: none"> • Locate the 15 wells to be constructed as prioritized by NLWE; • Provide a detailed study for each proposed well that includes field investigations for the presence of any public and private wells at each location; • Prepare well designs, Bills of Quantities, technical specifications, schedules and tender documents for each water supply well in accordance with local rules and regulations; and • Cadastral certificate and topographic maps for target plots for the proposed wells and reservoirs.. 		
Update of the National Agriculture Strategy of the Kingdom of Saudi Arabia	<ul style="list-style-type: none"> • Conduct a sector wider assessment of the agriculture sector • Synthesize agricultural sector challenges and opportunities • Update existing list of improvement initiatives across the agriculture sector supply chain • Support in developing the future institutional setting of the agriculture sector taking into account major ongoing reforms including the restructuring of MEWA and establishment of the agriculture services company and Saudi Irrigation Organization 	Oct.2017 Mar.2018	Booz Allen Hamilton, contracted by the KSA's Ministry of Environment, Agriculture, and Water

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	<ul style="list-style-type: none"> • Review and recommend other key enablers for sustainable sector growth including financing sources and private sector participation opportunities, legal and regulatory changes, research and technology development, and human capabilities and awareness buildup • Consolidate strategic programs and initiatives into a phased implementation roadmap • Review and update the proposed governance and performance monitoring mechanisms for the strategy and related communication plan 		
Update of the National Irrigation Strategy of the Kingdom of Saudi Arabia	<ul style="list-style-type: none"> • Developing the baseline for the irrigation sector in KSA • Benchmarking comparable entities • Defining the mandate of Saudi Irrigation Organization (SIO) • Articulating the Kingdom's irrigation strategy • Developing a high level business model and an operating model for SIO • Developing the strategy implementation roadmap 	Aug.2017 Dec.2017	Booz Allen Hamilton, contracted by the KSA's Ministry of Environment, Agriculture, and Water (MEWA)
Hydrogeological Study of Akkar Caza and Assessment of Well Siting	<p>The study is divided into two (2) phases according to the terms of Reference (TOR) with the following scope of work:</p> <p>Phase 1</p> <ul style="list-style-type: none"> • Perform a detailed population survey within the Akkar Caza; • Prepare a water demand study for zones experiencing water shortage and/or requiring independent water supply networks in the Akkar Caza; • Assess the groundwater resources through geological and hydrogeological field and desk work; • Prepare Phase 1 report, which includes the results of the population survey and water demand on the one hand and the geologic and hydrogeologic assessment on the other. This report will then provide recommendations on proposed groundwater exploitation scenarios to satisfy water demand in the water deficient zones as well as estimates on the expected yields from wells in those areas. <p>Phase 2</p> <ul style="list-style-type: none"> • Locate the wells to be constructed as prioritized by NLWE; • Provide a detailed study for each proposed well that includes a 1000 meters radius of field investigations for the presence of any public and private wells at each location; 	Jul.16 Feb.17	North Lebanon Water Establishment (NLWE)

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	<ul style="list-style-type: none"> • Prepare expropriation files for each designated public water well; • Prepare designs, technical specifications, and tender documents for each water supply well in accordance with local rules and regulations. 		
Hydrogeological Study - Well Survey In Priority Caza	<p>Hydrogeological Assessment of 4 cazas: (Zahle, Minieh-Dannyeh, Marjehyoun, and Rachaya) Which include:</p> <ul style="list-style-type: none"> • Well Survey and Sampling • Water Balance Assessment of the Various Aquifers • Aquifer Pollution Assessment • Identifications of unstressed Aquifer Zones for further exploitation. 	Sep.16 Jan.17	United Nations International Children's Emergency Fund (UNICEF)
Water resources assessment to supply water for 4 towns (3 in north governorate and 1 in Bekaa governorate)	<p>Hydrogeological Assessment of 4 cazas: (Aley Baabda, Baabda, and West Bekaa, Which include:</p> <ul style="list-style-type: none"> • Well Survey and Sampling • Water Balance Assessment of the Various Aquifers • Aquifer Pollution Assessment • Identifications of unstressed Aquifer Zones for further exploitation. • Location and Design of proposed wells 	Jul.16 Jan.17	United Nations High Commissioner for Refugees (UNHCR)
Hydrogeological Study of Akkar Caza and Assessment of Well Siting	<ul style="list-style-type: none"> • The study is divided into two (2) phases according to the terms of Reference (TOR) with the following scope of work: <p>Phase 1</p> <ul style="list-style-type: none"> • Perform a detailed population survey within the Akkar Caza; • Prepare a water demand study for zones experiencing water shortage and/or requiring independent water supply networks in the Akkar Caza; • Assess the groundwater resources through geological and hydrogeological field and desk work; • Prepare Phase 1 report, which includes the results of the population survey and water demand on the one hand and the geologic and hydrogeologic assessment on the other. This report will then provide recommendations on proposed groundwater exploitation scenarios to satisfy water demand in the water deficient zones as well as estimates on the expected yields from wells in those areas. <p>Phase 2</p> <ul style="list-style-type: none"> • Locate the wells to be constructed as prioritized by NLWE; 	Jul.2016 Feb.2017	North Lebanon Water Establishment (NLWE)- Lebanon

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	<ul style="list-style-type: none"> • Provide a detailed study for each proposed well that includes a 1000 meters radius of field investigations for the presence of any public and private wells at each location; • Prepare expropriation files for each designated public water well; • Prepare designs, technical specifications, and tender documents for each water supply well in accordance with local rules and regulations. 		
Assistance in Field Reconnaissance for the Artificial Recharge project	<ul style="list-style-type: none"> • Drilling supervision of the first mud drilling technology used in Lebanon to drill up to 230 meters. Provided training and technical guidance to the drilling contractor. • Assistance to Field reconnaissance survey for MAR. • Supervision of the first successful well drilling using mud technology in Lebanon. 	Apr.17 Feb.18	Acacia Water
Assessment of River Gauging Stations In Lebanon	<ul style="list-style-type: none"> • Assess the status of the 71 installed surface gauging stations as well as the 90 predefined measurement locations and propose new locations for additional gauging stations among the predefined measurement locations along the Lebanese rivers and their main tributaries. • This consultancy entailed: <ul style="list-style-type: none"> – Collection of all the necessary data regarding the location of the 71 existing surface gauging stations as well as the locations of the 90 predefined measurement sites, identification of the type of existing measurement stations, the brands, the capacity, and the date of installation and identification of potential locations for new gauging stations; – Field investigation for the 71 surface gauging stations and to the 90 predefined measurement locations in order to identify their physical status as well as their operational conditions; – Organization of all survey results in a user-friendly, GIS-supported database; – Classification of all the validated sites and their attributes in the datasheet and then uploaded and integrated into a 	Jun.2016 Feb.2017	DAI – LEBANON WATER PROJECT/Lebanon

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	<p>Geographic Information System (GIS) georeferenced using both the stereographic projection corrected to Lebanon and the WGS 84 and thus to correspond with the requirements of the LRA;</p> <ul style="list-style-type: none"> - Assessment of available and collected data upon completion of the data collection and field validation. • The assessment covered the following: <ul style="list-style-type: none"> - Evaluation of the suitability of the sites; - Suitability and condition of the equipment; - Analysis of the historical data; - Coverage of the network; - Suitability of the current software used for data collection and management; - Assess the capacity of existing staff and eventual needs for capacity building and training; - Assess the need for expansion of the gauging network cover locations that used to host stations before the civil war or where water courses or springs gauging is deemed necessary. • The Assessment Report included: <ul style="list-style-type: none"> - GIS database for the gauging stations and measurements points; - Results of the findings from the data collection and the site inspection to each existing gauging station and assess its suitability in obtaining reliable data; - Recommendations of upgrades needed as well as requirements, corrective measures, and recommended upgrades with estimated costs to meet LRA and LWP requirements; - Identification and location of proposed new gauging stations, to ensure proper coverage of all the rivers courses and potentially major streams; - Conceptual design for the preparation works required for the installation of the gauging device in each station; 		

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	<ul style="list-style-type: none"> - Technical specifications and cost estimation for the construction/rehabilitation of the gauging station along with the monitoring equipment to be installed in each station, taking into consideration the newly acquired equipment; - Detail procedures for the setup of the equipment and flow measurement procedures for initial calibration system; - An operational and maintenance manual to ensure the continuous acquisition of reliable data; - Advice on need to upgrade existing software used by LRA; - Advice on need for capacity building for LRA Staff related to software upgrade and data acquisition, transmission and keeping. 		
Set-up of Surface Water and Groundwater Monitoring System within the Litani River Basin	<ul style="list-style-type: none"> • Determining Locations of surface water monitoring stations; • Installation of surface monitoring stations and training LRA staff; • Determining locations of groundwater monitoring stations; • Preparing TORs of well drilling; • Supervision of well drilling; • Installation of groundwater monitoring stations and training LRA staff; • Suggesting further capacity building for water monitoring 	Mar.2011 Aug.2012	International Resource Group (IRG)/Lebanon
Groundwater Modeling in Upper Litani Basin	<ul style="list-style-type: none"> • Hydro-geological Model Conceptualization • Initial Model Setup: • Model Calibration and Sensitivity Analysis • Model Simulation and Predictions • Capacity building and Training 	Jan.2013 Jan.2014	International Resources Group (IRG)/Lebanon
Preparation of a Business Plan for Combating Pollution of the Lower Litani Basin	<ul style="list-style-type: none"> • Information Review, Data Collection and Assessment consisting of: extensive field surveys for pollution sources, wells and springs; assessment or mapping in addition to water quality sampling and analysis. • Development of an environmental database based on GIS platform. • Drafting of a Business Plan • Analytical diagnosis of pollution pressures 	Feb.2018 Apr.2019	Council for Development and Reconstruction (CDR)/Lebanon

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	<ul style="list-style-type: none"> • Assessment of possible solutions or mitigation measures • Examination of the Enabling Environment for the Preferred Response(s) per Pressure • Consultation workshop 		
Preparation of a Business Plan for Combating Pollution of the Qaraon Lake, Lebanon	<ul style="list-style-type: none"> • Information Review, Data Collection and Assessment consisting of: extensive field surveys for pollution sources, wells and springs; assessment or mapping in addition to water quality sampling and analysis. • Development of an environmental database based on GIS platform. • Drafting of a Business Plan • Analytical diagnosis of pollution pressures • Assessment of possible solutions or mitigation measures • Examination of the Enabling Environment for the Preferred Response(s) per Pressure • Consultation workshops Analytical diagnosis of sources • Assessment of possible solutions or mitigation measures 	Jul.2010 Jun.2011	United Nations Development Programme (UNDP)/Lebanon
Consultancy Services for Flood Risk Management and Prevention in Baalback-Hermel	<ul style="list-style-type: none"> • Collecting, providing, generating, preparing and Analyzing all needed meteorological, geographical and hydrological data for the target region including information about topography, soil types and characteristics, land cover, soil erosion sensitive areas and available climatic data • Assessing and studying the watershed that affects the Ras Baalback/Aarsal region, proposing appropriate flood management measures including hydraulic structures (ponds, canals and check dams) and preparing the detailed design and the specification of technical details for these structures. • Supervising the execution phase of all the flood management measures including field work and proposing technical measures and cost-estimates required for the maintenance and protection of the proposed flood management structures • Assisting the project team in capacity building (trainings or other) and awareness raising activities of target communities and the general public. 	Oct.2009 Jan.2013	United Nations Development Programme (UNDP)/Lebanon

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Environmental and Social Impact Assessment Study for the Beirut Awali Water Conveyor Project	<ul style="list-style-type: none"> • legal and Institutional Framework; • Analysis of Alternatives; • Environmental and Social Baseline; • Public Participation, and consultations meetings; • Environmental and Social Impacts Assessment; • Environmental and Social Management Plan (ESMP) including mitigation, monitoring, and institutional strengthening-capacity building and training; • The Resettlement Action Plan (RAP) identifies all the impacts on the residence, economic activities and assets caused by acquisition of land. The RAP identifies people affected by the project, describes the nature and scale of the impacts, identifies the mitigation measures to be taken and specifies the legal and institutional framework responsibilities that, together, will ensure that all losses incurred by the taking of land or imposition of other restrictions are fully compensated and do not face any kind of diminution of livelihoods or assets. 	Mar.2010 Aug.2010	Council for Development and Reconstruction (CDR)/Lebanon
Design of the Construction Changes for the Installation of the Multipara meter Probes for the Project Entitled "Protection of Jeita Spring, Lebanon"	<ul style="list-style-type: none"> • Design of the System; this task includes the design of the system including installation procedures and the concept of constructional changes. • Installation of the Probes, telemetry and cables. Installation of the Multi parameter probes and telemetry units in the 5 sites, including programming and testing. • Training; This task consists of training of 3 persons at Dbaye treatment plant concerning data download and telemetric data transfer 	Apr.2010 Jul.2010	Federal Institute for Geosciences and Natural Resources (BGR)/Lebanon
Optimization for Sustainable Water Resources Management (OPTIMA)	<ul style="list-style-type: none"> • Characterization of lower Litani River Basin • Development and calibration of decision-support system for optimal water allocation • Participation in regional meetings with project partners and contribution to all aspects of the project • Performance of a comparative review of the case studies on river basins in 11 countries and preparation of a lessons- 	Jul.2004 Jul.2007	European Commission 6th Framework Program/Lebanon

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	<p>learned report</p> <ul style="list-style-type: none"> • Participation in project dissemination activities 		
Hydrogeology and Water Resources Assessment of Naba'a Tasseh Basin	<ul style="list-style-type: none"> • Geologic and geomorphologic mapping • Hydrological and hydrogeological investigation, including well survey • Basin monitoring • Groundwater levels • River and spring discharges • Water quality and monitoring • Surface water flow gauging • Aquifer Testing and tracer testing • Development of a GIS database • Development of hydrogeologic model and water balance for basin • Application of a specialized groundwater vulnerability method for karstic aquifers using a GIS • Pollution risk assessment, mitigation and prevention • Analysis of alternatives for optimizing the exploitation Nabaa Tasseh water resources and adequate basin management 	Oct.2004 Oct.2005	Council for Development and Reconstruction – Funded by Agence Francaise de Developpement/Lebanon
Integrated Water Resources Management in the Southern Lebanese Coast	<ul style="list-style-type: none"> • Assessment of water resources in the study area in both quantitative and qualitative aspects • Review of legal and institutional frameworks related to water resource management in the study area • Organization of stakeholders meetings to promote cooperation and consensus during strategy formulation • Survey of pollution sources in Damour River Basin • Review of the role of economic instruments in water resource management • Preparation of an integrated water resource management plan for the pilot municipalities • Identification of sustainability indicators to be used by the municipalities for monitoring water resource management activities 	Oct.2002 Oct.2003	Regional Activity Centre, Priority Actions Programme (UNEP-RAC/PAP), Split, Croatia/Lebanon



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Comprehensive Hydrogeological Study for the Jabel El Knaisih and water resource assessment for Nestle water bottling factory (Sohat Factory)	<ul style="list-style-type: none"> • Detailed Geological Mapping at a scale of 1/10,000 • Well survey • Basin delineation and Water balance analysis • Conceptual Hydrogeological modelling of the Entire Basin • Tracer Test Analysis • Well Location Design, and Construction Supervision • Aquifer testing • Water sampling and analysis • Spring Discharge measurements • Aquifer Vulnerability Study • Aquifer pollution risk analysis 	Jun.2002 Oct.2003	Nestlé- Water/ Société des Eaux Minérales du Liban/Lebanon