



وزارة البيئة والمياه والزراعة  
Ministry of Environment Water & Agriculture

المملكة العربية السعودية Kingdom of Saudi Arabia



*Empowered lives.  
Resilient nations.*

## **UNDP Project Document**

Capacity Development and Related Services for an Integrated Sustainable Development and Management of the Water Sector in

# **the Kingdom of Saudi Arabia in the Framework of the VISION 2030**

**Project Number: SAU10/107888**

**Implementing Partner**  
**Ministry of Environment, Water and Agriculture**  
**(MEWA)**

**Start Date: 1/3/2018**

**End Date: 28/2/2022**

**Jumada Al-Awwal 1439 - February 2018**

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

*In the name of Allah, the most  
beneficent, the most merciful*





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## Project Title

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**PAC Meeting date: 11/12/2017**

### Brief Description

The project aims at strengthening and optimizing the technical and organizational capacities of the MEWA with respect to water resources and water supply management of the Kingdom. With the increase in tasks attributed to the MEWA and the concomitant increase in the portfolio, the MEWA personnel must be trained to meet the new challenges. The cooperation with UNDP and its provision of international experts for project work and capacity development is expected to ensure that the capability of the MEWA meets the highest standards to carry on all tasks at the best possible level.

**Contributing Outcome (UNDAF/CPD, RPD or GPD):**

Improved management of non-oil natural resources and preservation of culture and heritage

**Indicative Output(s):**

National capacities developed for better management of non-oil natural resources

**Total resources required:** SAR 93,189,108.75  
equivalent to  
US\$ 24,850,429.00

### Total resources allocated:

<b>UNDP TRAC:</b>	
<b>Government:</b>	US\$ 24,850,429.00
<b>In-Kind:</b>	0
<b>Unfunded:</b>	0

### Agreed by (signatures):

<b>Government (MEWA)</b>	<b>UNDP</b>
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Eng. Abdulrahman Abdulmohsen Al Fadley  
Minister of Environment, Water and Agriculture

Dr. Ashok Nigam  
UNDP Resident Representative

**Date:** .....

**Date:** .....



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## Section 1: Development Challenge

### Section 1.1: History and Present Situation

In recent years, the Kingdom of Saudi Arabia has undertaken enormous efforts to save and protect one of its most precious resources, water, and to ensure a high-quality and lasting supply with water for all purposes for its population. The basis for this was a National Water Plan, which has been updated in 2017. Within this updated plan (Saudi National Water Strategy 2030, Strategy Definition Report), a series of strategic programs and initiatives have been formulated, many of which shall be implemented in cooperation with UNDP according to the present proposal.

A water-saving campaign addressed domestic and non-domestic consumers and led to a significant per-capita water consumption reduction. This saving campaign combined a public awareness program with strict regulatory measures and the pricing of water to reflect its strategic importance and scarcity. Guidelines were developed for the agricultural sector in order to reduce water-intensive crops but simultaneously maintain the basic nutrition demands of the population.

The then Ministry of Water & Electricity (MoWE) had institutional and governmental responsibility for these reforms in the water sector, while the then Ministry of Agriculture (MoA) was responsible for the additional tasks. To ensure adequate water supply, the MoWE initiated a variety of additional measures (operational side). Desalination capacities were greatly enhanced, the reuse of wastewater was initiated, and the few capacities expanded. Surface water was recognized as a successively important natural resource and initiatives were started to exploit increasingly this natural resource.

During the last years, the MoWE initiated an ambitious program for the investigations of its major surface and groundwater resources, for the monitoring of these resources, for the study of hydrological resources (research side), and for the management of the resources (management side). While most of these tasks have been completed or are about to come to an end, the implementation of most of the necessary measures is in its very early stages and hampered by the increasing workload in the ministry.

Concomitantly, the Saudi government initiated the privatization of key sectors in the water business in order to increase the efficiency of these sectors and to reduce costs. This was accompanied by administrative reorganizations to adjust the governmental institutions to the changing challenges and responsibilities. The latest of these measures led to the foundation of the now Ministry of Environment, Water & Agriculture (MEWA). Internationally, Saudi Arabia wholeheartedly supports the UN goals of environmental protection and a sustainable dealing with natural resources.

However, the still rapidly increasing population mainly counteracts the successes the Saudi government and MEWA have achieved in sustainable resources water management through its reforms. In addition, newer and more precise predictions of the effects of climate change indicate that Saudi Arabia will be affected more than had been assumed only a decade ago. Together with the recognition that the sole dependence on hydrocarbons as the major income for the nation may have adverse effects, the Saudi government has implemented an ambitious program to transform Saudi Arabia into a more flexible and diversified society with its **VISION 2030**.



In meeting Vision 2030 goals the Kingdom of Saudi Arabia and, specifically, in this case, the Ministry of Environment Water and Agriculture are keen to meet all of the **SDG** goals especially as pertains to this project in terms of water in Goal 6: Clean Water and Sanitation, Goal 11: Sustainable Cities and Communities, Goal 12: Responsible Consumption and Production and, Goal 13: Climate Action

## Section 1.2: The Challenge

Saudi Arabia with its almost 2.2 Million km<sup>2</sup> is among the driest countries in the world. It is dominated by an arid climate, only in the southwestern parts semi-arid conditions prevail. Although several desalination plants have been built and several are under construction, water supply still dominantly is provided by groundwater. As under the present climatic conditions, groundwater recharge is negligible, the abstraction of groundwater is *groundwater mining*. Given that the present population of around 32 Million is supposed to increase to almost 40 Million over the next two decades, and given that the per capita water consumption is far above the OECD average, one of ***the most prominent challenges of Saudi government policies is the sustainable water supply of all urban, agricultural, and industrial sectors of Saudi Arabia over the next decades.***

## Section 1.3: Rationale and Justification

Recognizing the social and economic importance of this challenge, several strategic tasks were identified that shall answer the challenge of still increasing needs for sustainable water supply in all sectors of the society and the effects of accelerating climatic change:

1. Capacity development and institutional adaption to the amplification of MEWA's responsibilities and tasks;
2. Development and implementation of an all-encompassing "Water Resources Management System";
3. Development and implementation of an all-encompassing "Water Supply Management System" with the ultimate goal of securing water supply in normal times and stress situations;
4. Development of strategies to mitigate and counter the effects of climate change (increasing rainfall with flash flood risk while taking advantage of the additional potential water resources);
5. Consideration of surface water as a supplementary strategic reserve and its exploitation;
6. Investigation of the exploitation potential for secondary groundwater resources and resources in remote areas and provision of the infrastructure necessary;
7. Amalgamation of the existing databases and database systems plus adaption to the increasing portfolio of the MEWA.

With a rapidly growing population of presently close to 32 million, the Kingdom of Saudi Arabia faces a number of challenges including growing urbanization and environmental change. While urbanization poses great pressure on regional water and sewage infrastructure and bears pollution risks, environmental challenges include depletion of aquifers and increasing torrential flood risks. Earning relatively high annual revenues from natural resources, Saudi Arabia has invested heavily in development and upgrading infrastructure during the past few decades, including in water and sewage infrastructure, road networks, housing, hospitals, and schools.



Due to MEWA's recent initiatives, efficient water use and governance in the municipal and irrigation subsector, reuse of wastewater and exploitation of shallow aquifers caused significant reduction of groundwater abstractions.

Nevertheless, a set of bolstering measures towards sustainable water supply even in stress and emergency situations and minimizing the climatically induced environmental risks needs to be formulated. These actions or interventions simultaneously should target the supply side; curtail water demands in various productive sectors; and mitigate the environmental risks.

However, to make a transition from the current patterns of water administration to sound water management mode, **two things must happen**. First, there is strong need to strengthen the technical and organizational capacities of the MEWA to deal with the triple challenge of water exploitation and distribution (operational side), research for additional resources and cutting-edge technologies to satisfy the increasing demand (research side), and rigid control and administration of all water-related aspects (control side). Second, a sound information base covering data on groundwater availability, quality, withdrawal, and usage is about to be put in place.

The transformation of this information into an all-encompassing water resources management requires sustained long-term efforts, especially since the MEWA has limited capacity and experience in this field. It needs to go a long way in terms of development and strengthening its technical capacities in order to be able to meet its mandates. This program has been designed to initiate a systematic process of capacity development to help in sustainable development of water resources and management of water-related affairs in the Kingdom to ensure permanent and sufficient supply.

## Section 2: Strategy

### Section 2.1

The present project builds upon the work that either has been completed or is currently being carried out by the MEWA, especially in relation to the formulation of the **VISION 2030**. With the necessities to comply with the timeframe and goals of the **VISION 2030** and the corresponding **Initiatives 2020**, the responsibilities and the workload of the MEWA were considerably enlarged, often into subjects that hitherto have not been the core business of the ministry. Simultaneously, the water-related necessities of all sectors of the society are also increasing.

MEWA's Vision to comply with all these goals is the creation of a Water Management and Control Center (**WMCC**). In this center, nationwide strategic decisions will be made on the highest administrative levels, based on accumulated knowledge and the most recent economic and technical achievements. Real-time actions can then be implemented immediately, including emergency situations. Real-time decisions in parts are facilitated by the **Integrated Water Information System (IWIS)**, presently under development within the precursor program of this project proposal. The contributions of the proposed project to **WMCC** are described in the following.

The proposed project aims at complementing the efforts for **Vision 2030** and for **WMCC** in implementing national water management goals and objectives mentioned in Section 1 above. While recognizing the need to avoid duplication of efforts, it will contribute towards maximizing the impact



of all proposed interventions. In fact, this project will initiate a capacity development process that will gradually contribute to the technical and professional growth and development of the MEWA, and will enable it to steer the process of integrated water resources management plus regulation. For this very reason, it will establish effective coordination mechanisms with the work on the development of national water strategy and action plan. Moreover, it will ensure coordination with other relevant water sector activities implemented by other ministries and private development partners. Similarly, in its formulation it will attend to the recommendations emerging from the studies carried out under the auspices of a preceding UNDP project as well as other available studies.

## Section 2.2: Key Objectives

### Section 2.2.1: MEWA Capacity

*Strengthening and optimizing the technical and organizational capacities of the MEWA with respect to water resources and water supply management of the Kingdom*

With the increase in tasks attributed to the MEWA and the concomitant increase in the portfolio, the MEWA personnel must be trained to accomplish the new challenges. The cooperation with UNDP and its provision of international experts for project work and capacity development is expected to regain the capability of the MEWA of complying with all tasks at the highest possible level.

### Section 2.2.2: Implementation of IWIS

In the precursor project, the processes and data models of an integrated water resources management have been elaborated. These include processes from data acquisition through data processing (modeling) to implementation of a monitoring system for all steps up to the consumer end side. IWIS shall now be implemented step-by-step. After completion, this system will be a key for input in **WMCC**.

### Section 2.2.3: Integrated Water Resources Management

*Design of an overall Water Resources Management with implementation and enforcement*

Water Resources Management requires the knowledge about the available sources. For their evaluation, these resources have to be split up into renewable and non-renewable resources on the one side and into surface water and groundwater resources on the other side. With the known distribution of the resources and their renewal time, the resources can be modeled to obtain accurate values for their potential amount. Discretization of the potential amount according to e.g. water quality, reservoir depth, and distance to consumer will then provide the economically available amount. This discretization is the basis for allocation of water to different groups of consumers (domestic, agricultural, or industrial): the Water Supply Management. Section 2.2.4 describes the methodology required for constant update of the model.

### Section 2.2.4: Integrated Water Supply Management

*Design of an overall Water Supply Management System with implementation*

Water Supply Management requires the knowledge of all facilities that serve directly or indirectly for water supply to the different customers. In addition, this management must consider risks, whether natural or intentional, to the infrastructure and requires plans for emergency in the case of damage. In addition, the Water Supply Management will have to consider the optimal mix of different water



resources under economic aspects. As in Saudi Arabia water scarcity is the dominant factor in the entire water cycle, control of water distribution and abstraction is of prime importance. Hence, a rigid monitoring and licensing program must be implemented.

### **Section 2.2.5: Monitoring**

*Establishing an all-encompassing monitoring system for the surface water and groundwater processes*

System Earth and the processes involved in the water cycle are highly dynamic and, in Saudi Arabia, are not in equilibrium. Hence, the input and output parameters of the system have constantly to be monitored. On the input side, monitoring comprises natural recharge through precipitation and artificial recharge through wastewater infiltration or storage of desalinated water. On the output side, natural components are evaporation or evapotranspiration, surface run-off and discharge to the sea, while groundwater abstraction for water supply is a non-natural component. On the regulatory side, monitoring of evapotranspiration of agricultural activity will help in the enforcement of allocation quota. Hydrological monitoring is also a pre-requisite for activities mentioned in section 2.2.6.

### **Section 2.2.6: Climate Change**

*Assessing the effects of climate change on the society and nature not only in the water business*

According to recent regional climate models for the Arabian Peninsula, Arabia will experience a rise of up to 4°C of average annual temperature and locally an increase of around 20% rainfall annually. Individual rainfall events are predicted to become more intense and temporally less predictable with a wider spread of events over the year. The increase of rainfall intensity increases the risk of torrential floods originating in the upper wadis and propagating down-wadi towards either the coastal plain with its dense population or towards the Najd, where similarly high population densities are present. At the same time, increased rainfall is a potential source for additional water resources. Hence, a major challenge is the development of flood protection systems that at the same time can transform large amounts of surface water into a water resource. This latter point is also part of the task described in section 2.2.7.

### **Section 2.2.7: Secondary Water Resources**

*Evaluating comprehensively the potential of water resources hitherto not in the focus of water supply: secondary and remote aquifers, surface run-off and rainwater harvesting, large-scale reuse of wastewater for agricultural purposes*

Hitherto, groundwater abstraction focused on the easily accessible and prolific aquifers of the Kingdom. However, groundwater in considerable amounts is also present in smaller, sometimes more remote aquifers, or in aquifers, whose hydraulic parameters do not permit high abstraction rates per time. Developing these potential resources for future use requires novel economic and technological approaches. Similarly, the ever-increasing rate of treated wastewater production by far outpaces the concepts for its storage and reuse. In coastal areas, large amounts of well-treated water are disposed of in the sea. There is an urgent need to convert these amounts of water into potential and accessible resources, e.g. through artificial storage. Some of the problems of artificial recharge are discussed in section 2.2.8.





### **Section 2.2.8: Environmental Risk**

*Evaluating environmental risks associated with the water cycle (groundwater pollution, seawater intrusion, radioactive contamination) and elaborating counter measures*

While groundwater pollution through irrigation return has long been recognized and counter measures are known, pollution through improperly treated wastewater and its infiltration is a major challenge. While pollution through inorganic chemistry mainly can be handled, contamination with microbes and bacteria and its treatment is hardly understood, although it constitutes a major health risk. Coastal areas with a high density of population are prone to over-abstraction of groundwater from the shallow aquifers that discharge to the sea. Water in these areas is used for agriculture and for domestic supply. With increasing overdraft, the natural discharge is reversed and up-coning of saltwater leads to a rapid deterioration of aquifer quality. Concepts for mitigation or prevention of this phenomenon are missing. Radioactive contamination, mainly through  $^{228}\text{Rn}$ , is widespread in Saudi aquifers. Primary treatment through osmosis is a recognized counter measure; however, the resulting sludge has much higher concentrations of radioactivity. This mud is regularly not adequately disposed of. As the deposits in the vicinity of the treatment plants are accessible and not protected, they form a major health hazard.

### **Section 2.2.9: Hydrothermal Energy**

*Investigating the additional, water-inherent resources (hydrothermal energy, geothermal potential)*

With increasing depth, groundwater successively is warmed up through Earth's natural emission of heat. The inherent energy can safely be converted into electrical energy and used for cooling or otherwise. Shallow hydrothermal systems are available for temperatures above about 50°C, while true geothermal energy is produced with waters above 100°C temperature. This kind of environmental-friendly energy (no emissions, regenerative) is of special relevance for remote areas that otherwise would have to be supplied with hydrocarbon-based energy.

### **Section 2.2.10: Public Relation and Awareness**

*Establishing an Environmental Awareness Center for public awareness*

The recent water-saving campaign was a successful measure and led to a per-capita water consumption decline. However, in order to raise public awareness about the entire problematic situation of the water sector as outlined above and of the environment in general, an institution for educational purposes and for publicity should be established, "Environmental Awareness Center".

## **Section 3: Results and Partnerships**

### **Section 3.1: Expected Results**

#### **Section 3.1.1: Capacity Development**

With the delegation of several post-graduate students to foreign universities, the MEWA intends to raise the spectrum of disciplines that will be represented by its personnel. As not only natural sciences careers are envisaged for the students, but also economics, business management, and public relations and communications management, the MEWA will head towards an all-encompassing, integrated water-supply facility.





### Section 3.1.2: IWIS

IWIS is intended to be a system that provides visual oversight over data and that provides automated decision-making support on both end of the water sector chain (provider and customer). The steps required are set-up of the database system, development of visual interfaces and applications for all activities, and pilot projects for testing.

### Section 3.1.3: Integrated Water Resources Management

Water Resources Management heavily depends on the knowledge of available resources. As these cannot directly be measured, **modeling** is the method of choice to approximate available quantities.

1) Groundwater Modeling. To predict the effects of groundwater abstraction, for each of the major groundwater systems, an individual groundwater model has been developed during the past decade. In the next step, these models must be combined into an overall groundwater model for the entire Kingdom. In a second step, economic aspects have to be incorporated into the model such as water quality, depth of the resource, and distance to consumers, among others. With this additional information, groundwater management zones will be established that are the basis for water allocation to the different groups of consumers. For the interpretation of reservoirs, a 3D-visualization will transform the rather abstract GIS- and modeling outputs into a basis for the daily work.

2) Hydrological Modeling. Hydrological models describe all processes involved in the surface water cycle with the parameters rainfall, temperature, solar insolation, wind, evapotranspiration, run-off, infiltration, and groundwater recharge. In this project, the first purpose of hydrological modeling is the quantification of groundwater recharge through considering rainfall, infiltration, and evapotranspiration. The next step here required is a better delineation of recharge areas for the individual aquifers, as these partly overlap. The second purpose is predicting the effects of individual flash floods through constant monitoring of surface water processes. With the expected climatic change, peak floods will increase and hence, the intensity of flash floods. Knowledge about peak discharge is essential for planning proper flood-protection systems in the affected areas. The third purpose is the optimization of surface-water “harvesting” through providing the hydrological parameters for the planning of the corresponding infrastructure.

### Section 3.1.4: Integrated Water Supply Management

Integrated Water Supply Management requires an intimate knowledge of all facilities that serve water abstraction, distribution, and supply to the customers. A first step is a detailed categorized inventory of these facilities. With this inventory, gaps in the infrastructure can be recognized and Water Supply Management Zones (**WSMZ**) established. The inventory also serves for determination of the ideal supply mix within each WSMZ.

On the operational side, Water Resources Management includes the planning and maintenance of a distribution network to guarantee constant water supply. This system must consider times of peak consumption (summer, Hajj, Umrah), and major events that lead to a partial breakdown of the network.



### Section 3.1.5: Monitoring

Modeling strongly depends on input parameters; hence, an all-encompassing monitoring network is required.

Key components for hydrological parameters are rainfall gauges, runoff gauges, and weather stations, which are needed for groundwater recharge, flood risk assessment, and especially the monitoring of climate change. This network is tendered but may need optimization.

Groundwater modeling relies on observation wells providing constant records of water levels and hydrochemical parameters. This network needs to be strongly extended and technically upgraded to guarantee a continuous data production and transmission. Step one will be the identification of gaps in the network and planning of necessary wells; step two the selection of proper hardware for measurement and data transmission. Step three is the incorporation of the data into the database system and its permanent input into the groundwater model. Groundwater abstraction in unconsolidated aquifers can also be monitored through satellite surveillance. Both GRACE and InSAR are able to measure regional topographic changes related to groundwater abstraction. This method hitherto has not been applied to Saudi aquifers but is promising in that it will help to estimate abstraction rates even in areas not sufficiently covered by observation wells.

### Section 3.1.6: Climate Change

As models on climate change can only roughly predict the regional effects, the first step needed is an updated regional model for Saudi Arabia. This will consider the records of both the MEWA and the Presidency of Meteorology and Environment (*PME*; actually *GAMEP*). The second step is a discretization of this model for individual catchment areas, on which planning of the infrastructure will be based. The third step is the construction of the remaining about 400 dams of the 1000 dams national plan, albeit after considering the outcomes of the initial modeling. A fourth step should be the search for alternative constructions for mitigating the immediate effects of flash floods in the vicinity of villages and to prevent damage from vital infrastructure.

Concomitant to all these measures is constant hydrological monitoring as described in 3.1.3.

### Section 3.1.7: Secondary Water Resources

The basic distribution of the aquifers in the Kingdom has long been established. However, water abstraction has concentrated on the most prolific aquifers, mainly those close to the surface and close to the locations, where the water was needed. With each new well drilled, knowledge about these aquifers increased, while information on those not considered remained rudimentary. Yet, these aquifers seemingly contain abundant water of varying quality. With the depletion of the “conventional” aquifers, these secondary reservoirs become increasingly more important. The first step to investigate these aquifers in more detail is an inventory of their properties. Based on that, exploration wells will have to be planned in promising areas. This planning must consider present and future economic aspects of potential exploitation. A drilling campaign with exploration wells will then establish the potential for water supply on a regional scale.

Treated Sewage Effluent (*TSE*) is produced in increasingly volumes that by far outpace concepts of reuse and storage capacities. MEWA has just initiated the search for suitable areas for Artificial Storage and Recharge (*ASR*) and Managed Artificial recharge (*MAR*). While the injection itself is not a technical



problem, potential reservoirs are insufficiently known, especially as the chemistry and microbiology of the water to be stored is different from conventional water. Each reservoir requires special geotechnical and hydrogeological investigations to estimate risks and potential storage. In addition, the creation of storage reservoirs has to be accompanied by the establishment of exclusion zones, in which no private abstraction and no agriculture are permitted. Steps needed are: Search for suitable reservoirs, check of the socio-economic environment (property rights etc.), search for suitable solutions for reuse, installation of the infrastructure, and continuous monitoring.

Several of the sites discussed by MEWA show abundant ash in the upper layers of the alluvial valley fill. Basaltic volcanic ashes, widespread in the Western Coastal Plain, are known for their fertility. Ideally, these valleys could be designated as special farming areas, as permanent water supply through recharge is guaranteed. This possibility should be considered in the socio-economic considerations about the impact of ASR/MAR.

Hitherto, freshwater harvesting from surface runoff is rather a byproduct of flood protection through dams. Much of these waters is lost to evaporation on the surface of the artificial lakes while the fines have to settle down before the water can be injected. The development of novel technologies to inhibit loss to evaporation and for potential in-situ infiltration through geotextiles is major challenge that must be addressed with priority.

### Section 3.1.8: Environmental Risk

Groundwater pollution through irrigation return flow has been demonstrated over the last decade in several groundwater studies. Consequences are increasing salt content (**TDS**) and contamination with nitrate. Steps needed are the optimization of irrigation volumes and the use of fertilizers plus rigid monitoring of the volumes used. Additionally, water management should establish groundwater protection zones that prevent irrigation return flow upstream of water abstraction for drinking water purposes. Zones with intensive agriculture should permanently be controlled through observation wells. Groundwater pollution through uncontrolled disposal of untreated or insufficiently treated wastewater must be prevented by an increase in the treatment capacities. Concomitantly, strict monitoring of the groundwater in the vicinity of major disposals must accompany the capacity increase. Similarly, the output of the treatment plants should permanently be controlled for water quality and potential microbial contamination.

In addition, besides conventional treatment plants, novel technologies such as “constructed wetlands” should be considered. The latter have much shorter construction times and strongly reduced maintenance costs during the years of operation.

Saltwater intrusion is a process that occurs with increasing overdraft in coastal aquifers. The natural discharge is reversed and up-coning of saltwater leads to a rapid deterioration of aquifer quality. Concepts for mitigation or prevention of this phenomenon are missing and have to be developed.

While Reverse Osmosis (**RO**) can counter the risks of <sup>228</sup>Rn contamination, this process itself leads to an enrichment of radioactivity in the sludge. Hitherto, there are no concepts for the disposal of this waste in special landfills or dumpsites. A first step needed is the identification of suitable sites, a second step the construction of the infrastructure and its protection. Concomitantly, legislation is required to enforce the proper disposal of the radioactive waste.



### **Section 3.1.9: Hydrothermal Energy**

For many aquifers, temperature data are available, however, mostly as point data from observation or production wells. The first step is to map temperature distribution and to model its distribution so that a spatial picture is developed. The second step is to select suitable areas based on the results of modeling and considering potential consumers. If within potential areas no wells are present, exploration wells have to be drilled. The basic technology for both shallow and deep hydrothermal exploitation is available; however, it may have to be adjusted to the harsh environmental conditions of Saudi Arabia.

### **Section 3.1.10: Public Relations**

The entire set of measures and projects described above alone will not be overly successful without the acceptance of the public. Hence, one of the major tasks is to raise public awareness for the limitation of the resource “water”. A “Water Information Center” could take care of this task through development of educational materials, organization of permanent exhibitions considering all aspects of “Water”, and courses to accompany the government’s efforts in saving water, electricity, and environmental resources. At the same time, the MEWA itself will address the public through publicity campaigns in the press, TV, and in social media to intensify to underline the activities of MEWA and to increase awareness of environmental thinking and behavior in daily life.

## **Section 3.2: Resources Required**

### **Section 3.2.1: Human Resources**

The intended output of the project heavily depends on three factors: Support on the technical implementation through international experts; the training of the MEWA personnel through integration into implementation (learning on the job) and short courses; and high-level education of young MEWA employees in fields presently not the standard portfolio of the ministry.

Modeling is a resources and time-consuming process and as almost all tasks require the input from hydrological or groundwater models, a number of modeling experts in both fields is required. In addition, there is a need for GIS-specialists with a background in geology to transform the geological and hydrogeological data through GIS into input parameters for modeling. As is standard in the hydrocarbon industry, reservoir characterization and interpretation strongly rely on a 3D visual system, which shall be implemented through these GIS specialists.

For surface water infrastructure planning and construction (dams, artificial reservoirs, flood mitigation constructions), hydraulic engineers are needed with different specializations (e.g. geotechnics, reservoir architecture). Project Managers are needed to coordinate effectively all works between the different executing partners involved.

With the ever increasing availability of satellite data for a wide range of applications, satellite image interpretation and remote sensing in monitoring of e.g. agricultural water abstraction, long-term hydrological evolution, and groundwater surveillance should be implemented in the program. Here too, experts are needed for implementation and training.



For the monitoring of groundwater and the potential pollution risks through agriculture and especially reuse of wastewater, a new field of monitoring is added to the ministry's portfolio, which shall be implemented through international experts.

Besides the planning and provision of infrastructure, Water Supply Management also requires considerations of the economic effects not only for the consumers but also for the national economy. Limitation of water supply to agriculture and the consequences for food supply for the national market is one example, another one the enormous water demand of some mining operations, where original water quality, transport distances to the operation, and their effects on the benefits must be considered. Hence, experts and consultants are needed that investigate these interconnected aspects. For the development of technical and administrative scenarios for future demand, a water-economist shall set up a decision-making support system.

Many topics envisaged here include the development of laws, bylaws, and executive regulations that have to be incorporated into the national legislative framework. In this field, lawyers are needed to accompany many of the projects. They should be familiar with similar international laws but also with the specifics of the Saudi legislative system and the society.

Public Relations, awareness raising, and education strongly depend on "conveying the message". For this purpose, an educational professional from the Saudi educational sector is needed, but also media professionals with experience in Social Media, Advertising, TV, etc.

For the high-level education of ministry staff, it is intended to set up a program to send up to 16 people abroad for a post-graduate degree in topics urgently needed in the ministry. UNDP is the right partner to help in the selection of topics and the choice of international institutions best suited for the goals of this program.

### Section 3.3: Partnerships

The National Water Company (**NWC**) is an integral part of the water-supply chain, as it is responsible for water distribution in the main urban centers. A close cooperation with NWC is an absolute necessity to achieve sustainable water supply for the population.

Similarly, the National Water Conversion Company (**SWCC**) is a major partner as it provides a considerable amount of desalinated water for the national water demand. If in the process of privatization other companies will be established through outsourcing or foundation, these also will be major partners for the MEWA.

The Agricultural Development Fund (**ADF**) is an influential factor in the agricultural sector. As a partner, it will help to mediate the intentions and goals of the MEWA to the largest group of water consumers.

World Bank is a major player in the international business of providing management expertise through their own staff, but more importantly in coping with the financial challenges that the entire water sector faces. Especially the chances of PPP projects have to be considered. A service contract between World Bank and the MEWA is now in preparation.



Within Saudi Arabia, the major universities and research institutions will be major partners. It is intended to concentrate all research-related items in a joint institution to relieve the MEWA from the administrative burden of research activities and to profit from the scientific expertise of this university.

ARAMCO's water division is a large entity, hitherto unrelated to the MEWA but in possession of several thousand water wells for different purposes. With changing legislation, ARAMCO will be an important partner for the MEWA with its data helping to refine the water resources management.

The Armed Forces run multiple installations for water supply and treatment on their vast premises. A partnership with them is highly desirable, as both parties would benefit from this relation. The Armed Forces might get sustainable water supply, while MEWA would get data on regions hitherto not accessible.

### **Section 3.4: Risks and Assumptions**

Three major risks are identified that will affect the Water Resources Management. First, ARAMCO has an own groundwater division taking care of the company's tremendous water demand. These data are not available to the ministry. Given that close to 600 wells are drilled annually, especially in Rub' Al Khali and the Eastern Province, Water Resources Management in these areas depends on assumptions. Second, the Armed Forces of the Kingdom use vast areas for their installations, including areas for housing of their personnel and their families (e.g. King Khalid Military City). The water demand, abstraction, and number of wells are not known.

Third, almost all activities of this program will be centered on and controlled by the headquarter of MEWA in Riyadh. The performance of the regional offices of MEWA is not at the standard of the headquarter. The risk is that if these offices are not entirely involved in the transformation process, they will react with resistance and low performance.



### Section 3.4.1: Risk Mitigation according to Section 5 (Results Framework)

Intended Output	Chapter	Risks and Mitigation
Intended Output 1	5.1.1 5.1.2	Delay in provision of regional groundwater models by consultants Strong cooperation with consultants and implementation of milestones from the contracts
	5.1.3	Lack of interest from stakeholders in contributing data to a shared system (ARAMCO; Armed Forces; mentioned above) Cooperation with respective ministry and Armed Forces
	5.1.3	Lack of sufficient personnel for data control and migration Legislation to enforce MEWA's rights on all water-related data
Intended Output 2	5.2.1	Lack of interest from stakeholders in contributing data to a shared system Legislation to enforce MEWA's rights on all water-related data Close cooperation with stakeholders
	5.2.8	Vandalism to the System Implementation of strong protection infrastructure Adequate surveillance of equipment
	5.2.11	Competence Conflict with KACST Legislation to enforce MEWA's rights on all water-related data Close cooperation with KACST
Intended Output 3	5.3.1	Limited or no access to military installations and ARAMCO Cooperation with respective ministry and Armed Forces
		Conflict of interest between Agricultural Industry and Water Sector Close cooperation with stakeholders
		Lack of interest in conducting water use audits in households Repeated awareness campaigns focusing on water saving
	5.3.2	Inability to ramp up in line with new requirements of pilgrims Real-time data exchange with Ministry of Hajj Improvement of demand predictions
Intended Output 4	5.4.1	Inadequate awareness campaigns that fail to showcase the economic and environmental benefits of water efficiency Permanent self-evaluation and outside evaluation of effectiveness and improvement possibilities

### Section 3.5: Stakeholder Engagement

Three main stakeholders are beneficiaries of all activities discussed in this proposal: The public, the agricultural industry, and the industrial sector including major mining companies. The intended national goal of protecting the natural resources, especially the stretching the groundwater reserves, will have to be communicated to the public in long-term campaigns and is addressed in the "Public Relations" chapter. Concomitantly, the costs of the provision of permanent high-quality supply of water will become evident and lead to an acceptance of water tariffs that cover at least partially the production costs.

As there is an inherent conflict of interest between a prospering agriculture and the necessity of water saving, a close cooperation with the agricultural industry is a prerequisite for the achievement of the goals of the water sector. In close cooperation with the Agricultural Development Fund (**ADF**), common workshops and annual meetings should be arranged, in which the achievements and necessities of both sectors are discussed, and common development goals are fixed.

A similar cooperation is intended for the heavy industry and mining industry represented by SABIC and Ma'aden, and the planning authority MODON.





### Section 3.6: South-South and Triangular Cooperation (SSC/TrC)

About a decade ago, Jordan was implementing an Integrated Water Resources Management System similar to that presently aimed at in Saudi Arabia. The implementation of this system and its documentation could provide valuable insight into the intended development of such a system during this project.

Bahrain has a fairly advanced system of water recycling and reuse, which potentially could provide solutions at least for parts of the project presented here.

If the program is successful, and if its evolution from planning through execution towards final results and implementations are properly documented, the entire project may act as a template for other countries with similar challenges.

### Section 3.7: Knowledge

One of the major outputs is Water Management and Control Center, a central database, in which all water-sector related information will be available. It will be the interface between government agencies, stakeholders of the water sector, and the public. Such different topics as hydraulic properties of the aquifers, meteorological data, and details of the licenses issued will be available there.

A second major output is a new printed edition of the “National Water Atlas” of Saudi Arabia, in which the progress in understanding the aquifers and their characteristics since 1985 will be documented, when the first edition was published.

## Section 4: Project Management

### Section 4.1 Cost Efficiency and Effectiveness

- The selected strategy of the intervention will deliver maximum results within the available funds as system-wide coordination is anticipated to reduce costs at downstream level with numerous synergies across sectors.

### Section 4.2 Project Management

- This project will be administered from the Head Office of the Ministry of Environment, Water and Agriculture (MEWA) in addition to the UNDP’s Implementation Support Services to be provided from the Country Office.
- A Chief Technical Advisor will be appointed to manage his/her own component as well as oversee all technical project activities, monitor progress and report to both MEWA and UNDP via quarterly and annually progress reports.
- A Project Manager will be appointed, who will supervise the institutional reorganization within MEWA necessary to integrate the tasks of the UNDP Program into the workflow of the MEWA.
- Direct UNDP Country Office Support Services will be budgeted to cover all costs incurred as a result of fast mobilization of support from UNDP for all work relevant to the write-ups and logistical support to the implementation of the project. In this respect, the Direct Project Costing (DPC) will be applied to dedicate support to the project.





## Section 5: Results Framework

<b>Intended Outcome as stated in the UNCCSF/Country Programme Results and Resource Framework:</b> National capacities developed for better management of non-oil natural resources									
<b>Outcome indicators as stated in the Country Programme:</b> Percentage annual decrease in agricultural water consumption									
<b>Applicable Output(s) from the UNDP Strategic Plan:</b> Output 3.2. Functions, financing and capacity of sub-national level institutions enabled to deliver improved basic services and respond to priorities voiced by the Public									
<b>Project title and Atlas Project Number:</b> Capacity Development and Related Services for an Integrated Sustainable Development and Management of the Water Sector in the Kingdom of Saudi Arabia in the framework of the VISION 2030									
<b>Project Number:</b> SAU10/107888									
EXPECTED OUTPUTS	OUTPUT INDICATORS  KPI	DATA SOURCE	BASELINE		TARGETS (by frequency of data collection)				DATA COLLECTION METHODS & RISKS
			Value	Year	Year 1 (2018)	Year 2 (2019)	Year 3 (2020)	Year 4 (2021)	
<b>Intended Output 1</b>  <i>Integrated Water Resources Management System implemented</i>	<b>Water Resources Management</b>								
	<b>1.1 Integrated Groundwater Model for the Kingdom</b>	MEWA Consultants	1	2016	Design 50%	Design 100%	Model, Groundwater Management Zones	Model runs + update	From 2.1 and data from consultants <i>Risks: In-time provision of regional groundwater models by consultants</i>
	<b>1.2 Integrated Hydrological Model for the Kingdom</b>	MEWA Consultants, GAMEP	1	2009			75%	100% + Model runs	From 2.1; GAMEP, and data from consultants <i>Risks: In-time provision of regional groundwater models by consultants</i>



	<b>1.3 Integrated Database System</b>	MEWA	1	2013	Design final Infrastructure set-up 30%	Infrastructure set-up 60%	Infrastructure set-up 100% + Testing		Various databases from MEWA and consultants <b>Risks: Lack of interest from stakeholders in contributing data to a shared system</b> <b>Lack of sufficient personnel for data control and migration</b>
<b>Intended Output 2</b> <i>Overall Secondary Water Resources supply-mix increased</i>	<b>Secondary Water Resources</b>								
	<b>2.1 Water Resources Management Plan for Secondary Aquifers</b> <i>Share of secondary water in the overall supply mix of the Kingdom (%)</i> <i>Amount of non-renewable groundwater in BCM</i>	MEWA	0	2018	Inventory of all secondary aquifers	Field investigations 50% Modelling 50%	Field investigations 100% Modelling 100%	Exploration and Exploitation	Data from MEWA, ADF, SABIC, MODON, Ma'aden, SWCC <b>Risks: Lack of interest from stakeholders in contributing data to a shared system</b>
	<b>2.2 Master Plan for Wastewater Treatment and Reuse</b> <i>Share of treated wastewater in the overall supply mix of the Kingdom (60%)</i>	MEWA	1	2017	15%				Data from MEWA, NWC



	<b>2.3</b> Groundwater Monitoring System for wastewater	MEWA NWC stakeholders	0					Design, Selection of Sites 100% Implementation 25%	Desktop Study and field implementation
	<b>2.4</b> Atlas of Potential ASR/MAR Sites Storage Capacity in BCM	MEWA SGS (Saudi Geological Survey)	0	2018	100%				Data from MEWA, SGS
	<b>2.5</b> Masterplan for Secondary Water Resources Share of surface water in the overall supply mix of the Kingdom (%) Share of non-renewable groundwater in the overall supply mix of the Kingdom (%)	MEWA	0	2021				Elaboration 100%	Data from MEWA;NWC
	<b>Climate Change Effects</b>								
	<b>2.6</b> Flood Mitigation Master Plan	MEWA	1	2017	Data collection 25%	Data collection 50%	Data collection 75%	Data collection 100%; Elaboration 100%	Data from MEWA



	<b>2.7 Surface Water Harvesting Plan</b>	MEWA	0	2020			Study and Planning 75%	Study and Planning 100%; Implementation	Data from MEWA
	<b>Environmental Risk</b>								
	<b>2.8 Groundwater Monitoring System concurrent with 2.3</b>	MEWA NWC stakeholders	1	2017	50%	100%			Desktop Study <u>Risk:</u> Vandalism to the System
	<b>2.9: Saltwater Intrusion Mitigation Plan</b>	MEWA SWCC	0	2019		100%			Desktop Study and field verification
	<b>2.10: Atlas of Potential Nuclear Waste Repository Storage capacity in TCM</b>	MEWA SGS	0	2021				Field and Desktop Study 100%; Atlas of potential sites 100%	Desktop Study and field verification, SGS
	<b>Hydrothermal Energy</b>								
	<b>2.11 300 MW</b>	MEWA SEC (Saudi Electricity Company)	44 MW	2016				Map of potential hydrothermal energy 100%	SEC <u>Risk:</u> Competence Conflict with KACST (King Abdullah City for Science and Technology)
	<b>Water Supply Master Plan</b>								



<b>Intended Output 3</b>  <i>Integrated Water Supply Management System fully operational</i>	<b>3.1 Master Plan for Water Supply</b>	MEWA, MEP,NWC, MOMRA (Ministry of Municipal and Rural Affairs), MODON  Local authorities municipalities mohafathas	1	2017	50%: Inventory 50% Master Plan	100% Inventory Master Plan 100%	Implement ation Enforceme nt Mechanis ms  Test and 25%	fully operationa l 100%	Desktop Study and field verification Data from MEWA, NWC, ADF, SABIC, MODON, Ma'aden <u>Risks:</u> Limited or no access to military installations and ARAMCO Conflict of interest between Agricultural Industry and Water Sector Lack of interest in conducting water use audits in households
	<b>3.2 Master Plan for Hajj and Umra Supply Expansion</b>  Maximum Peak Supply in BCM	MEWA Ministry of Health Ministry of Hajj	0	2018	Data Collection and Planning 25%	Master Plan 100%			Data and prognostics from ministries <u>Risks:</u> Inability to ramp up in line with new requirements of pilgrims
	<b>3.3 National Water Supply Risk Registry (%)</b>	MEWA NWC Local authorities	0	2018	Registry 50%	Registry 100%			Desktop Study and field verification
	<b>3.4 National Water Emergency Plan (%)</b>	MEWA, NWC, MoEP (Ministry of Economy and Planning) MOMRA, MODON Local authorities	0	2020			100%		Desktop Study and field verification
	<b>The Center</b>								



<b>Intended Output 4</b> Public Relation Center Established	<b>4.1 Number of Campaigns</b>	MEWA NWC Ministry of Education (MoE)	0	2018	2 Campaigns	2 Campaigns	2 Campaigns	2 Campaigns	Data from MEWA, NWC  Number of Clicks in Social Media  Risk: Inadequate awareness campaigns that fail to showcase the economic and environmental benefits of water efficiency
	<b>4.2 Development of “Nudges”</b>	MEWA MoE	0	2018	2	2	2	2	
	<b>4.3 Residential consumption rate in liter per capita per day (200 LCD) Urban water consumption rate (233 LCD in 2030)</b>	MEWA NWC MoE	265 271	2016					Evaluation 100%
<b>Intended Output 5</b> MEWA Capacity Enhanced	<b>Capacity Development</b>								
	<b>5.1 16 post-graduate scholarships</b>	MEWA	0	2018	4	6	6		
	<b>5.2 Technical and Leadership Training</b>	MEWA	0	2018	6	6	6	6	



## Section 6: Monitoring and Evaluation

### Monitoring Plan

Monitoring Activity	Purpose	Frequency	Expected Action	Partners (if joint)	Cost (if any)
<b>Track results progress</b>	Progress data against the results indicators in the RRF will be collected and analysed to assess the progress of the project in achieving the agreed outputs.	Quarterly, or in the frequency required for each indicator.	Slower than expected progress will be addressed by project management.	UNDP/MEWA	0
<b>Monitor and Manage Risk</b>	Identify specific risks that may threaten achievement of intended results. Identify and monitor risk management actions using a risk log. This includes monitoring measures and plans that may have been required as per UNDP's Social and Environmental Standards. Audits will be conducted in accordance with UNDP's audit policy to manage financial risk.	Quarterly	Risks are identified by project management and actions are taken to manage risk. The risk log is actively maintained to keep track of identified risks and actions taken.	UNDP/MEWA	0
<b>Learn</b>	Knowledge, good practices and lessons will be captured regularly, as well as actively sourced from other projects and partners and integrated back into the project.	At least annually	Relevant lessons are captured by the project team and used to inform management decisions.	Project CTA/external consultant	5,000
<b>Annual Project Quality Assurance</b>	The quality of the project will be assessed against UNDP's quality standards to identify project strengths and weaknesses	Annually	Areas of strength and weakness will be reviewed by project management and	UNDP/Project CTA	0



	and to inform management decision making to improve the project.		used to inform decisions to improve project performance.		
<b>Review and Make Course Corrections</b>	Internal review of data and evidence from all monitoring actions to inform decision making.	At least annually	Performance data, risks, lessons and quality will be discussed by the project board and used to make course corrections.	Project Board	0
<b>Project Report</b>	A progress report will be presented to the Project Board and key stakeholders, consisting of progress data showing the results achieved against pre-defined annual targets at the output level, the annual project quality rating summary, an updated risk long with mitigation measures, and any evaluation or review reports prepared over the period.	Quarterly, Annually, and at the end of the project (final report)		Project CTA	0
<b>Project Review (Project Board)</b>	The project's governance mechanism (i.e., project board) will hold regular project reviews to assess the performance of the project and review the Multi-Year Work Plan to ensure realistic budgeting over the life of the project. In the project's final year, the Project Board shall hold an end-of project review to capture lessons learned and discuss opportunities for scaling up and to socialize project results and lessons learned with relevant audiences.	Specify frequency (twice a year)	Any quality concerns or slower than expected progress should be discussed by the project board and management actions agreed to address the issues identified.	MEWA/Project CTA/UNDP	0





## Evaluation Plan

Evaluation Title	Partners (if joint)	Related Strategic Plan Output	UNDAF/CPD Outcome	Planned Completion Date	Key Evaluation Stakeholders	Cost and Source of Funding (Project funds) USD
Project Evaluation 1st year	MEWA/UNDP			October 2019	MEWA	60,000
Project Evaluation 2nd year	MEWA/UNDP			October 2020	MEWA	60,000
Project Evaluation 3rd year	MEWA/UNDP			October 2021	MEWA	60,000
Final Evaluation	MEWA/UNDP			October 2022	MEWA	85,000

## Section 7: Multi-Year Work Plan

EXPECTED OUTPUTS	PLANNED ACTIVITIES	Planned Budget by Year				RESPONSIBLE PARTY	PLANNED BUDGET		
		Year 1	Year 2	Year 3	Year 4		Funding Source	Budget Description	Amount
<b>Output 1:</b> <i>Integrated Water Resources Management System implemented</i>	<b>1.1 Water Resources Assessment; Modeling</b>								
	Activity 1.1.1: Combination of existing groundwater models into 3D Model and update					MEWA/WRM		1 Expert	\$ 576,000.00
	Activity 1.1.2: Visualization of 3D groundwater model - GIS					MEWA/WRM		1 Expert	\$ 432,000.00
	Activity 1.1.3: Demarcation of Groundwater Management Zones					MEWA/WRM			incl. in 1.2.1
	Activity 1.1.4: Development of hydrological model for KSA; focus surface runoff and renewable groundwater					MEWA/WRM		1 Expert	\$ 288,000.00
	Activity 1.1.5: Development of hydrological model for KSA; focus on climate					MEWA/WRM		1 Expert	\$ 288,000.00
	Activity 1.1.6: Modeling of groundwater recharge					MEWA/WRM			
	Activity 1.1.7: Modeling of surface runoff and peak flood discharge					MEWA/WRM			
<b>Subtotal Water Resources Assessment; Modeling</b>									<b>\$ 1,728,000.00</b>
	<b>1.2 Integrated Water Resources Management System</b>								
	Activity 1.2.1: Setup of database system with data model and data migration plan					MEWA/WRM		1 Expert	\$ 432,000.00
	Activity 1.2.2 : Data migration and update of database with all relevant data					MEWA/WRM		4 Technical Experts	\$ 480,000.00
	Project Manager Output 1					MEWA		1 Expert	\$ 576,000.00
<b>Subtotal Integrated Water Resources Management System</b>									<b>\$ 1,488,000.00</b>
<b>Total Output 1</b>									<b>\$ 3,216,000.00</b>



<b>Output 2:</b> <i>Overall Secondary Water Resources supply-mix increased</i>	<b>2.1 Secondary Water Resources</b>							
	Activity 2.1.1: Field Investigation and well interpretation of secondary aquifers					MEWA/WRM	1 Expert	\$ 288,000.00
	Activity 2.1.2: Inventory of information on secondary aquifers - GIS					MEWA/WRM		incl. in 1.1.2
	Activity 2.1.3: 3D Modeling of aquifers and volumes stored					MEWA/WRM	1 Expert	\$ 288,000.00
	Activity 2.1.4: Exploration supervision					MEWA/WRM	1 Expert	\$ 288,000.00
	Activity 2.1.5: Travel					MEWA/WRM		\$ 100,000.00
	Activity 2.1.6: Masterplan for Wastewater Treatment and potential ASR/MAR					MEWA/WRM	1Expert	\$ 144,000.00
	Activity 2.1.7: Geology and Hydrogeology of ASR/MAR sites					MEWA/WRM	1 Expert	\$ 288,000.00
	Activity 2.1.8: Exploration supervision and Reservoir Management					MEWA/WRM		
	Travel					MEWA/WRM		\$ 50,000.00
	Activity 2.1.9 Monitoring Network for wastewater					MEWA/WRM	1 Expert	\$ 144,000.00
	Activity 2.1.10 Atlas of potential ASR/MAR sites					MEWA/WRM		incl. in 2.2.1
	Activity 2.1.11: Secondary Water Resources Master Plan					MEWA/WRM	1 Expert	\$ 144,000.00
<b>Subtotal Secondary Water Resources</b>								<b>\$ 1,734,000.00</b>
<b>2.2 Effects of Climate Change</b>								
Activity 2.2.1 Flood Mitigation Master Plan with Consideration of alternative flood mitigation constructions, not only dams					MEWA/WRM	1 Expert	\$ 576,000.00	
Activity 2.2.2 Development of surface water harvesting installations								
<b>Subtotal Climate Change</b>								<b>\$ 576,000.00</b>
<b>2.3 Environmental Risk</b>								



	Activity 2.3.1: Establishment of monitoring network in areas with potential contaminators					MEWA/WRM		Consultant	costs with Plant construction
	Activity 2.3.2: Desktop study for mitigation of seawater intrusion, e.g. TSE injection					MEWA/WRM		1 Expert	\$ 144,000.00
	Activity 2.3.3: Evaluation of soil and bedrock geology and hydrogeology for nuclear waste disposal sites					MEWA/WRM		1 Expert	\$ 144,000.00
	Activity 2.3.4: Demarcation of nuclear waste disposal sites					MEWA/WRM			
	Travel					MEWA/WRM			\$ 50,000.00
<b>Subtotal Environmental Risk</b>									<b>\$ 338,000.00</b>
<b>2.4 Hydrothermal Energy</b>									
	Activity 2.4.1: Preparation of groundwater temperature maps					MEWA/WRM		1 Expert	\$ 144,000.00
	Activity 2.4.2: Demarcation of potential zones for shallow hydrothermal energy								
	Activity 2.4.3: Demarcation of potential zones for deep hydrothermal energy								
	Project Manager Output 2					MEWA		1 Expert	\$ 576,000.00
<b>Subtotal Hydrothermal Energy</b>									<b>\$ 720,000.00</b>
<b>Total Output 2</b>									<b>\$ 3,224,000.00</b>
<b>Output 3: Integrated Water Supply Management System fully operational</b>									
	<b>3.1 Water Supply System</b>								
	Activity 3.1.1: Establishment of water supply management zones					MEWA/PD		1 Expert	\$ 144,000.00
	Activity 3.1.2: Production of a water action plan identifying the main areas for efficiency improvements and potential measures to be taken					MEWA/RD		1 Expert	\$ 288,000.00
Activity 3.1.3: Implementation of a water abstraction control system					MEWA/RD			\$ 1,152,000.00	



	Activity 3.1.4: Establishment of a licensing scheme for resource abstraction: wells, abstraction quota, etc.					MEWA/RD		2 Experts Project Management	
	Activity 3.1.5: Implementation of enforcement mechanisms for conditions set out in the licenses					MEWA/RD			
	Activity 3.1.6 Remote Sensing					MEWA/RD		1 Expert	\$ 288,000.00
	Activity 3.1.7 Master Supply Plan with logistics modeling (Project Manager Output 3)					MEWA/PD		1 Expert	\$ 576,000.00
	Activity 3.1.8 Master Plan for Hajj and Umra					MEWA/PD			
	Activity 3.1.9: Risk Assessment and development of Risk Registry					MEWA/PD		1 Expert	\$ 432,000.00
	Activity 3.1.10: Emergency Master Plan based on 3.1.7					MEWA/PD			
<b>Subtotal Water Supply</b>									<b>\$ 2,880,000.00</b>
<b>Total Output 3</b>									<b>\$ 2,880,000.00</b>
<b>Output 4: Public Relation Center Established</b>	<b>4.1 The Center</b>								
	Activity 4.1.1: Design of campaigns to raise awareness about water use efficiency and demand-side-management programs					MEWA/PRD		1 Expert	\$ 288,000.00
	Activity 4.1.2: Development of "Nudges"					MEWA/PRD			
	Activity 4.1.3: Execution of Campaigns					MEWA/PRD		Campaign Costs	\$ 2,000,000.00
	Activity 4.1.4: Development of focused information material and educational material for several topics					MEWA/PRD		1 Saudi National	\$ 576,000.00
	Activity 4.1.5: Organization of temporary and permanent exhibitions topic "Water Cycle"								
	Media Spokesman					MEWA/PRD		1 Saudi National	\$ 576,000.00
<b>Subtotal Center</b>									<b>\$ 3,440,000.00</b>



Total Output 4										\$ 3,440,000.00
Output 5: MEWA Capacity Enhanced	5.1 Capacity Building									
	Career	2018	2019	2020	2021	2022				
	Post-Graduate Capacity Building Hydrogeology and Groundwater Modeling						MEWA		1	\$ 450,000.00
	Post-Graduate Capacity Building Hydrogeology and Hydrochemistry						MEWA		1	\$ 450,000.00
	Post-Graduate Capacity Building Hydrogeology and Groundwater Modeling						MEWA		1	\$ 450,000.00
	Post-Graduate Capacity Building Geophysics						MEWA		1	\$ 450,000.00
	Post-Graduate Capacity Building Hydrogeology and Hydrological Modeling						MEWA		1	\$ 450,000.00
	Post-Graduate Capacity Building Environmental Engineering						MEWA		1	\$ 450,000.00
	Post-Graduate Capacity Building Environmental Engineering						MEWA		1	\$ 450,000.00
	Post-Graduate Capacity Building Geology/Geothermics Erlangen, Germany, in English						MEWA		1	\$ 450,000.00
	Post-Graduate Capacity Building Water Supply Management						MEWA		1	\$ 450,000.00
	Post-Graduate Capacity Building Environmental Sciences and Climate Change						MEWA		1	\$ 450,000.00
	Post-Graduate Capacity Building Geoinformatics						MEWA		1	\$ 450,000.00
	Post-Graduate Capacity Building Business Management (MBA)						MEWA		1	\$ 450,000.00
	Post-Graduate Capacity Building Business Management (MBA)						MEWA		1	\$ 450,000.00
	Post-Graduate Capacity Building Media Management and Public Relations						MEWA		1	\$ 450,000.00
	Post-Graduate Capacity Building Communications Management						MEWA		1	\$ 450,000.00



	Post-Graduate Capacity Building Law specialty water economy law								1	\$ 450,000.00
	Technical and Leadership Training								Consultants	\$ 600,000.00
	GIS-Training (10)								Consultants	\$ 35,000.00
	<b>Subtotal Capacity Building</b>									<b>\$ 7,835,000.00</b>
<b>Total Output 5</b>										<b>\$ 7,835,000.00</b>
<b>Subtotal Output 1-5</b>										<b>\$20,595,000.00</b>
<b>Overall Project Costs</b>										
<b>Equipment</b>		<b>total units</b>	<b>unit cost</b>							
	Water Quality WTW Set	4	\$ 5,000.00							\$ 20,000.00
	Workstations Group 1 Modeling	4	\$ 5,000.00							\$ 20,000.00
	ESRI GIS Software Group 1 Modeling	2	\$ 15,000.00							\$ 30,000.00
	Autocad Licences	2	\$ 2,500.00							\$ 20,000.00
	Capacity Buiding Room PC Systems	18	\$ 2,000.00							\$ 36,000.00
	Beamer CP Room, Meeting rooms	4	\$ 900.00							\$ 3,600.00
	Canvas/Screen	2	\$ 800.00							\$ 1,600.00
	PC System Project Managers	5	\$ 3,000.00							\$ 15,000.00
	PC Systems International Experts	34	\$ 3,000.00							\$ 102,000.00
	A1 Plotter International Experts	4	\$ 4,000.00							\$ 16,000.00



	A3 Printer International Experts multifunction	3	\$ 2,500.00					\$ 7,500.00
<b>Subtotal Equipment</b>								<b>\$ 268,700.00</b>
<b>Personnel</b>	<b>Project Management UNDP within MEWA</b>					<b>MEWA</b>	1 Expert	\$ 576,000.00
	<b>Chief Technical Advisor UNDP and cooperation with research institutions</b>					<b>MEWA</b>	1 Expert	\$ 576,000.00
	<b>2 Lawyers (2 x 2 years)</b>						Legal support for Water Law and all other activities that need legal support (nuclear depository, etc)	\$ 576,000.00
	<b>Admin. Assistant Bilingual</b>						1	\$ 168,000.00
	<b>Technical Translator Bilingual</b>						1	\$ 168,000.00
<b>Subtotal Personnel</b>								<b>\$ 2,064,000.00</b>
<b>Total Output Project Costs</b>								<b>\$2,335,700.00</b>
<b>Subtotal Output 1-5 &amp; Overall Project Costs</b>								<b>\$22,927,700.00</b>
<b>Administrative Costs</b>								
<b>Evaluation</b>	each year	year 1	year 2	year 3	year 4			\$ 265,000.00
		\$ 60,000.00	\$ 60,000.00	\$ 60,000.00	\$ 85,000.00			
<b>Audit Fees 8.000 US\$</b>								\$ 32,000.00
<b>General Management Support (3%)</b>						<b>UNDP</b>		\$696,741.00
<b>Direct Project Costs (4%)</b>								\$928,988.00
<b>TOTAL US\$</b>	<b>\$24,850,429.00</b>							







## Section 8: Governance and Management Arrangements

### Section 8.1: Organization

Figure 1 shows the proposed organizational scheme for the project. The General Department of Water Affairs and Conservation of the MEWA assisted by the General Department of Planning will execute this project dominantly. Hence, it is proposed to establish several working groups according to the existing administrative structure of MEWA. Working Group I will comprise all groundwater-management activities: Integrated Water Resources Management, Groundwater Modeling, and Hydrological Monitoring. Working Group II is concerned with the investigation of secondary aquifers, wastewater including artificial recharge, the effects of climate change, and surface water exploitation. Working Group III takes care of the Integrated Water Supply Management. Group IV is responsible for all tasks related to public relations, public awareness, customer (stakeholder) relations, and education. Each working group has one project manager to coordinate the group's activities and reports to the Chief Technical Assistant, who is the main project manager and the link to UNDP. The Chief Technical Advisor is also part of a steering committee, composed of the general managers of the Directorates of Water Affairs and Department of Planning plus Department of Wastewater. The cooperation of a UNDP representative in this committee would be most welcome. This committee shall meet every 6 months for a workshop. In this workshop, all groups will present the status of the current activities and the steering committee will then discuss operational aspects of the project and control its progress.

Subsequently, the steering committee will inform the Project Board about the overall aspects of the project, and the Board will take corrective measures or strategic decisions to improve the performance of the project.

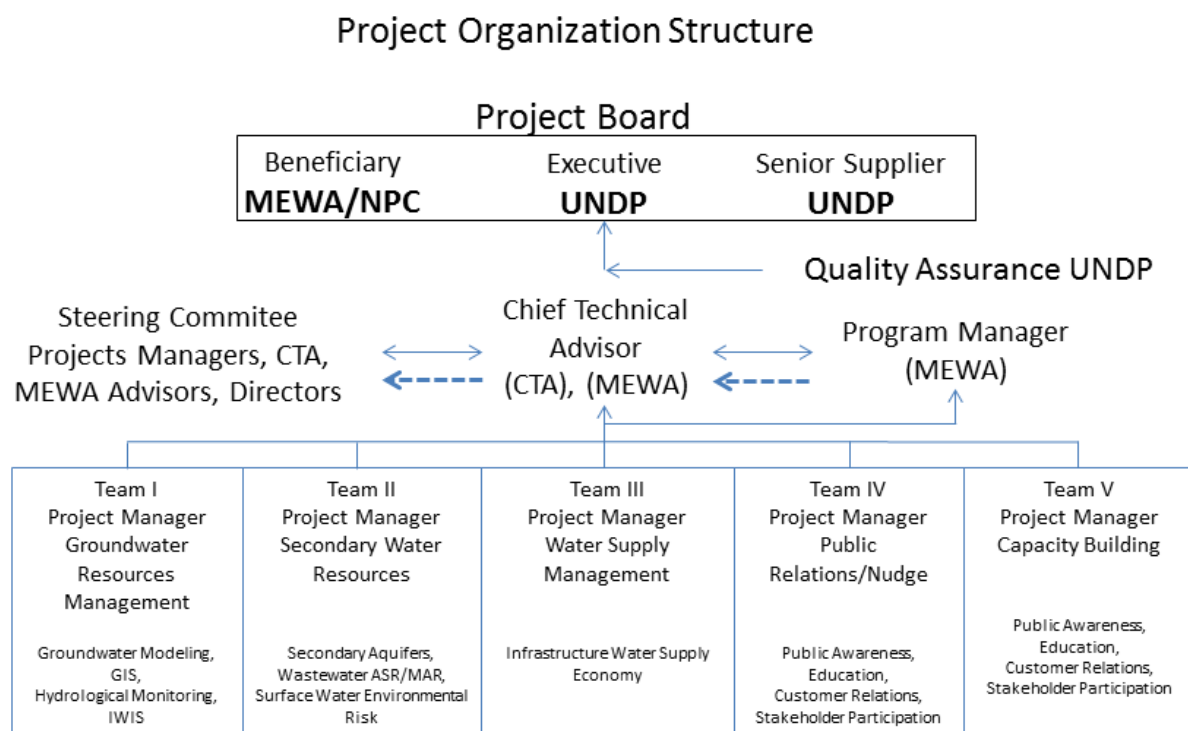


Figure 1: Organizational Structure of the proposed Project



## Section 8.2: Execution Arrangements

MEWA will be the Implementing Partner with UNDP Implementation Support Services for recruitment of international and national experts and other activities as noted in the Multi-Year Work Plan. All activities under the project will be done through standard Project Board mechanism to serve as a steering committee between MEWA and UNDP to ensure coherence of all activities under the project. UNDP will provide technical advisory support to all activities through the UNDP Country Office in Riyadh. Following the official signature on Tuesday, February 20th, 2018, the Project contract will enter into validity on March 1st, 2018 for a period of (4) years ending on February 28th 2022. Correspondingly, the Project Working Program as stated in Section ( 5) will start officially on 1/3/2018.

## Section 8.3: Project Board

The Project Board is the group responsible for making on consensus-based management decisions for a project when guidance is required by the National Project Manager, including recommendation for approval of project revisions. Project reviews by this group are made at biannual basis in Riyadh, or as necessary when raised by the National Project Manager. This group is consulted by the National Project Manager for decisions when management tolerances (i.e. constraints normally in terms of time and budget) have been exceeded. This group contains three roles: executive representing the project ownership to chair the group, senior Supplier role to provide guidance regarding the technical feasibility of the project, and senior Beneficiary role to ensure the realization of project benefits from the perspective of project beneficiaries.

The Project Board has the following members: MEWA as an executive member, selected stakeholders representatives as Senior Beneficiary, and United Nations Development Programme, Saudi Arabia as Senior Supplier.

## Section 8.4: Technical Committee

The technical committee is comprised of representatives from MEWA and UNDP, in addition to the national and international experts and representative of identified sectors. The committee will meet on a monthly basis, and is responsible for following up on the implementation progress through periodic reports at each meeting; ensuring technical review of project-related documents prior to approval by the Project Board; proposing correctional measures and offer guidance on obstacles hindering implementation; escalating issues to the Project Board when needed; and evaluating and implementing recommendations made by the Project Board.

## Section 8.5: Project Assurance

Project Assurance is the responsibility of each Project Board member, but the role can be delegated to staff within each agency. The Project Assurance role supports the Project Board by carrying out objective and independent project oversight and monitoring functions. This role ensures appropriate project management milestones are managed and completed. UNDP Saudi Arabia will hold the Project Assurance role. A similar officer at MEWA will undertake the role of project assurance to provide on-the-site quality assurance of results. However, the National Project Manager and Project Assurance roles will never be held by the same individual in MEWA.



## Section 8.6: National Project Manager

The National Project Manager has the authority to run the project on a day-to-day basis on behalf of the Project Board within the constraints laid down by the Project Board. The National Project Manager is responsible for day-to-day management and decision-making for the project. The National Project Manager's prime responsibility is to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost. The National Project Manager is responsible for preparing the project progress reports, update risks and issues logs, and ensure the accuracy of financial transactions under the project. The National Project Manager is appointed by MEWA through letter to UNDP. MEWA will also provide counterpart staff, offices facilities and necessary office equipment (including computers) for project staff, other project support facilities as required including for project related seminars, workshops and training facilities; other support in kind.

**Project Staff Input Schedule**

Position	2018	2019	2020	2021
<b>International</b>				
<b>Output 1</b>				
Project Manager Output 1	//	//	//	//
Groundwater Modeling Specialist	//	//	//	//
GIS - Visualization Specialist	//	//	//	
Hydrology Modeler			//	//
Hydrology Modeler				//
Water Resources Management Specialist	//	//	//	//
4 Technical Experts Data Migration			//	//
<b>Output 2</b>				
Project Manager Output 2	//	//	//	//
Senior Geologist Specialist	//	//	//	//
Civil Engineer/Hydrogeologist Wastewater	//			
Hydrochemistry/Hydrogeology Specialist			//	//
Consultant for Geology/Hydrogeology			//	//
Civil Engineer/Hydrogeologist Wastewater				//
Civil Engineer/Hydrologist Surface Water Infrastructure	//	//	//	//





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## Section 9: Legal Context and Risk Management

### Section 9.1: Legal Context Standard Clauses

This project document shall be the instrument referred to as such in Article 1 of the Standard Basic Assistance Agreement between the Government of the Kingdom of Saudi Arabia and UNDP, signed on 4 January 1976. All references in the SBAA to “Executing Agency” shall be deemed to refer to “Implementing Partner.”

This project will be implemented by the agency (MEWA) (“Implementing Partner”) in accordance with its financial regulations, rules, practices, and procedures only to the extent that they do not contravene the principles of the Financial Regulations and Rules of UNDP. Where the financial governance of an Implementing Partner does not provide the required guidance to ensure best value for money, fairness, integrity, transparency, and effective international competition, the financial governance of UNDP shall apply.

### Section 9.2: Risk Management Standard Clauses

- 1) Consistent with the Article III of the SBAA, the responsibility for the safety and security of the Implementing Partner and its personnel and property, and of UNDP’s property in the Implementing Partner’s custody, rests with the Implementing Partner. To this end, the Implementing Partner shall:
  - (1) put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
  - (2) assume all risks and liabilities related to the Implementing Partner’s security, and the full implementation of the security plan.
- 2) UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of the Implementing Partner’s obligations under this Project Document.
- 3) The Implementing Partner agrees to undertake all reasonable efforts to ensure that no UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via [http://www.un.org/sc/committees/1267/aq\\_sanctions\\_list.shtml](http://www.un.org/sc/committees/1267/aq_sanctions_list.shtml). This provision must be included in all sub-contracts or sub-agreements entered into under/further to this Project Document.
- 4) Consistent with UNDP’s Programme and Operations Policies and Procedures, social and environmental sustainability will be enhanced through application of the UNDP Social and Environmental Standards (<http://www.undp.org/ses>) and related Accountability Mechanism (<http://www.undp.org/secu-srm>).
- 5) The Implementing Partner shall: (a) conduct project and programme-related activities in a manner consistent with the UNDP Social and Environmental Standards, (b) implement any management or mitigation plan prepared for the project or programme to comply with such standards, and (c)



engage in a constructive and timely manner to address any concerns and complaints raised through the Accountability Mechanism. UNDP will seek to ensure that communities and other project stakeholders are informed of and have access to the Accountability Mechanism.

- 6) All signatories to the Project Document shall cooperate in good faith with any exercise to evaluate any programme or project-related commitments or compliance with the UNDP Social and Environmental Standards. This includes providing access to project sites, relevant personnel, information, and documentation.



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## ANNEXES

1. **Social and Environmental Screening Template**
2. **Risk Log Analysis.**
3. **Project Board Terms of Reference and TORs of key management positions**
4. **Agreement for the Provision of UNDP Support Services**
5. **Schedule Of Payment (Cost Sharing)**





## Annex 1: Social and Environmental Screening

### Project Information

<b>Project Information</b>	
1. Project Title	Capacity Development and Related Services for an Integrated Sustainable Development and Management of the Water Sector in the Kingdom of Saudi Arabia in the framework of the VISION 2030
2. Project Number	SAU10/107888
3. Location (Global/Region/Country)	Middle East/Saudi Arabia

### Part A. Integrating Overarching Principles to Strengthen Social and Environmental Sustainability

<b>QUESTION 1: How Does the Project Integrate the Overarching Principles in order to Strengthen Social and Environmental Sustainability?</b>
<b>Briefly describe in the space below how the Project mainstreams the human-rights based approach</b>
The main goal of the project is securing the provision of water to all parts of the society
<b>Briefly describe in the space below how the Project is likely to improve gender equality and women's empowerment</b>
does not apply
<b>Briefly describe in the space below how the Project mainstreams environmental sustainability</b>
The project aims at protecting the environment through awareness campaigns for environmental sustainability and the protection of the non-renewable water resources. Through wastewater reuse and secure deposition of contaminated sludges, environmental protection will improve.

## Part B. Identifying and Managing Social and Environmental Risks

QUESTION 2: What are the Potential Social and Environmental Risks? <i>Note: Describe briefly potential social and environmental risks identified in Attachment 1 – Risk Screening Checklist (based on any “Yes” responses). If no risks have been identified in Attachment 1 then note “No Risks Identified” and skip to Question 4 and Select “Low Risk”. Questions 5 and 6 not required for Low Risk Projects.</i>	QUESTION 3: What is the level of significance of the potential social and environmental risks? <i>Note: Respond to Questions 4 and 5 below before proceeding to Question 6</i>			QUESTION 6: What social and environmental assessment and management measures have been conducted and/or are required to address potential risks (for Risks with Moderate and High Significance)?
Risk Description	Impact and Probability (1-5)	Significance (Low, Moderate, High)	Comments	Description of assessment and management measures as reflected in the Project design. If ESIA or SESA is required note that the assessment should consider all potential impacts and risks.
Risk 1: (1.8) Construction of dams is intended to protect the environment from flood hazards and to capture surface water for water supply that otherwise is mainly lost to evaporation	I = P =	low	The “risks” described here (dams) are actually the benefit of the project: To protect the environment and to protect the groundwater reserves	Much of the project is aimed at capturing rainfall and exploit it in order to save the groundwater and to protect the environment from hazards.
Risk 2 (3.3) Dams are built in unpopulated areas to mitigate flood hazards farther downstream	I = P =	low	as above	The dams are built to capture water and to mitigate flash-flood risks induced through climate change
	<b>QUESTION 4: What is the overall Project risk categorization?</b>			
	Select one (see <a href="#">SESP</a> for guidance)			Comments
	<i>Low Risk</i>	<input checked="" type="checkbox"/>		
	<i>Moderate Risk</i>	<input type="checkbox"/>		
		<i>High Risk</i>	<input type="checkbox"/>	
	<b>QUESTION 5: Based on the identified risks and risk categorization, what requirements of the SES are relevant?</b>			



	Check all that apply		Comments
	<i>Principle 1: Human Rights</i>	<input type="checkbox"/>	
<i>Principle 2: Gender Equality and Women's Empowerment</i>	<input type="checkbox"/>		
<i>1. Biodiversity Conservation and Natural Resource Management</i>	<input type="checkbox"/>		
<i>2. Climate Change Mitigation and Adaptation</i>	<input type="checkbox"/>		
<i>3. Community Health, Safety and Working Conditions</i>	<input type="checkbox"/>		
<i>4. Cultural Heritage</i>	<input type="checkbox"/>		
<i>5. Displacement and Resettlement</i>	<input type="checkbox"/>		
<i>6. Indigenous Peoples</i>	<input type="checkbox"/>		
<i>7. Pollution Prevention and Resource Efficiency</i>	<input type="checkbox"/>		

### Final Sign Off

<i>Signature</i>	<i>Date</i>	<i>Description</i>
QA Assessor		UNDP staff member responsible for the Project, typically a UNDP Programme Officer. Final signature confirms they have "checked" to ensure that the SESP is adequately conducted.
QA Approver		UNDP senior manager, typically the UNDP Deputy Country Director (DCD), Country Director (CD), Deputy Resident Representative (DRR), or Resident Representative (RR). The QA Approver cannot also be the QA Assessor. Final signature confirms they have "cleared" the SESP prior to submittal to the PAC.
PAC Chair		UNDP chair of the PAC. In some cases PAC Chair may also be the QA Approver. Final signature confirms that the SESP was considered as part of the project appraisal and considered in recommendations of the PAC.



## Annex 1

### SESP Attachment 1. Social and Environmental Risk Screening Checklist

<b>Checklist Potential Social and Environmental Risks</b>		<b>Answer (Yes/No)</b>
<b>Principles 1: Human Rights</b>		
1.	Could the Project lead to adverse impacts on enjoyment of the human rights (civil, political, economic, social or cultural) of the affected population and particularly of marginalized groups?	no
2.	Is there a likelihood that the Project would have inequitable or discriminatory adverse impacts on affected populations, particularly people living in poverty or marginalized or excluded individuals or groups? <sup>1</sup>	no
3.	Could the Project potentially restrict availability, quality of and access to resources or basic services, in particular to marginalized individuals or groups?	no
4.	Is there a likelihood that the Project would exclude any potentially affected stakeholders, in particular marginalized groups, from fully participating in decisions that may affect them?	no
5.	Is there a risk that duty-bearers do not have the capacity to meet their obligations in the Project?	no
6.	Is there a risk that rights-holders do not have the capacity to claim their rights?	no
7.	Have local communities or individuals, given the opportunity, raised human rights concerns regarding the Project during the stakeholder engagement process?	no
8.	Is there a risk that the Project would exacerbate conflicts among and/or the risk of violence to project-affected communities and individuals?	no
<b>Principle 2: Gender Equality and Women's Empowerment</b>		
1.	Is there a likelihood that the proposed Project would have adverse impacts on gender equality and/or the situation of women and girls?	no
2.	Would the Project potentially reproduce discriminations against women based on gender, especially regarding participation in design and implementation or access to opportunities and benefits?	no
3.	Have women's groups/leaders raised gender equality concerns regarding the Project during the stakeholder engagement process and has this been included in the overall Project proposal and in the risk assessment?	no
4.	Would the Project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and positions of women and men in accessing environmental goods and services? <i>For example, activities that could lead to natural resources degradation or depletion in communities who depend on these resources for their livelihoods and well being</i>	no
<b>Principle 3: Environmental Sustainability:</b> Screening questions regarding environmental risks are encompassed by the specific Standard-related questions below		
<b>Standard 1: Biodiversity Conservation and Sustainable Natural Resource Management</b>		
1.1	Would the Project potentially cause adverse impacts to habitats (e.g. modified, natural, and critical habitats) and/or ecosystems and ecosystem services?	no

<sup>1</sup> Prohibited grounds of discrimination include race, ethnicity, gender, age, language, disability, sexual orientation, religion, political or other opinion, national or social or geographical origin, property, birth or other status including as an indigenous person or as a member of a minority. References to "women and men" or similar is understood to include women and men, boys and girls, and other groups discriminated against based on their gender identities, such as transgender people and transsexuals.



	<i>For example, through habitat loss, conversion or degradation, fragmentation, hydrological changes</i>	
1.2	Are any Project activities proposed within or adjacent to critical habitats and/or environmentally sensitive areas, including legally protected areas (e.g. nature reserve, national park), areas proposed for protection, or recognized as such by authoritative sources and/or indigenous peoples or local communities?	no
1.3	Does the Project involve changes to the use of lands and resources that may have adverse impacts on habitats, ecosystems, and/or livelihoods? (Note: if restrictions and/or limitations of access to lands would apply, refer to Standard 5)	no
1.4	Would Project activities pose risks to endangered species?	no
1.5	Would the Project pose a risk of introducing invasive alien species?	no
1.6	Does the Project involve harvesting of natural forests, plantation development, or reforestation?	no
1.7	Does the Project involve the production and/or harvesting of fish populations or other aquatic species?	no
1.8	Does the Project involve significant extraction, diversion or containment of surface or ground water? <i>For example, construction of dams, reservoirs, river basin developments, groundwater extraction</i>	yes
1.9	Does the Project involve utilization of genetic resources? (e.g. collection and/or harvesting, commercial development)	no
1.10	Would the Project generate potential adverse transboundary or global environmental concerns?	no
1.11	Would the Project result in secondary or consequential development activities which could lead to adverse social and environmental effects, or would it generate cumulative impacts with other known existing or planned activities in the area? <i>For example, a new road through forested lands will generate direct environmental and social impacts (e.g. felling of trees, earthworks, potential relocation of inhabitants). The new road may also facilitate encroachment on lands by illegal settlers or generate unplanned commercial development along the route, potentially in sensitive areas. These are indirect, secondary, or induced impacts that need to be considered. Also, if similar developments in the same forested area are planned, then cumulative impacts of multiple activities (even if not part of the same Project) need to be considered.</i>	no
<b>Standard 2: Climate Change Mitigation and Adaptation</b>		
2.1	Will the proposed Project result in significant <sup>2</sup> greenhouse gas emissions or may exacerbate climate change?	no
2.2	Would the potential outcomes of the Project be sensitive or vulnerable to potential impacts of climate change?	no
2.3	Is the proposed Project likely to directly or indirectly increase social and environmental vulnerability to climate change now or in the future (also known as maladaptive practices)? <i>For example, changes to land use planning may encourage further development of floodplains, potentially increasing the population's vulnerability to climate change, specifically flooding</i>	no
<b>Standard 3: Community Health, Safety and Working Conditions</b>		
3.1	Would elements of Project construction, operation, or decommissioning pose potential safety risks to local communities?	no
3.2	Would the Project pose potential risks to community health and safety due to the transport, storage, and use and/or disposal of hazardous or dangerous materials (e.g. explosives, fuel and other chemicals during construction and operation)?	no
3.3	Does the Project involve large-scale infrastructure development (e.g. dams, roads, buildings)?	yes
3.4	Would failure of structural elements of the Project pose risks to communities? (e.g. collapse of buildings or infrastructure)	no

<sup>2</sup> In regards to CO<sub>2</sub>, 'significant emissions' corresponds generally to more than 25,000 tons per year (from both direct and indirect sources). [The Guidance Note on Climate Change Mitigation and Adaptation provides additional information on GHG emissions.]



3.5	Would the proposed Project be susceptible to or lead to increased vulnerability to earthquakes, subsidence, landslides, erosion, flooding or extreme climatic conditions?	no
3.6	Would the Project result in potential increased health risks (e.g. from water-borne or other vector-borne diseases or communicable infections such as HIV/AIDS)?	no
3.7	Does the Project pose potential risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during Project construction, operation, or decommissioning?	no
3.8	Does the Project involve support for employment or livelihoods that may fail to comply with national and international labor standards (i.e. principles and standards of ILO fundamental conventions)?	no
3.9	Does the Project engage security personnel that may pose a potential risk to health and safety of communities and/or individuals (e.g. due to a lack of adequate training or accountability)?	no
<b>Standard 4: Cultural Heritage</b>		
4.1	Will the proposed Project result in interventions that would potentially adversely impact sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture (e.g. knowledge, innovations, practices)? (Note: Projects intended to protect and conserve Cultural Heritage may also have inadvertent adverse impacts)	no
4.2	Does the Project propose utilizing tangible and/or intangible forms of cultural heritage for commercial or other purposes?	no
<b>Standard 5: Displacement and Resettlement</b>		
5.1	Would the Project potentially involve temporary or permanent and full or partial physical displacement?	no
5.2	Would the Project possibly result in economic displacement (e.g. loss of assets or access to resources due to land acquisition or access restrictions – even in the absence of physical relocation)?	no
5.3	Is there a risk that the Project would lead to forced evictions? <sup>3</sup>	no
5.4	Would the proposed Project possibly affect land tenure arrangements and/or community based property rights/customary rights to land, territories and/or resources?	no
<b>Standard 6: Indigenous Peoples</b>		
6.1	Are indigenous peoples present in the Project area (including Project area of influence)?	no
6.2	Is it likely that the Project or portions of the Project will be located on lands and territories claimed by indigenous peoples?	no
6.3	Would the proposed Project potentially affect the human rights, lands, natural resources, territories, and traditional livelihoods of indigenous peoples (regardless of whether indigenous peoples possess the legal titles to such areas, whether the Project is located within or outside of the lands and territories inhabited by the affected peoples, or whether the indigenous peoples are recognized as indigenous peoples by the country in question)?  <i>If the answer to the screening question 6.3 is "yes" the potential risk impacts are considered potentially severe and/or critical and the Project would be categorized as either Moderate or High Risk.</i>	no
6.4	Has there been an absence of culturally appropriate consultations carried out with the objective of achieving FPIC on matters that may affect the rights and interests, lands, resources, territories and traditional livelihoods of the indigenous peoples concerned?	no
6.5	Does the proposed Project involve the utilization and/or commercial development of natural resources on lands and territories claimed by indigenous peoples?	no

<sup>3</sup> Forced evictions include acts and/or omissions involving the coerced or involuntary displacement of individuals, groups, or communities from homes and/or lands and common property resources that were occupied or depended upon, thus eliminating the ability of an individual, group, or community to reside or work in a particular dwelling, residence, or location without the provision of, and access to, appropriate forms of legal or other protections.



6.6	Is there a potential for forced eviction or the whole or partial physical or economic displacement of indigenous peoples, including through access restrictions to lands, territories, and resources?	no
6.7	Would the Project adversely affect the development priorities of indigenous peoples as defined by them?	no
6.8	Would the Project potentially affect the physical and cultural survival of indigenous peoples?	no
6.9	Would the Project potentially affect the Cultural Heritage of indigenous peoples, including through the commercialization or use of their traditional knowledge and practices?	no
<b>Standard 7: Pollution Prevention and Resource Efficiency</b>		
7.1	Would the Project potentially result in the release of pollutants to the environment due to routine or non-routine circumstances with the potential for adverse local, regional, and/or transboundary impacts?	no
7.2	Would the proposed Project potentially result in the generation of waste (both hazardous and non-hazardous)?	no
7.3	Will the proposed Project potentially involve the manufacture, trade, release, and/or use of hazardous chemicals and/or materials? Does the Project propose use of chemicals or materials subject to international bans or phase-outs?  <i>For example, DDT, PCBs and other chemicals listed in international conventions such as the Stockholm Conventions on Persistent Organic Pollutants or the Montreal Protocol</i>	no
7.4	Will the proposed Project involve the application of pesticides that may have a negative effect on the environment or human health?	no
7.5	Does the Project include activities that require significant consumption of raw materials, energy, and/or water?	no



## Annex 2

### RISK LOG

<b>Project Title: Integrated Sustainable Development and Management of the Water Sector in the Kingdom of Saudi Arabia in the framework of the VISION 2030</b>	<b>Award ID:SAU10/107888</b>	<b>Date: 1/1/2018</b>
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#	Description	Date Identified	Type	Impact & Probability	Countermeasures / Mngt response	Owner	Submitted, updated by
1	In-time provision of regional groundwater models by consultants	Jan 2018	Operational	Probability: P = 2 Impact : I = 4	Strong cooperation with consultants and implementation of milestones from the contracts	MEWA	UNDP
2	Lack of interest from stakeholders in contributing data to a shared system (ARAMCO; Armed Forces; mentioned above)	Jan 2018	Organizational	P= 2 I = 2	Cooperation with respective ministry and Armed Forces	MEWA	UNDP
3	Lack of sufficient personnel for data control and migration	Jan 2018	Operational	P= 2 I = 2	Legislation to enforce MEWA's rights on all water-related data	MEWA	UNDP
4	Inadequate awareness campaigns that fail to showcase the economic and environmental benefits of water efficiency	Jan 2018	Operational	P= 2 I = 4	Permanent self-evaluation and outside evaluation of effectiveness and improvement possibilities	MEWA	UNDP





## Annex 3.1

### **TOR Chief Technical Advisor (MEWA-UNDP Coordinator, Project Manager)**

During the last years, the Ministry of Environment, Water and Agriculture (MEWA) initiated an ambitious program for the investigations of its major surface and groundwater resources, for the monitoring of these resources, for the study of hydrological resources (research side), and for the management of the resources (management side). While most of these tasks have been completed or are about to come to an end, the implementation of most of the necessary measures is in its very early stages and hampered by the increasing workload in the ministry. The still rapidly increasing population mainly counteracts the successes the Saudi government and MEWA have achieved in sustainable resources water management through its reforms. In addition, newer and more precise predictions of the effects of climate change indicate that Saudi Arabia will be affected more than had been assumed only a decade ago.

To make a transition from the current patterns of water administration to sound water management mode, two things must happen. First, there is strong need to strengthen the technical and organizational capacities of the MEWA to deal with the triple challenge of water exploitation and distribution (operational side), research for additional resources and cutting-edge technologies to satisfy the increasing demand (research side), and rigid control and administration of all water-related aspects (control side). Second, a sound information base covering data on groundwater availability, quality, withdrawal, and usage is about to be put in place.

The transformation of this information into an all-encompassing water resources management requires sustained long-term efforts, especially since the MEWA has limited capacity and experience in this field. An UNDP program has been designed to initiate a systematic process of capacity development to help in sustainable development of water resources and management of water-related affairs the Kingdom to ensure permanent and sufficient supply. The program has four pillars: Groundwater Resources Management; Secondary Water Resources; Water Supply Management; and Public Relations, each represented by a working group. Consequently, for this UNDP program, a Chief Technical Advisor is needed in order to

- Coordinate all activities between UNDP, MEWA, and the four groups
- Coordinate and supervise the activities of the individual groups
- Coordinate group activities with the corresponding stakeholders
- Enforce the time schedule of the entire program and the activities of the four groups

Hence, the tasks and responsibilities of the Expert are to:

- Stay in permanent contact with UNDP to discuss and handle all administrative issues arising from the project
- Help in the selection of suitable candidates for the expert positions within the four working groups
- Coordinate the daily work within the working groups and mediate in cases of conflicts of competence or interest



- Exert quality control on the individual outputs within the working groups and of the entire working groups
- Organize workshops for each group every three months, in which achievements and problems of the group are discussed and documented
- Prepare a status report for the entire project following the quarterly workshops documenting achievements and problems
- Present the main topics of these status reports to the steering committee
- Inform the steering committee immediately in case of unforeseen risks that arise and endanger the successful execution of topics of the program

#### Requirements

- MS or PhD in geosciences or civil engineering with specialization in water-related topics; a relevant multi-disciplinary background is considered useful.
- Minimum of 10 years' experience in management of major projects, preferably in water-related business'
- Comprehensive record of successfully completed projects
- Excellent leadership and influence skills
- Excellent written, verbal, and interpersonal communication skills in English; Arabic language skills will be an advantage.



## Annex 3.2

### TOR Program Manager MEWA Organizational Optimization Specialist (Water Sector)

#### 1. Background

During the last years, the Ministry of Environment, Water & Agriculture (MEWA) of the Kingdom of Saudi Arabia initiated an ambitious program for the investigations of its major surface and groundwater resources, for the monitoring of these resources, for the study of hydrological resources (research side), and for the management of the resources including the distribution network and control of water consumption (management side). While most of these tasks have been completed or are about to come to an end, the implementation of most of the necessary measures is in its very early stages and hampered by the increasing workload in the ministry.

For the transition from the current patterns of water administration to future professional water management, two activities are envisaged. First, the strengthening of the technical and organizational capacities of the MEWA to deal with the triple challenge of

- water exploitation and distribution (operational side),
- research for additional resources and cutting-edge technologies to satisfy the increasing demand (research side),
- rigid control and administration of all water-related aspects (control side).

Second, a sound information base covering data on groundwater availability, quality, withdrawal, and usage is about to be put in place. However, the transformation of this information into an all-encompassing water resources management requires sustained long-term efforts, especially since the MEWA has limited capacity and experience in this field. It needs to go a long way in terms of development and strengthening its technical capacities in order to be able to meet its mandates.

Together with **UNDP**, a program has been designed to initiate a systematic process of capacity development to help in sustainable development of water resources and management of water-related affairs the Kingdom to ensure permanent and sufficient supply. The program has five pillars: Groundwater Resources Management; Secondary Water Resources; Water Supply Management; and Public Relations, Capacity Building ,each represented by a working group. Through this UNDP program, several experts with expertise in a wide spectrum of project-related fields will be hired. The proposed position is part of this program.

#### 2. Tasks and responsibilities:

- Design, development, and implementation of MEWA organizational development programs with all their aspects, especially in the water logistics sector
- Development of training programs, facilitation of change management initiatives, and review of current development programs to ensure linkage to MEWA goals
- Lead of the pillar “Integrated Water Supply Management”
- Building the MEWA stock of human capital and encouraging employee development



- Measurement of employee performance to gauge success of programs and identification of areas for improvement
- Promotion of leadership development, team development, and organizational communication programs and practices
- Integration of information technology systems and other software into the workflow of the MEWA personnel for improvement of the performance
- Training of MEWA personnel to keep up with the advancing IT developments and implementations (hardware and software) for their workflow
- Participation in MEWA's strategic planning and facilitation of in-house planning that ensures implementation of key goals
- Development of standards, policies, and procedures to support high quality OD services.

### 3. Qualification and Experience Required

- MS or PhD in Organization Development, Business Administration, MIS, Psychology or other relevant behavioral science.
- Minimum of ten years of professional-level experience in Organization Development and/or Administration or Human Resources Development in an intermediate to large size institution
- Minimum of 10 years' experience in management of similar projects
- Excellent leadership and influence skills
- Excellent written, verbal, and interpersonal communication skills
- Experience in analysis of development and training program needs for personnel at all levels
- Demonstrated ability to anticipate future trends/consequences and create innovative strategies and flexible plans



## Annex 4

### Appendix A

#### **AGREEMENT BETWEEN UNDP AND THE GOVERNMENT FOR THE PROVISION OF SUPPORT SERVICES**

- 1) Reference is made to consultations between officials of the Government of the Kingdom of Saudi Arabia (hereinafter referred to as “the Government”) and officials of UNDP with respect to the provision of support services by the UNDP country office for nationally managed programmes and projects. UNDP and the Government hereby agree that the UNDP country office may provide such support services at the request of the Government through its institution designated in the relevant programme support document or project document, as described below.
- 2) The UNDP country office may provide support services for assistance with reporting requirements and direct payment. In providing such support services, the UNDP country office shall ensure that the capacity of the Government-designated institution is strengthened to enable it to carry out such activities directly. The costs incurred by the UNDP country office in providing such support services shall be recovered from the administrative budget of the office.
- 3) The UNDP country office may provide, at the request of the designated institution, the following support services for the activities of the programme/project:
  - a. Identification and/or recruitment of project and programme personnel;
  - b. Identification and facilitation of training activities;
  - c. Procurement of goods and services.
- 4) The procurement of goods and services and the recruitment of project and programme personnel by the UNDP country office shall be in accordance with the UNDP regulations, rules, policies, and procedures. Support services described in paragraph 3 above shall be detailed in an annex to the programme support document or project document, in the form provided in the Attachment hereto. If the requirements for support services by the country office change during the life of a programme or project, the annex to the programme support document or project document is revised with the mutual agreement of the UNDP resident representative and the designated institution.
- 5) The relevant provisions of the Agreement between the Government of the Kingdom of Saudi Arabia and the United Nations Development Programme signed in 4<sup>th</sup> January 1976 (the “SBAA”), including the provisions on liability and privileges and immunities, shall apply to the provision of such support services. The Government shall retain overall responsibility for the nationally managed programme or project through its designated institution. The responsibility of the UNDP country office for the provision of the support services described herein shall be limited to the provision of such support services detailed in the annex to the programme support document or project document.
- 6) Any claim or dispute arising under or in connection with the provision of support services by the UNDP country office in accordance with this letter shall be handled pursuant to the relevant provisions of the SBAA.
- 7) The manner and method of cost-recovery by the UNDP country office in providing the support services described in paragraph 3 above shall be specified in the annex to the programme support document or project document.



- 8) The UNDP country office shall submit progress reports on the support services provided and shall report on the costs reimbursed in providing such services, as may be required.
- 9) Any modification of the present arrangements shall be effected by mutual written agreement of the parties hereto.
- 10) If you are in agreement with the provisions set forth above, please sign and return to this office two signed copies of this letter. Upon your signature, this letter shall constitute an agreement between your Government and UNDP on the terms and conditions for the provision of support services by the UNDP country office for nationally managed programmes and projects.

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**On Behalf of the United Nations Development Programme (UNDP)  
UNDP Resident Representative**

Signature: .....

**Dr. Ashok Nigam**

Date:

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**On Behalf of the Kingdom of Saudi Arabia Government  
Minister of Environment, Water and Agriculture (MEWA)**

Signature: .....

**HE Eng. Abdulrahman Abdulmohsen Al Fadley**

Date:



## Attachment To Annex 4

### DESCRIPTION OF UNDP COUNTRY OFFICE SUPPORT SERVICES

- Reference is made to consultations between the Ministry of Environment, Water & Agriculture (MEWA), the institution designated by the Government of the Kingdom of Saudi Arabia, and officials of UNDP with respect to the provision of support services by the UNDP country office for the nationally managed project "Capacity Development and Related Services for an Integrated Sustainable Development and Management of the Water Sector in the Kingdom of Saudi Arabia in the framework of the VISION 2030", "the Project".
- In accordance with the provisions of the letter of agreement signed on December 2017 and the project document, the UNDP country office shall provide support services for the Project as described below.
- Support services to be provided:

Support services (insert description)	Schedule for the provision of the support services	Cost to UNDP of providing such support services (where appropriate)	Amount and method of reimbursement of UNDP (where appropriate)
1. Recruitment of experts	Throughout project		4% of project annual expenditure
2. procurement of equipment	Throughout project		
3. Identification of training institutes	Throughout project		

- Description of functions and responsibilities of the parties involved:



## Annex 5

### Schedule of Payment

<u>DATE</u>	<u>AMOUNT</u>	<u>Remarks</u>	<u>CONTRIBUTOR</u>
To be Paid in 2018	<b>\$6,031,269.00</b>		KSA Government
To be paid in 2019	<b>\$5,801,540.00</b>		
To be paid in 2020	<b>\$7,136,900.00</b>		
To be paid in 2021	<b>\$5,880,720.00</b>		
<b>Total Received</b>	<b>24,850,429</b>		