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**Forum 2000**  
**Exploring Water Patterns in the Middle East**

**Concise Report on the South Valley Development Project**

**December 2007**

## **Introduction**

Egypt is a country that is known the world over for vast deserts as for ambitious mega water projects. It's a reputation that can trace its inception back to 1869 when the Suez Canal, the 101-mile long waterway connecting the Mediterranean Sea to the Red Sea that was engineered by the French, opened to world trade. The prestige of the canal was followed by the Aswan Low Dam, which was engineered by the British in 1902, and then the Aswan High Dam, which was finished in 1970 by the Soviet Union, a testament to the Cold War's shifting alliances.

As is often the case, many of these mega projects had to survive a great deal of controversy at the time of their inception. The Suez Canal's construction costs reportedly ran 100 percent over budget. And the Aswan Low Dam was an imperfect solution to the Nile's floods. Its wall was raised twice before the construction of the Aswan High Dam was decided upon.

The erection of the Aswan High Dam certainly has brought significant benefits to southern Egypt. The dam accounts for approximately 13 percent of Egypt's current energy portfolio. The dam mitigates floods and droughts that used to devastate southern Egypt and fostered the development of a thriving fishing industry. Yet for all these benefits, the dam brought significant costs to the Nubians in the south and the regions cultural inheritance. The dam's reservoir, Lake Nasser, flooded lower Nubia, causing the displacement of more than 90,000 indigenous people and buried numerous archaeological sites under water. From an agricultural point of view, the dam now withholds the silt that used to fertilize the Nile floodplain, a repercussion that has since had an anemic affect on farms downstream.

Despite Egypt's history of big solutions to flooding, navigation and trade, and in those respects, to development, its burgeoning population remains constrained to a tiny fraction of the country's total land area. Seventy million Egyptians make their homes on a scant four to five percent of the country's land, mostly along the Nile River and on the Nile Delta. It is a demographic that roughly corresponds to Egypt's 3.4 million hectares of cultivated land, a scant 3 percent of the country's total land area whose expansion, for the past two centuries, has been outstripped by Egypt's population growth. And Egypt's population continues to grow, making a crisis ever more palpable. Indeed, mitigating the country's lack of arable land and heavily overcrowded cities is a high priority of Hosni Mubarak's government. The Mubarak administration's grandest solution is to implement more mega water projects, all under the umbrella of the New Valley

Project, in order to expand the country's arable, or inhabitable land to 25 percent by 2017.

The South Valley Development Project, also known as the Toshka Project, is perhaps Egypt's most widely publicized mega project within the New Valley scheme, and the focus of the Forum 2000 Foundation's Exploring Water Patterns in the Middle East's (EWaP) close-up on water activity in the Middle East region for 2007. In December, the EWaP team visited Egypt's southern valley to see the controversial Toshka Project firsthand. During the short trip EWaP visited the colossal Mubarak Pumping Station and the private farm of the Kingdom Agricultural Development Company (KADCO). If successful, the Toshka Project will redraw Egypt's demographic map in the south.

### **The Food and Water Picture**

The Food and Agriculture Organization of the United Nations (FAO), says that in Egypt "inadequate social services, landlessness, small farm size and inadequate off-farm income opportunities are the main causes of rural poverty."

As of 2002, Egypt's cultivated land, which includes arable land plus permanent crops, was 3.4 million hectares, a scant three percent of the country's total land area. To make matters worse, cultivated land lies almost entirely along the Nile River and Delta, as well as along canals. The result is that approximately 97 percent of the Egyptian population lives in a literally constrained area, with population densities in excess of 1,165 inhabitants per km<sup>2</sup>.

Compounding the severity of the situation is Egypt's rainfall, which is extremely low, random and therefore unpredictable. Some areas in the south receive a minimum annual rainfall of almost zero. Heat is harshest in the south and west where summer temperatures reach a sweltering high of 49 degrees Celsius.

Egypt's total renewable water resources are estimated at 58.3 km<sup>3</sup> per year. The Nile River, which flows north from Sudan to the south, and empties into the Mediterranean Sea, is Egypt's main source of water. Fifty-five and a half km<sup>3</sup> per year is guaranteed to Egypt under the Nile Waters Agreement, which it signed with Sudan in 1959. The remaining 2.8 km<sup>3</sup> per year comes from internal surface and groundwater, the Nubian Sandstone aquifer under the Western Desert, and groundwater flowing from Libyan Arab Jamahiriya. Egypt also has several desalination plants on the Mediterranean and Red seas, however they primarily serve coastal resorts.

Looking back at past water use, of the 68.3 km<sup>3</sup> of water withdrawn in 2000, 86 percent was used for agriculture. That 86 percent, or 58.5 km<sup>3</sup> of water, combined with other factors, enables Egypt to be self-supporting across many

food-stuffs. Despite the apparent autonomy in this respect Egypt is one of the world's largest food importers. Indeed, Egypt imports wheat, wheat flour, vegetable oils, maize, and sugar in the millions of tons. In contrast, Egypt exports citrus, potatoes, cotton, and rice in the thousands of tons. According to the FAO, approximately 50 percent of the country's land holdings have an area less than 0.4 ha (1 feddan), which indicates a prevalence of small-scale farming. Recent statistics show that agriculture accounts for approximately 17 percent of Egypt's GDP and employs 31 percent of the total workforce, of which 49 percent are women.

### **The South Valley Development Project**

The South Valley Development Project, or more commonly known as the Toshka Project due to the projects proximity to the town of Toshka on the northern rim of Lake Nasser, consists of the colossal Mubarak Pumping Station, a powerhouse of 24 pumps on the northern rim of Lake Nasser that work in concert to drive 5.5bn cubic meters of water per year into the Sheikh Zayed Canal, so named for Sheikh Zayed Bin Sultan El Nahayan, president of the United Arab Emirates, who bestowed USD 100 million of the USD 1.2 billion that went into building the canal.

The ultimate impetus for the project is to support a new community of some three million people by 2017. The water conveyed by the Sheikh Zayed Canal will be used to irrigate approximately 540,000 feddans (226,800 ha) that will be government owned, and available for lease to investors and families. Once the desert around Toshka is reclaimed as farmland it will form the economic and social foundation for the government's planned community there.

Further efforts at development will be brought to bear on livestock, poultry and fish breeding for local and international consumption. Road, rail, water and air transport will be upgraded and extended. Tourist attractions will be further developed and created in the region. And the value of mineral and metal resources will be maximized.

Currently, a visit to the Toshka project requires an approximately 300 km drive southwest from Aswan through a desolate, blanched land of sand, rock, and sparse grasses, that is spotted with burned out steel drums and decrepit concrete structures of one storey or less. In the middle of nowhere, along the road, there are numerous makeshift checkpoints. Since a van of tourists were massacred on the road as they traveled to the temple ruins at Abu Simbel in 1997, foreigners make the journey in a convoy, with the accompaniment of military personnel.

With a decade's worth of labor past and less than a decade to go before Egypt's hopes to have drawn three million people to a thriving community in the desert, there are few signs advertising the government's ambitious plans and few signs of bustling construction projects underway. Indeed, there are just a few concrete buildings with no roofs or windows or life, amidst rock and rubble. The government had said housing, schools, clinics, cinemas, social clubs, and a police station would be built in the first decade following the project's commencement.

The picture seems to vindicate those critics of the Toshka Project who dispute that even after the technical hurdles are surmounted, the remote and desolate location will dissuade people from leaving their homes and thereby cause the government to drastically miss its expectations for local labor and demand for housing and services.

Yet two thirds of the way to Abu Simbel, there is a road that heads due south and ends at the Mubarak Pumping Station, an altogether different scene. Outside the gate to the pumping station are large palms and a few short rows of crops covered with shade cloth and watered by drip irrigation. The crops are ostensibly for demonstration less so than for economic production. On the other side of the gate are administrative buildings, carpets of clipped green grass and turnarounds, a small, covered dais for presidential speeches, and the Mubarak Pumping Station rising out of a man-made inlet on Lake Nasser.

At a cost of USD 440 million, the station sits in a 50 m deep intake channel and is undeniably an impressive site. Of its 24 state-of-the-art pumps only 21 are currently used to raise water to the discharge basin and then into the canal. The 250 megawatts of electricity needed to run the station are supplied by Aswan's main hydraulic power station. The amount of finished detail and grooming that surrounds the pumping station grounds lies in stark contrast to the undeveloped desert to the north, and betrays the fact that the power station is serving as the crown jewel of Toshka's achievement far before any of the projects stated goals have been realized.

Back in the late 90s, as the Toshka project was just getting underway, critics pointed to the dearth of feasibility studies undertaken before construction on the project began as ample evidence that while many lofty goals had been piled on the project, none had been close to adequately grounded by facts and studies. Even Mamdouh Hamza, the chairman of Hamza Associates, one of the main designers of the Mubarak Pumping Station, can be found telling *Business Today*, in 2003, that he feared an inadequate number of planning and feasibility studies were executed. 'All these projects are not made on economic feasibility studies, except the Suez Canal and the High Dam,' he told the news agency.

Criticism could also be heard within the halls of government. *Egypt Today* reported in 1999 that some politicians felt the Toshka project was too costly and risky an endeavor "when more conventional and cheaper land reclamation options are available, such as charging farmers for water or reclaiming more fringe land."

The US governmental agency, USAID, noted a lack of feasibility studies done before Egypt broke ground on the Toshka project. In response, US politicians advised American companies not to invest in the project.

In fact, it seems the only investor currently capitalizing on the water flowing into the deserts from Toshka is billionaire Prince Al-Waleed Inbn Talal ibn Abdul Aziz Al-Saud of the House of Saud. Prince Waleed is the owner of The Kingdom Agriculture Development Corporation (KADCO), which purchased some 350,000 feddans (147,000 ha) in 1997, of which only 100,000 feddans (42,000 ha) is currently in use. As a part of the deal, KADCO agreed to invest some USD 300 million in the area and develop agro-industries. But by the end of 2007, KADCO's nascent operation had just managed to break out of the red.

The farm's general manager said it took KADCO six years to get the farm going "in earnest." The reason was not a shortage of labor or the poor soil, he explained, but rather he attributed the stalled success to a formerly associated Egyptian CEO, who didn't know how to manage the company's assets. Nevertheless, KADCO's troubled start serves evinces the hurdles that other companies and individuals may face to get their farms up and running in the desert.

Much of what KADCO is doing and growing in the region fulfills the government's hopes for agriculture in the region. For instance, the farm grows many of the crops that the government expects other farmers to produce: melons, table grapes, alfalfa, potatoes, and onions, among others. Most of the produce goes to export and ends up on west European tables. In 2007, for example, more than 50 percent of KADCO's melon crop went to export to Belgium and UK.

Beyond helping the nation close its trade gap KADCO is taking praiseworthy strides at conserving water, even though it gets the water for free. Some of the methods KADCO is using include drip irrigation, plastic mulch and shade cloth, as can also be seen at the small, show plots at the pumping station.

Since the government is using an inflexible quota system that offers no incentives to conserve water, the conservation work being done at KADCO's farm may not be readily adopted at other farms that move into the area. Yet, for the time being, KADCO's conservation practices should allay the criticisms of those

who believe the government's decision to give the water for free will only lead to waste.

The difficult soil KADCO has to contend with is fine clay that will layer like cement over time. Surprisingly, the farm hasn't experienced overwhelming problems with salinisation, as some have feared it would. KADCO's formula for heading off salinisation uses drip irrigation and pivot irrigation systems in conjunction with EnviroSCAN, a moisture monitor tool.

KADCO uses these systems to apply water in a "flushing cycle," that pushes through any salts when necessary. Besides, the farm also "pulses the water" applied to the crops and soil in six-hour rotations, which has the same effect as the flushing cycle.

During the growing season, KADCO hires 1,200 laborers. The farm's structure offers a number of positions from unskilled to skilled laborers, fuel engineers and department managers. Finding workers who have had a basic education and are or can be adequately trained has been one of KADCO's major challenges. When KADCO first started in area, the company brought in Chileans who were then cheaper and better skilled than Egyptians. But the farm has since taken on Egyptians, regardless of the fact that they are typically unskilled and undedicated, and can often be found to have left their work for an afternoon of tea in the shade, the farm manager said. The case highlights the fact that while the water-side of the Toshka project may be complete, the perhaps more difficult task of finding educated workers who can be trained to work the land remains an uphill battle for the government.

KADCO shows that with the proper know-how, careful planning and the right technology, the desert around Toshka can most certainly be reclaimed. KADCO's approach, in brief, involved first installing irrigation equipment and doing a full soil survey. Next, KADCO performed minimum tillage where the soil was sandiest. KADCO planted wedge grass, which has long roots that break up the soil, as a one-time crop to break the soil. Thereafter, alfalfa was planted, and is interrupted every three to four years with a corn crop.

Aside from being the only farm in the area, KADCO is the only private landholder in the area. The Egyptian government owns all the lands around KADCO, and even tried to retain the rights to KADCO's land, but Prince Waleed apparently interceded and the government backed off. The possibility of having property nationalized by the Egyptian government after it has been cultivated adds a substantial risk that may become the ultimate reason why investors, who lack Prince Waleed's clout, don't move into the area.

As KADCO's manager said, "I know people in the Delta who've developed the land –spent a lot of money- and then the government went native, you know, for whatever reason. So, it is not a good, secure system. It is a difficult thing about Egypt."