

SECTOR ANALYSIS



Egypt: Water Sector

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Embassy of Denmark in Cairo

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Resumé: In this sector analysis you will find relevant and updated information on the water sector and its subsectors in Egypt including: Groundwater, Wastewater and Desalination. Additionally the analysis provide general information on the water sector and mention the recent relevant government water policies.

WATER

A growing population combined with scarce water resources is the condensation of Egypt's water problems. Until now the political unrest in Egypt has been hindering development in the field; but the future looks promising as the government has showed great commitment to the issue. The Public-Private Partnership unit's decision to revive the prequalification for the Abu Rawash wastewater treatment plant is a positive development and the government is clearly aware that it cannot afford to let the water sector drift.

Egypt will need around 86.2bn m³ of water by 2017 if demand is to be met, but is likely to have access to resources totalling only 71.4bn m³ at the present rate of development, according to a report by the government's Information and Decision Support Centre.

THE MARKET

Egypt is considered water scarce due to an imbalance between increasing water demand and limited supply, which makes alternative water recourses increasingly important. The allocation for the water consumption is approximately 86% for agriculture, 8% for domestic use, 6% for industry. The source of Egypt's water supply is today dominated by the Nile River, which is providing 95% of the water for the country. This implicates that Egypt faces a looming threat with the Ethiopian Renaissance Dam project, which is situated upstream the Nile River, since the dam is estimated to cut Egypt's water resources with approximately 18 bn m³ annually.

Several challenges of water scarcity are accumulating rapidly, which will undoubtedly mean that we can expect the government to make decisions on key projects in the near future.

In November, a consortium comprising Passavant-Roediger GmbH, Acciona, and Hassan Allam Sons won the USD 148mn contract to expand Al Gabal Al Asfar Wastewater Treatment Plant in Cairo. General Electric (GE) has signed a contract with Carbon Holdings to provide water equipment for a new petrochemical plant in Ain Sokhna. As part of the partnership, GE will provide equity financing and advanced technologies to the new petrochemicals complex, including advanced aero-derivatives gas turbines, steam turbines, generators, water filtration and desalination equipment.

The government has agreed to implement a number of water network and sanitation projects in the rural areas of the country, worth US\$261mn which will be spread out over 150 projects and is offering tenders for a number of water and sanitation projects under the PPP format. Egypt is highly depending on their large system of wells, however, after many years of little or no maintenance are the wells in need rehabilitation. For this purpose has Saudi Arabia given Egypt a loan of USD 80mn, from which contracts can be anticipated to be given to private contractors. Egypt has signed an agreement with Libya, Chad and Sudan concerning the sharing of underground water resources in an aquifer system straddling the four countries known as the Nubian Sandstone Aquifer System.

WATER DEMAND

Agriculture, drinking and industrial sectors are the highest water consumers. The competition among these demands will intensify under climate change, but drinking water will always have the highest priority for the government.

At the same time a number of heavy water using companies are constructing their own water extraction facilities to cater to their needs. For example was General Motors (GE) awarded a contract to build a cracker with an attached desalination plant in Ain Sokhna.

GOVERNMENT REFORMS

The Ministry of Water Resources and Irrigation's written strategies for addressing water scarcity and the future implications of climate changes highlights development in the groundwater industry for opening the possibility for agricultural expansion into new areas and relocation of people from the Nile Valley and Delta to new communities in areas currently desert. These initiatives will clearly intensify demands on groundwater irrigation in the future. Other strategies outlined in the plans include:

- Implementation of vertical well drainage systems and employment of sprinkler or drip irrigation from groundwater to prevent waterlogging and rising water tables.
- Utilizing renewable energy sources, including solar and wind, to minimize the pumping costs.
- Application of new irrigation technologies in desert areas for minimizing losses, especially deep percolation due to the high porosity.
- Desalination of brackish and sea water,
- Water harvesting projects from rainfall and flash floods.
- Modernizing water control systems, and upgrade municipal infrastructures.
- Utilizing groundwater for artificial fish ponds.
- Establishing seawater agriculture.

The total estimated budget for implementing this strategy is about USD 25.85 billion until 2050.

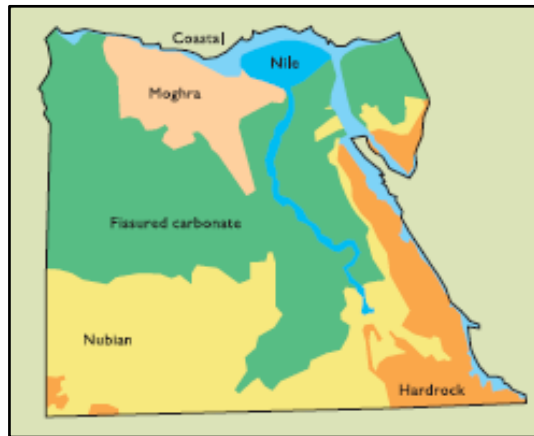
Public Private Partnerships

The government has recently created initiatives for private sector participation in Egyptian water project, with a commitment to bring on a new major wastewater treatment plant on public-private partnership (PPP) terms. The PPP Central Unit has reassured investors with the provision of arbitration in any future disputes. Desalination will be a major priority for the government with a reported USD 164mn, which will be made available for deals schemes in the Red Sea and Mediterranean coastal regions.

The Egyptian government's focus on PPPs had been heavily balanced toward water infrastructure and substantial potential is still there if the government decides to throw its support behind PPPs. The country's first ever PPP was awarded in May 2009 for the New Cairo Wastewater Treatment plant. The Abu Rawash wastewater project and the 6th October City wastewater treatment plant are the next projects in the pipeline, both of which are being tendered under 20-year concessions. Numerous other PPPs are in the pipeline for 2014.

GROUND WATER

The extraction of ground water is one of the main areas of focus for the Egyptian government and in the coming years we will see an even more comprehensive focus on implementing well drainage systems and application of new irrigation technologies in desert areas for minimizing losses, especially deep percolation due to the high porosity as well as implementation of renewable energy solutions, including solar and wind, to minimize the pumping costs. The major groundwater system in Egypt consists of several aquifers as shown in the figure below.



Source: National Water Resources Plan – 2017 (NWRP-MWRI, 2005)

The Nile Aquifer

A shallow one that is recharged mainly by infiltration of excess irrigation water (i.e. originally Nile water), so it is not an additional source, and is considered as a reservoir. However, in terms of abstractions, it provides about 85% of total groundwater abstractions in Egypt. It is composed of a thick sand and gravel layer covered by a clay cap of varying depth up to 50 meters.

The Nubian Sandstone Aquifer

It covers an area of about 2 million km², and extends into Libya, Chad and Sudan. The aquifer is phreatic in the southern part Egypt and is confined elsewhere. The thickness of the fresh layer ranges from 200 meters in East Owinat to 3500 meters North West of El-Farafra Oasis. The aquifer is of fossil origin and flows are in a North direction. The total potential volume stored in this aquifer exceeds 150,000 billion cubic meters, but most of it is very deep and still not economically feasible to abstract.

The Fissured Carbonate Rock Aquifer

It occupies more than 50% of the Egypt's area and acts as a confining layer on top of the Nubian sandstone aquifer. It extends from Sinai to Libya, and has many natural springs. The aquifer recharge is unknown and there is no reliable information regarding its potential.

The Moghira Aquifer

Is located in the North western desert and groundwater is directed towards Qattara Depression. It is recharged by rainfall and lateral inflow from the Nile aquifer. It contains fresh groundwater only with salinity increases towards North and West. The water quality and sustainability of this aquifer is at risk due to the rapid development of land reclamation in this area.

The coastal Aquifer

Its system is recharged by rainfall, and the abstractions are limited due to the presence of saline water underneath the fresh water lenses. Similarly, the fissured hard rock aquifer system in the Eastern desert and Southern Sinai is also recharged by small quantities of infiltrating rainwater.

WASTE WATER

The wastewater and sanitation segments are not as developed as the groundwater industry and are in need of substantial investments in the future. Wastewater, if properly harnessed, represents a vast resource of low-quality water suitable for agricultural irrigation and some industrial consumption. The Holding Company for Water and Wastewater (HCWW) has finalised the country's master plan for water and sanitation up to 2037, which prioritises a number of potential water projects according to socioeconomic need. HCWW says capital expenditure of over US\$2bn will be ploughed into water supply, and more than US\$3.5bn will go into wastewater between 2012 and 2017.

Wastewater discharged will soar over the next five years as sewage connections and pipelines increase. The overall volume of wastewater will grow by 6.7% over 2013, to 17.4mn cubic metres. By 2017, this will have increased by almost 10mn cubic metres, reaching 24.06mn cubic metres. The use of recycled or reclaimed wastewater is not as widespread as it could be. However, in part this is because treatment facilities are not yet numerous enough to be able to cope with the large volumes of wastewater produced.

Egypt had 372 municipal wastewater treatment plants in 2012, treating an average of 10.1 million cubic meters per day. The largest wastewater treatment plant in Egypt is located in Gabal el Asfar to the Northeast of Cairo, serving about 9 million people and treating 2 million cubic meters per day. A planned third stage would bring capacity to 3 million cubic meters per day, serving 12 million people and making Gabal al Asfar one of the largest wastewater treatment plants in the world. The expansion of the Gabal As Asfar plant involves the construction of a primary and secondary wastewater plant which is expected to be completed in 2017.

Another large wastewater treatment plant is located at Abu Rawash in the western part of Giza governorate. It initially treated 0.4 million cubic meters only at primary level. The treated water is discharged in the Barakat drain and then 50 km downstream into the Nile River. In 2005-08 the capacity was increased to 1.2 million cubic meters per day. In 2013 a tender was underway to upgrade the entire plant to secondary treatment and to increase its capacity to 1.6 million cubic meters per day with a possible loan funding from European Bank for Reconstruction and Development (EBRD) and Egyptian banks as part of a public-private partnership.

SALT WATER DESALINATION

Though wastewater treatment and irrigation remains a priority for foreign investors, PPP structures will be deployed in other areas, notably desalination, with talk of two desalination projects being tendered in Hurghada and Sharm al-Shaikh in Sinai. The government has showed efforts to quickly expand desalination capacity in the coastal areas - for which the authorities are seeking to raise external funding. The main company charged with responsibility for the desalination scheme, HCWW, is seeking to revive the mothballed desalination programme in the near future which should ensure some key opportunities for international developers and advisers with robust risk appetites.

Smaller-scale projects are gaining traction, with financial assistance from multilateral donors such as USAID. In July 2011 the US aid agency signed a memorandum of understanding with the North Sinai governorate, which will lead to the construction of three new desalination plants in Central Sinai.

MARKET ASSESSMENTS

There is a risk that Egypt might see changes in their source of water supply which until now has been supplied 95% from the Nile River. This is due to the construction of the Ethiopian Renaissance Dam project as well as challenges from climate changes. This opens a market opportunity for establishing business within the alternative subsectors of water supply such as groundwater, wastewater and desalination of sea water. Except for the above mentioned opportunities in the water sector, Egypt also has great potential for development of the sector of rainwater harvesting - especially in the northern part of Egypt by Alexandria and establishment of salt water agriculture and artificial fishponds. With the recent development of the Ethiopian Dam and the increasing awareness of climate change has the government created several long-term strategies for future water supply including a sufficient budget for public private partnerships.

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