

**PROJECT INFORMATION DOCUMENT (PID)
IDENTIFICATION/CONCEPT STAGE**

Report No.: PIDC19559

Project Name	Strengthen capacity for an inclusive design of groundwater mangement contract for green growth.
Region	MIDDLE EAST AND NORTH AFRICA
Country	Morocco
Sector(s)	General water, sanitation and flood protection sector (100%)
Theme(s)	Climate change (20%), Water resource management (80%)
Lending Instrument	Lending Instrument
Project ID	P154280
Borrower Name	
Implementing Agency	
Environment Category	C - Not Required
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Initiation Note Review Decision	The review did authorize the preparation to continue

I. Introduction and Context

Country Context

Against the backdrop of the historic events that swept through the Middle East and North Africa region in early 2011, Morocco initiated important political and social changes of its own, with King Mohammed VI spearheading the drafting of a new constitution and a broad range of reforms to respond to popular demands for more democratic governance and better opportunities. The new constitution presented a revised governance framework, strengthened the separation of powers and granted greater human and social rights to the people of Morocco. The current government has a busy agenda ahead and is expected to deliver on key economic reforms to cut down on subsidies, reform the pensions system, spur competitiveness, create jobs, and improve quality of services in key sectors. Overall, despite regional political unrest, Morocco has done well in keeping a fine political balance and smoothly addressing the population's need for broader reforms and better governance. While reforms are being implemented gradually, the performance of key public sectors, namely education and health, and the bridging of social and human development gaps are perceived as a priority.

Morocco's economy has been performing relatively well with an average growth rate of non-agricultural sector of 4% since 2007, despite successive external shocks due notably to the Eurozone crisis and a highly volatile global market. GDP per capita doubled from 2003 to reach US \$3,300 in 2014. This economic growth has greatly contributed to reducing poverty. However, inequality, poverty, and vulnerability remain important challenges. Morocco's Gini coefficient of 0.41 reflects stubbornly high level of inequality in incomes and access to services. With 17.5% of the population still living just above the poverty line (vulnerable), it also means that more than a

fifth of Morocco's population (6.3 million people) still lives either in poverty or just above the poverty line. In addition, overall unemployment remains high at around 9%, with urban youth unemployment reaching 35.4%. In the long term, Morocco needs to achieve higher growth rates that will lead to sustainable job creation and generate wealth, while prove to be more inclusive. In particular, the quality and governance of public services, including for youth and women, must be strengthened and the development model needs to be environmentally sustainable.

Sectoral and Institutional Context

Morocco has 22 billion cubic meters (BCM) of renewable, natural water resources, equivalent to 700 cubic meters per capita per year (CM/cap/yr), which is under the 1,000 CM/cap/yr scarcity threshold. Moroccan water resources are variable in space (more than half of all resources are concentrated in the Northern river basins, covering just 7% of the national territory) and time (precipitation can vary tenfold from 5 to 50 BCM over the years).

To manage this temporal and geographic variability, Morocco has traditionally focused on storage of surface water. Morocco's available surface water resources have largely been mobilized since the 1960s, through large water mobilization dams, conveyance systems, and water supply or irrigation infrastructure. 17.5 BCM of surface water is captured in reservoirs, representing 90% of potential storage capacity. Of this total, an average of 10% is lost annually to siltation, and 20% to evaporation, leaving approximately 12 BCM available for use each year.

In the meantime, water demand is growing, leading to exploitation beyond the threshold of available, renewable water resources. Recent population growth of 1.5% per year, and economic growth of 4% on average per year are increasing the pressure on water resources. Urban population is expected to carry the brunt of the population increase by 2030 (8 million additional inhabitants, a 50% increase). Programs for the extension of service delivery through individual household connections in replacement of standpipes will represent a significantly increase in water consumption by poor peri-urban and rural households. Morocco's large imports of agricultural products call for intensification of agriculture to cover increasing needs. The development of industries and tourism (+2.4% per year) also represent an increasing pressure on water resources.

Increasing demand is faced with reducing supply due to the impacts of climate variability and change, leading to overexploitation of groundwater resources. The current water deficit is estimated at around 2 billion m³ and could reach 3.8 billion m³ in 2030 and 5.4 billion m³ in 2050 due to the estimated impacts of climate change. Successive droughts over the last 30 years have significantly reduced runoff in around double that recorded for precipitation, and led to major shortfalls in the supply of irrigation water (52% down according to a 10-year average). As additional surface water storage capacity has been assessed as uneconomical, temporal deficits are being largely bridged by exploiting groundwater resources, though aquifers are considered overexploited (beyond their recharge rate) in all parts of Morocco. Groundwater quality has also deteriorated due to pollution and, in coastal areas, saltwater intrusion. The imbalance between demand and supply will be further accentuated by climate change. According to a recent World Bank study, climate projections in Morocco have shown that climate change is likely to result in (i) an increase in summer temperatures of up to 3.7°C by 2030; and (ii) a reduction in rainfall in the region of 5% to 15% by 2030 and 10% to 25% by 2050. The 3°C increase in temperature and 15% reduction in rainfall by 2030 could reduce the available groundwater recharge by 33 to 45 percent.

Agriculture is central to Morocco's economy as evidenced by the strong correlation among GDP

and agriculture GDP. Over the 2014 agricultural campaign, thanks to favorable weather, the sector represented 15.6 percent of GDP, contributing the most to the country's overall growth. The 20 percent increase in agricultural production allowed Morocco's GDP to jump from 2.7 percent in 2012 to 4.4 percent in 2013. Although the 1.46 million ha of permanently irrigated land represent only 16 percent of the cultivated land, it contributes to half of the agriculture GDP, to 75 percent of agricultural exports, and to 15 percent of overall merchandise exports. It is thus a critical factor to increase the level and stability of incomes in rural areas.

However, agriculture accounts for about 85 percent of the surface water withdrawals in Morocco. The ability of the agricultural sector to continue to drive shared prosperity in rural areas is therefore threatened by increasing water scarcity, which is projected to worsen as a result of climate variability and change. Reduced rainfall, increased rainfall variability, reduced run off, groundwater depletion, and degradation of water resources have reached alarming levels. As a result, severe restrictions in irrigation have been common in the last 15 years. Recent year to year precipitation variability is now challenging the security of water supply from dams and threatens rainfed agriculture. Northern areas of Morocco, where precipitations are usually concentrated, are experiencing variable levels of droughts while southern arid and semi-arid areas undergo extreme weather events and major floods, leading to major destructions.

As surface water becomes scarcer and the impacts of climate change become more visible, irrigated agriculture increasingly turns towards groundwater. In areas with private irrigation (441,000 ha), which largely rely on groundwater to complement precipitation, reduced and more variable rainfall translates into groundwater overexploitation. In Large Scale Irrigation (LSI) perimeters (682,600 ha), which rely on surface water conveyed from dams or rivers, water scarcity translates into reduced volumes allocated to farmers and unreliable service provided by the Regional Agricultural Development Office (Office Régional de Mise en Valeur Agricole, ORMVA) with access to water every one or two weeks. Therefore, wherever possible, farmers in LSI perimeter have been making up for this shortfall by complementing their allocation with groundwater, further aggravating groundwater depletion. In small and medium scale traditional irrigation schemes managed by Water Users Associations (WUA) (334,000 ha), which rely partly on surface water, partly on aquifers, farmers are affected as well by increasing scarcity.

To date, the majority of the wells used for irrigation is neither declared nor monitored, and remain largely uncontrolled. In addition, improvement in water pumping technologies, the introduction of subsidized solar pumping and current butane subsidy facilitate over-extraction. Decreasing groundwater levels have a specific equity dimension, impacting at first smallholders with less capacity for drilling and pumping deeper. The preservation of groundwater resources is strategic to the overall adaptation to the projected impact of climate change. However, preserving them as a strategic resource and critical buffer during dry years is proving an excessively challenging goal. Economic growth and the demographic challenge of maintaining the rural population in rural areas are higher priorities.

In an effort to cope with this situation, the Government of Morocco (GoM) has put in place a National Plan for Saving Water in Irrigation (Plan national d'économie de l'eau d'irrigation, PNEEI), which promotes more productive water use by introducing efficient irrigation technologies (mainly drip irrigation) over 555,000 ha of the country's irrigated land by 2020, of which 335,000 ha in private farms and 220,000 ha in LSI perimeters. This process is supported through the FDA, with up to 100 percent subsidies for the adoption of drip and microsprinkler irrigation (under a

maximum per hectare amount), and with 70 percent subsidies for sprinkler irrigation. While the program aims at increasing water efficiency, it will only reduce the pressure on overexploited aquifers in areas where the groundwater is used to bridge a deficit of surface water resource (LSIs and small and medium scale irrigation), or if the switch to drip irrigation leads to private irrigation using groundwater more efficiently. However, the PNEEI embeds the risk of increased aquifer overexploitation if the extension of private irrigation is not strictly regulated or if farmers switch to more water intensive agricultural productions or misuse of the drip irrigation system translate into increased groundwater consumption. There is therefore a need for increased law-enforcement on illegal borehole drilling and a careful agricultural policy promoting water efficient crops and agricultural practices.

Groundwater over-abstraction by farmers is difficult to monitor and control. In Morocco, despite the provisions of the water law No. 10-95, which imposes that all water users must register their wells, apply for an abstraction authorization, and pay the volumetric fee for groundwater abstraction, in practice it has proven very challenging for river basin agencies to ensure compliance. Global experience teaches that attempts to control groundwater abstraction through coercive actions have often failed.

Morocco has already experienced the total depletion of aquifers with dramatic consequences on agriculture and the local economy. 13,000 hectares dried in Guerdane before the irrigation PPP was established. The water available allowed irrigating 10,000 hectares, leaving 3,000 hectares aside. As groundwater levels decrease rapidly, farmers are increasingly aware of the need to work collectively to reduce or rationalize their consumptions in order not to reach the crisis scenario.

Morocco has prior experience in groundwater management contracts. In the Souss area in the South of Morocco, the current agriculture Minister played a key role in the establishment of a first aquifer management contract. Building on this experience, the GoM is now looking at piloting a second generation of aquifer management contract, aiming at having groundwater users directly commit to reduce their own consumption of groundwater, in an effort to collectively benefit from it in the long run. The challenge is to change the paradigm from the current situation whereby each groundwater user is trying to get the most water for short term profit into a paradigm whereby farmers reduce their consumption and adapt their productions and crops to such limitation. The key to success will be to convince farmers of their interest in entering into the groundwater management contract and the establishment of recognized local governance and self-enforcement mechanisms to ensure that users respect their commitment.

The grant aims at supporting the design of two groundwater management contracts, using an inclusive and participatory approach. Although farmers are the biggest consumer and the largest number of stakeholders, the groundwater management contracts would also include all other stakeholders using the selected aquifers, including potentially ONEE (National Electricity and Water Supply Utility), OCP (phosphates mining industry) and other industries and businesses. By supporting in the design of inclusive groundwater management contract, this grant is expected to contribute to the long-term effort of the GoM for a more sustainable use of groundwater resources. The Bank supports this process and objective through its sector dialog and the ongoing Green Growth DPL series, which promotes piloting the preparation of a new generation of groundwater management contracts that are inclusive and ensure that stakeholder are involved and provide feedback during the design of the groundwater management contract.

Relationship to CAS/CPS/CPF

The objective of this proposed grant is fully aligned with our country program: the salience of groundwater resources is fully reflected in the 2014-2017 CPS, which lists “the establishment of three groundwater management contracts” as a CPS target. This proposed grant is also aligned (i) with the 2012 Bank’s framework for engagement in MENA and particularly with its objective of strengthen governance and social inclusion and (ii) the conceptual framework for Inclusive Green Growth supported by the World Bank through a resilient and socially inclusive methodology. The proposed grant aims to empower the River Basin Agency of Our Er Rbia (Agence de Bassin Hydraulique de Oum Er Rbia, ABH-OER) in addressing the challenges of groundwater management at river basin level. It complements prior grant funded analytical work implemented by the ABH-OER to quantify the impacts of climate change in the River Basin, and the establishment of a comprehensive adaptation strategy, which it is currently implementing out of its own funds.

II. Project Development Objective(s)

Proposed Development Objective(s)

The proposed development objective of the grant is to support the ABH-OER in the inclusive design of groundwater management contracts.

Key Results

The expected result is that the management of overexploited aquifers (nappes/groundwater) in Oum er Rbia basin is regulated by aquifers/groundwater agreements.

III. Preliminary Description

Concept Description

The activities of this grant will be conducted in the Oum Er Rbia river basin and in particular in the Tadla groundwater system. The Tadla, a vast plain, which stretches about 320,000 ha, is located 200 km south-east of Casablanca, at an average altitude of 400 m. It is drained by the Oum Er Rbia river (OER) and its major tributaries, the wadis Srou and El Abid. The Tadla groundwater system includes, from top to bottom, the following entities: (i) a very limited groundwater in contact with the crystalline basement, together with Triassic formations which are not exposed in the basin and which provides only local interest; (ii) a Cénomian-Turonian carbonated groundwater; (iii) a Senonian aquifer of minor significance; (iv) the Eocene groundwater; and ultimately a complex plio-quadernary groundwater made of by places of sand and gravels, conglomerates, and lacustrine limestones (calcarenites).

The two most strategic aquifers in the Tadla system, from water quality and quantity aspects, are the Turonian groundwater and the Eocene groundwater. They are the ones for which a groundwater management contract is likely to be designed under this grant. Although the Turonian and Eocene aquifers are yearly recharged by rainfall in areas where they are outcropping (but also through leakage from other aquifers), their exploitation by drilling has grown considerably from the early 80s, after a succession of dry years. As a result, surface water deficits induced by drought events have led the farmers of irrigated areas to develop groundwater exploitation. From that time, the proliferation of drilled wells resulted in a continual unbalance of each of these two aquifers. The balance deficit of the two groundwater results in a continuous destocking since the early 1990s, and in a steady decline of groundwater levels, variable by sector, of the order of 1 to 2 m/year (Turonian) and 1 to 3 meters/year (Eocene).

Climate change projections in Oum Er Rbia basin predict a reduction in the annual water availability for irrigation by 0.2 billion m³ by 2030 and a potential lowering of the groundwater table up to 50 meters by 2030. The main irrigation areas in the Oum Er Rbia basin (e.g. Tessaout Amont and Tessaout Aval, Doukkala and Haouz) are expected to be affected by this reduction of water availability according to one of the three climate change models used in the World Bank study on climate change impacts in Oum Er Rbia Basin (2013). The potential lowering of the groundwater table is a concern as groundwater is used to irrigate 10 percent of cultivated land in the basin, however 9 out of the 11 different groundwater units in the Oum Er Rbia basin already are overused due to irrigation.

As groundwater will be a resource that will be needed to reduce the impact of climate change, as a result, demand management for groundwater needs to be put in place as of now. The top-down option with water counter on wells and the water police have not been successful as very few wells are installed and the water police is limited in number and in power. New approach is needed.

Groundwater management contract is an option that has been tested in other basins such as Souss Massa and the ABH-OER is willing to test it in the Oum Er Rbia river basin. To increase the likelihood of success of this approach, the ABH OER is designing with a strong emphasis on a participatory approach with a strong and direct involvement of the users.

One major step of the design of the contract management is to conduct a modeling of the groundwater system to project the levels of groundwater over time in the next decades, based on the inflows (rainfall and recharge) and the different use scenario. A firm (Anzar) conducted a modeling of the groundwater system of the Tadla; however there are two shortcomings: (i) the projections of the rainfall did not take into account the projected impact of climate change (i.e. the projected reduced recharge of the groundwater) and hence overestimated the water storage in the groundwater in the next two decades; and (ii) the use of groundwater were based on user declarations and not based on actual pumping which resulted in a significant underestimation of the exploitation of the groundwater. As such the current modeling needs to be updated.

Once the modeling is completed, with the inclusion of the impact of climate change and actual use of water, different future groundwater use scenarios are discussed with users and the agreed scenario is then the base of a groundwater contract management where the role a responsibilities of each stakeholder is defined, the monitoring of the groundwater discussed and agreed, the allocation for users agreed on, and redress mechanism for users agreed upon as part of the management contract.

This grant will support the ABH-OER in the design of an inclusive groundwater management contract and will (i) in the first component project provide rainfall series for the groundwater modeling, which is the basis for user discussion on the selection of the use scenario, and also identify and discuss with stakeholder the basin's vulnerabilities to climate change, and (ii) based on the climate change, update the modeling (taking into account the climate change) so as to present to the stakeholder accurate evolution of groundwater and establish on this basis the management contract. The in-depth knowledge on the stakeholder mapping in particular for the larger group representing the farmers will be conducted as part of the grant (in terms of large farmers versus small farmers, type of irrigation, technologies, etc.). This stakeholder mapping is doable for the two aquifers of the Turonien and the Eocene as the number of farmers is expected to be in the hundreds for the Turonien and thousands for the Eocene. The more detailed description of the content of the components is presented as follows:

Component 1: Stakeholder involvement in selecting performance indicator for a climate risk assessment of Oum Er Rbia Basin

The key objective of this component is to establish from available information and current knowledge, the evolution of rainfall/runoff, and the vulnerability in the basin based on performance indicators selected by stakeholder. Indeed, most of climate change analyses focus on the change in the rainfall and temperature, and in some cases the runoff. However, users are likely to be also interested on performance indicators that matters to them, for example how this translates in number of hectares that can be irrigated, or does it affect the energy production through hydropower, etc.

Main tasks: The initial planning of this component is to have the following tasks : (i) assessment of current information/knowledge on the Basin (hydrology/hydrogeology) and initial climate risk assessment; (ii) training on methodology for the initial climate risk assessment and consultation with key stakeholders in identifying key performance indicators for main uses (and to extent possible thresholds); (iii) climate risk assessment for key performance indicators (and threshold to the extent possible); (iv) consultations on results of climate risk impact based on key indicators (and possibly threshold) and identify potential trade-off.

Component 2: Inclusive design and establishment of groundwater contract management in Oum Er Rbia Basin.

Key objective: Morocco's groundwater resources are strategic to ensuring notably sustainable and stable agricultural revenues, including for small scale farmers, but over the past decades stocks have been heavily impacted. Based on initial pilot in Morocco on a convention including water users at the level of the Souss-Massa basin and on lessons learned in other basins in Morocco and in other countries, key elements for increasing the likelihood of successful groundwater management contract are involving stakeholder, building trust, good communication, and transparency in the process. Given the long engagement of the Bank in the Oum Er Rbia Basin (in agriculture, water supply and sanitation, climate change, etc.), and the interest of the ABH-OER to design and establish two groundwater management contracts following these principles of bottom up approach (inclusiveness, transparency, agreement), this component aims at piloting this approach in the Basin and supporting the ABH-OER in the consultations and consensus building process.

Main task: The initial planning of this component is to have the following tasks : (i) consultation with stakeholder to select the two aquifers for establishing the groundwater contract management based on agreed criteria; (ii) stakeholder analysis and assessment on way forward for each contract (including legal gaps and way to move forward with existing legal instruments); (iii) initial consultations workshop to agree on the process and key content of contract management for two aquifers; (iv) assistance to the ABH-OER in the designing process and first draft contract management for two aquifers; (v) consultation workshops on process and initial draft of contract management (including getting the medium and long-term objective of use of groundwater be stakeholder in a context of reduction of recharge of groundwater due to climate change); (vi) workshop to present and exchange with other ABH-OER on the groundwater contract management; and (vii) synthesize lessons learned and prospective.

IV. Safeguard Policies that Might Apply

Safeguard Policies Triggered by the Project	Yes	No	TBD
Environmental Assessment OP/BP 4.01		x	
Natural Habitats OP/BP 4.04		x	
Forests OP/BP 4.36		x	
Pest Management OP 4.09		x	
Physical Cultural Resources OP/BP 4.11		x	
Indigenous Peoples OP/BP 4.10		x	
Involuntary Resettlement OP/BP 4.12		x	
Safety of Dams OP/BP 4.37		x	
Projects on International Waterways OP/BP 7.50		x	
Projects in Disputed Areas OP/BP 7.60		x	

V. Financing (in USD Million)

Total Project Cost:	0.75	Total Bank Financing:	0
Financing Gap:	0		
Financing Source			Amount
Miscellaneous 1			0.75

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