



The “Desalination Facility for the Gaza Strip” Project

Brief Information

SUMMARY

On 22 June 2011, the Union for the Mediterranean “labeled” its very first project. This landmark operation consists of the construction of a 100 million cubic meters desalination facility and distribution system in the Gaza strip that would help to address the major water deficit for a population of 1.6 million. The “labeling” of this large-scale project, submitted by the Secretariat’s Environment & Water Division in collaboration with the Palestinian Water Authority, by the representatives the 43 UfM countries¹ was partly based on a unanimous recommendation from the UfM’s Water Expert Group, and is an acknowledgement that the project is capable of delivering concrete benefits for 1.6 million impoverished citizens living on the southern shores of the Mediterranean, not only from humanitarian and health perspectives, but also contributes to job creation and future economic and sustainable development in that highly populated region of the Mediterranean. The Project will also contribute to the political stability of the region through the removal of the water scarcity issue from the web of the multiple and complex issues facing the Gaza Strip.

THE CONTEXT

The 1.6 million Palestinian people in the Gaza Strip, 1.1 million of whom are UNRWA-registered refugees, rely almost exclusively on the trans-boundary Coastal Aquifer for acquiring fresh water. The aquifer is located under the entirety of the Gaza Strip but also stretches well beyond the borders into Egypt and Israel.

The sustainable yield of the portion of the aquifer under the Gaza Strip is around 45-55 million cubic metres (MCM)/year; however, in 2010, the population in Gaza consumed in excess of 170 MCM/year from the aquifer – thus abstracting almost three times as much as the aquifer is able to sustainably recharge each year. This over-pumping of groundwater has led to the damage of the trans-boundary aquifer

¹ 27 EU Member States, nine Arab countries (Algeria, Egypt, , , Jordan, Lebanon, Mauritania, Morocco, Palestine, Syria and Tunisia) and seven non-eu-non-Arab states (Albania, Bosnia and Herzegovina, Croatia, Israel, Monaco, Montenegro and Turkey).



due in part to a large increase in groundwater salinity following from seawater intrusion into the aquifer from the Mediterranean. Levels of salinity found in the aquifer under Gaza have risen continuously over the last two decades, and are now far in excess of the World Health Organization standards for drinking water.

According to a World Bank report, which conducted an independent third-party assessment in 2009, “no new [water] sources have been officially developed in Gaza since Oslo II and heavy over drafting of groundwater has led to groundwater quality decline and seawater intrusion. Only 5-10% of the aquifer is now yielding drinking quality water”. Also in 2009, the United Nations Environment Programme issued an environmental assessment that highlighted the severe groundwater crisis following unsustainable rates of exploitation for decades, and recommended that completely “resting” the aquifer by identifying suitable alternative sources was the only way to halt further degradation of this source and avert a major water crisis and cited sea water desalination as “the only method that can produce water in adequate quantities”. The portion of the aquifer under the Gaza Strip is currently showing clear signs of imminent failure or collapse. Severe contamination (mainly from wastewaters) is also evident, and almost none of the groundwater meets internationally accepted guidelines for use as a domestic supply. The population is therefore exposed to very high levels of risk, and the treatment of the water is too expensive for many of the inhabitants. Even where the groundwater is treated, the resulting flows are often contaminated, and high levels of water-borne disease continue amongst the Gaza population.

At this time Palestinian groundwater models show that the Aquifer is likely to collapse before 2020 (see Annex for Figure 1 on saline intrusion and water level in the Gaza aquifer and Figure 2 on the effects of different interventions on groundwater from the only aquifer).

THE PROJECT

With no alternative existing source of fresh water, a large-scale desalination plant is an absolute requirement to address the water deficit in the Gaza Strip. The urgency for the Desalination Facility for the Gaza Strip has increased with the rising level of humanitarian crisis in Gaza related to inadequate water resources with related impacts on human health. Further, the desalination of water from the Mediterranean would substantially alleviate the over pumping of groundwater from the Coastal Aquifer which underlies the Gaza Strip as a clear environmental benefit. This outcome aligns with the strategic objectives of the Union for the Mediterranean (UfM) in



protecting coastal aquifers, especially when considering it is accompanied under a Palestinian water programme in the development of new wastewater treatment plants in Gaza which shall actively prevent the further pollution of the Mediterranean as well as the Coastal Aquifer.

The deterioration of the trans-boundary aquifer has likely impacts on neighbors Egypt and Israel, both of whom have a shared interest in protecting this communal source of fresh water. Importantly, there is a corresponding conservation and environmental protection need to address the wastewater generated in Gaza to avoid not only filtration of untreated wastewater into the aquifer (e.g. northern Gaza wastewater treatment facility), but to provide an effective alternative to the current practice of pumping partially or totally untreated wastewater into the Mediterranean for the central and southern Gaza wastewater treatment facilities. This directly serves the interests of the littoral states of the Eastern Mediterranean as well as the environmental protection objectives of the Union for the Mediterranean towards the De-pollution of the Mediterranean (Horizon 2020 Initiative).

Lastly, the construction of the desalination facility and conveyance system in Gaza offers a substantial opportunity for job creation in their construction and subsequent operation as it will represent the largest single project built to date in the Gaza Strip.

ROLE OF UfM SECRETARIAT

At the UfM Water Expert Group Meeting organised by the Secretariat in Barcelona on 18 May 2011 with attendance by Water Experts representing 22 UfM member countries, including Egypt, Israel, Jordan and Palestine, the national Water Experts unanimously proposed to the UfM Senior Officials Meeting the “labeling” by the UfM of the Desalination Project for Gaza. The Secretariat, in collaboration with the Palestine Water Authority, submitted the project to Senior Officials representing the 43-member countries of the Union on 22 June in Brussels, who unanimously “labelled” it as the first UfM project.

The Secretariat considers the Gaza Desalination project as an important national project with regional impact and implications which will help meet most of the future medium- to long-term drinking water needs for 1.6 million Palestinians living in the Gaza Strip. The project will also aim at stabilizing and regenerating the only fresh water source in Gaza, which is the “Coastal Aquifer” that runs beneath the entirety of the Gaza Strip but is more extensive in both Israel and Egypt. It will also be a step towards effective reduction of pollution in the Eastern Mediterranean, through the construction of a desalination facility, and a modern water distribution system, as an



initial component of a broader water and wastewater programme including development of a number of wastewater treatment facilities.

The Secretariat also believes that the desalination project will contribute to the political stability of the region through the removal of the water scarcity issue from the web of the multiple and complex issues facing the Gaza Strip.

As a next step, the Secretariat will be working with the Palestinian Authority to update a 2003 feasibility study and to attract the required funding of €310 million, mostly in terms of grants, from a number of donors within and outside the framework of the Union for the Mediterranean. In this respect it is worth noting that the Gaza Reconstruction Conference held in Sharm el-Sheikh in Egypt in March 2009 has pledged around \$5.2 billion (€3.6 billion) by 80 countries and international agencies, including the USA, EC and Arab Gulf States. These funds have not yet been fully utilized.

ESTIMATED PROJECT COSTS

<u>Activity</u>	<u>Estimated cost in</u>
<u>Euros</u>	
• Updating the 2003 Feasibility Study	500,000
• Design and Construction Management	6,800,000
• Construction of sea water desalination plant	170,000,000
• Construction of water distribution system	102,000,000
• Training of operations, maintenance, management personnel	950,000
• Project contingency	27,000,000
• Project development, oversight management, and coordination with authorities by the sponsor	2,750,000



Preliminary total project cost estimate

310,000,000

With the launching of an updated feasibility study before the end of 2011, the project duration is estimated to be four to five years.

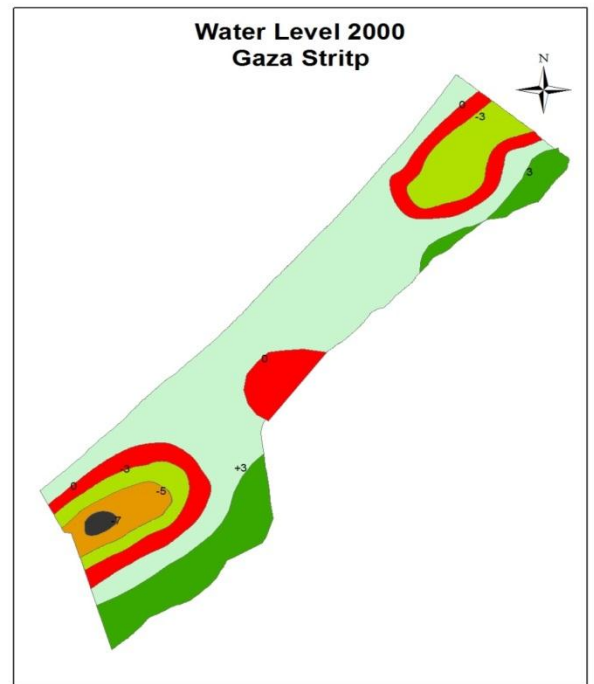
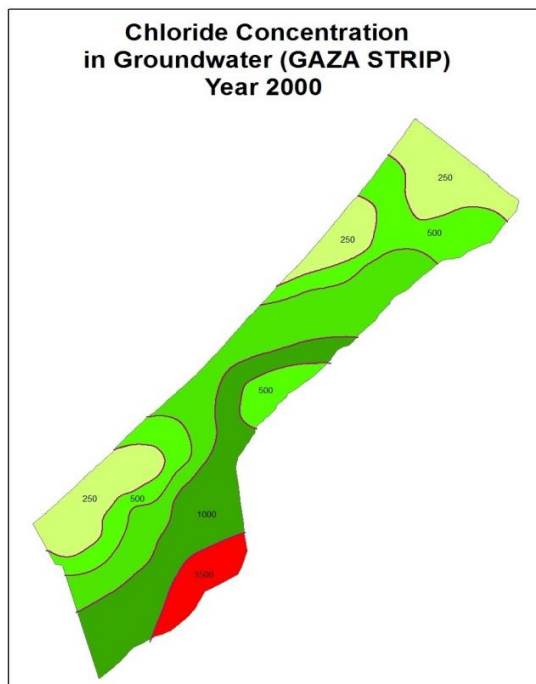
Commenting on the decision to label the project by the UfM Senior Officials, Dr. Rafiq Hussein, Deputy Secretary General for Environment and Water commented: "This project was swiftly labeled by the UfM because its benefits are multi-factorial. Not only it addresses a humanitarian and health crisis by supplying families with adequate clean water, but also it will generate jobs, improve future economic and sustainable development prospects and contribute to political stability in the southern region of the Mediterranean. All this has special attractiveness and appeal and will encourage financial assistance from the Arab Gulf States the European Union and the broader international community".



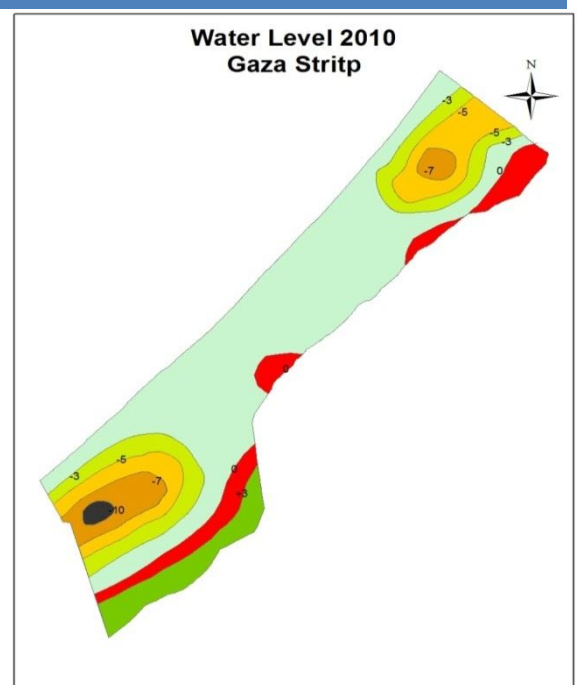
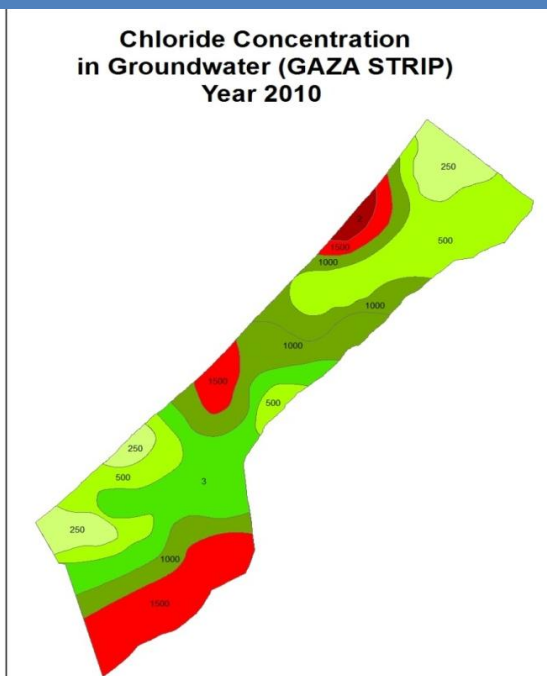
Figures

Figure 1.Diagrams provided by the Palestinian Water Authority show the increase in chloride level and decrease in water levels over 20 years as a result of over pumping

Saline Intrusion & Water Level in the Aquifer



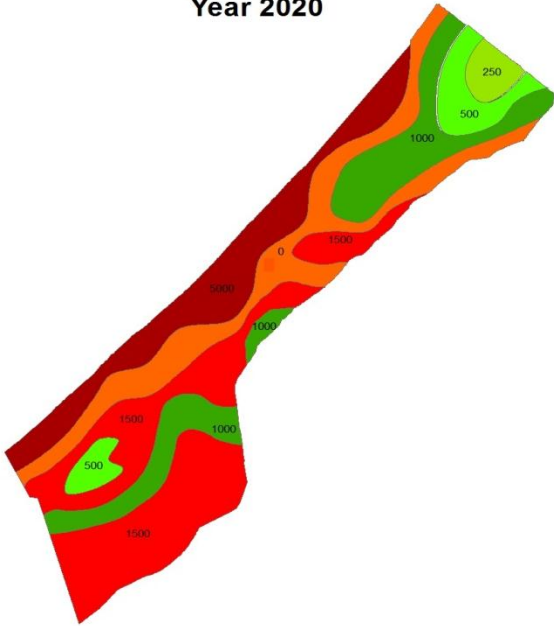
Saline Intrusion & water level in the Aquifer





Saline Intrusion & Water Level in the Aquifer

**Predicted Chloride Concentration
in Groundwater (GAZA STRIP)
Year 2020**



**Predicted Water Level 2020
Gaza Strip**

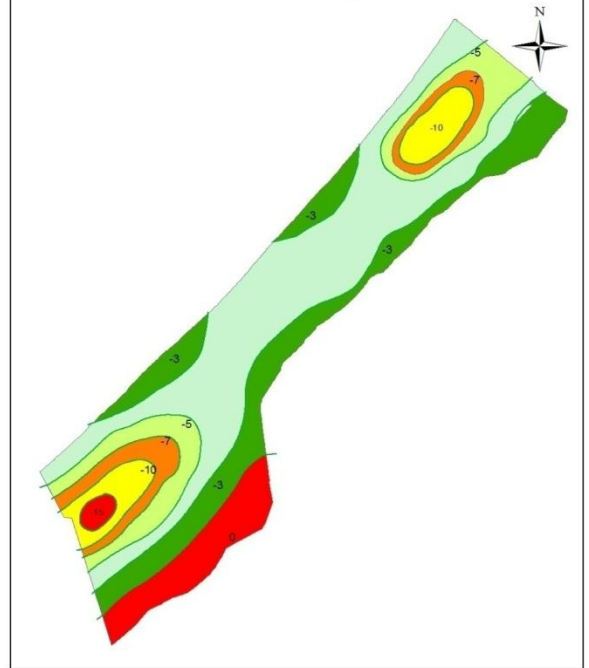




Figure 2. A historical profile showing the derivation of problems relating to the groundwater in Gaza, with diagrammatic indications of the effects of short-term, medium-term and longer term interventions.

