The Palestinian Water Authority
Water and Wastewater Services Improvement Project

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1. Palestinian Water Sector Challenges

- Improving water resources management and environmental health conditions;

- Improving water supply delivery systems;

- Improving the sewage collection;

- Improving wastewater resource management;

- Enhancing new water resources to meet current and future demands, and

- Strengthening the institutional, financial and regulatory framework of the management of water and wastewater.
2. Strategy for Water and Wastewater Services Improvement

Important Results

- Available Fresh Groundwater: 56.0 mm
- Available Brackish Groundwater: 39.0 mm
- Fresh Groundwater surplus: 0.0 mm
- Brackish Groundwater surplus: 0.0 mm
- Brackish Water Declination: 69.8 mm
- Seawater Desalination Import Capacity: 54.2 mm

Fig 4. WATER RESOURCES AND DEMANDS

<table>
<thead>
<tr>
<th>Resource Data</th>
<th>Wastewater Data</th>
<th>Demand Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rain Fall = 150 mm</td>
<td>Collection Efficiency = 90%</td>
<td>Domestic &amp; Industrial Demand = 160 mm</td>
</tr>
<tr>
<td>Rain Infiltration Efficiency = 40%</td>
<td>Treatment Efficiency = 90%</td>
<td>Return Flow from Rises = 10%</td>
</tr>
<tr>
<td>Stormwater = 5 mm</td>
<td>Surface Infiltration Efficiency = 88%</td>
<td>Agricultural Domestic Fresh = 20 mm</td>
</tr>
<tr>
<td>Stormwater Harvesting = 5 mm</td>
<td>Surface Treated Effluent Losses = 20%</td>
<td>Agricultural Domestic Brackish = 60 mm</td>
</tr>
<tr>
<td>Lateral Inflow Balance = 20 mm</td>
<td>Surface Treated Effluent Use = 20%</td>
<td>Agricultural Return Flow % = 20%</td>
</tr>
<tr>
<td>Brackish Water Recovery = 70%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. Strategy for Water and Wastewater Services Improvement, Cont.

- Improvement of the services should be conducted in a sustainable manner that leads to the protection of the fragile Palestinian environment.

- Equitable Access to adequate service at an affordable price.

- Plan towards full cost recovery.

- Recognized the need for an internationally experienced water and wastewater Operator.
3. Overall Objectives of the Management Contract

1. Improve quality of water supplied and treated wastewater.

2. Improve quantity of water available.

3. Improve management of water and wastewater services.

4. Promote the appropriate institutional setup through which a unified water utility will perform water and sewage services as a replacement to the current fragmented structure.
4. Specific Objectives

1. Improving the efficiency of the water supply distribution system.

2. Improving the efficiency of the water systems and wastewater operating equipment.

3. Improving the disinfection of drinking water.

4. Protecting the integrity of the well sources.

5. Improving the quality of the wastewater effluent.

6. Improving the efficiency of revenue collections.

7. Improving the operations of water and wastewater.
4. Specific Objectives, Cont.

8. Improving the efficiency of customer service and public relations.

9. Improving the effectiveness of the management of the Water and Wastewater systems.

10. Improving the long-term performance of the water and wastewater systems.

11. Assisting in implementing the investment component which will be carried out in parallel and financed by other donors.

12. Establishing a water utility to carry out the water and wastewater services in Gaza instead of the fragmented municipal water departments.
5. Tendering Process

- The tendering process was carried out in accordance with the World Bank guidelines in two stage bidding.

- Due to the positive political environment at the time, PWA received 52 expression of interest with more than 15 operation companies.

- The short listing allowed for 8 companies to compete out of which 6 responded to the request for proposal.

- The winner was a consortium composed of Lyonnaise des Eaux and Khatib and Alamy (LEKA).
6. Contract Structure and Payment

- Palestinian Water Authority (PWA)
  - Steering Committee
  - Project Management Unit (PMU)
    - Operators
    - Coordinators
  - Municipalities
    - Beit Hanoun
    - Beit Lahia
    - Jabalia
    - Gaza
    - El-Burj
    - Al-Nusirat
    - El-Maghazi
    - Zawida
    - Deir Al-Balah
    - Qarara
    - Khan Younis
    - Abassan K.
    - Abassan J.
    - Khouza’a
    - Bani Suhaila
    - Rafah
    - Village councils

- An international Operator composed of joint venture between Lyonnaise des Eaux and Khatib and Alami was selected with the best offer.

- The duration of the Contract was initially 4 years ending on 31th of Aug., 2000 but extended until 30th of Sep., 2003 in provision to start a second phase of Operating Contract.

- The operator is paid a monthly base fee subject to adjustment against inflation.

- On top of the base fee, the operator is entitled to an incentive fee with an annual ceiling of USD 750,000.

- The incentive is performance driven and a neutral auditor, Deloite and Touche was selected to determine the operator incentive entitlement based on the following formula:

\[
\text{Annual Incentive Payment} = 3.5 - \text{composite Score} \times \text{USD 750,000}
\]

• The operator was responsible to manage USD 12,000,000 as an operating investment fee for the first 4 years an amount of about 3,000,000 per year was allocated for the successive years of extension.

• In order to motivate the municipal staff, the contract allows the operator to propose incentive payment based on their performance.

• The operator is expected to work with the municipal staff which are not seconded to him but remain as municipal staff.
7. Project Management and Institutional Framework Setup

- **Project Management Unit**: Overviews the project implementation

- **Technical Counterpart Team**: TCT members covered a wide range of specialties, representative of the whole municipalities and approved by the Mayors. The incentive is calculated based on the following formula which accounts for both the extra time and performance.

\[
I = S \sum_{i=1}^{T} (1.25 + 0.5 Pi)
\]

where,
- \( I \) = Incentive payment,
- \( S \) = Hourly rate based on the net salary,
- \( Pi \) = Performance factor from 0 to 1.0 and
- \( T \) = Total number of working hours to perform the various tasks.

- **Steering Committee:** Represents the major stockholder in the water sector. The main role of this committee was the advice of the operator and PWA on the priority issues.

- **Regional Coordinators:** Five regional coordinators to:
  1. follow the implementation of the project throughout the Gaza Governorates,
  2. follow activities in the water and wastewater sectors by other donors, and
  3. facilitate the role of the operator in conjunction with the TCT members.

- **Auditors:** To evaluate the technical and financial performance of the operator.
## 8.0 Achievements

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Task</th>
<th>Target</th>
<th>Achieved</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Y 1</td>
</tr>
<tr>
<td>1.</td>
<td><em>Improvement Quantity of water</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.1</td>
<td>LEKA Detection survey</td>
<td>1,050 km</td>
<td>1,261 km</td>
<td>1</td>
</tr>
<tr>
<td>1.1.1.2</td>
<td>Service Connections Replacement</td>
<td>20,000 Hc</td>
<td>22,337</td>
<td>5</td>
</tr>
<tr>
<td>1.1.2.1</td>
<td>Meters Repair</td>
<td>20,000</td>
<td>20,000</td>
<td>1</td>
</tr>
<tr>
<td>1.1.2.2</td>
<td>Meters Replacement</td>
<td>30,000</td>
<td>30,687</td>
<td>1</td>
</tr>
<tr>
<td>1.2</td>
<td>Overall System Efficiency</td>
<td>70%</td>
<td>69.3%</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td><em>Improving Quality of Water</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1</td>
<td>Improve disinfection</td>
<td>100%</td>
<td>96%</td>
<td>1</td>
</tr>
<tr>
<td>2.2</td>
<td>Improve Wastewater Discharge</td>
<td>85%</td>
<td>91%</td>
<td>1</td>
</tr>
</tbody>
</table>
### 8.0 Achievements, Cont.

<table>
<thead>
<tr>
<th>3.</th>
<th><strong>Improving Management</strong></th>
<th></th>
<th>No</th>
<th>3</th>
<th>5</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1.1</td>
<td>Decrease in account receivable</td>
<td>10%</td>
<td>No number</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3.1.2</td>
<td>Identify illegal connection /convert to database</td>
<td>15,000</td>
<td>16,215</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3.1.3</td>
<td>Develop and update database of service connections</td>
<td>100%</td>
<td>100%</td>
<td>2</td>
<td>1</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>3.1.4</td>
<td>Implement computerized administrative system</td>
<td>100%</td>
<td>100%</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>NA</td>
</tr>
<tr>
<td>3.1.5</td>
<td>Analyses tariffs and recommend progressively increasing tariff system</td>
<td>100%</td>
<td>100%</td>
<td>1</td>
<td>1</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>3.1.6</td>
<td>Establish on unified billing and collection system</td>
<td>100%</td>
<td>45%</td>
<td>5</td>
<td>5</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>3.1.7</td>
<td>Map and hydraulically Model water and wastewater network</td>
<td>100%</td>
<td>100%</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>3.1.8</td>
<td>Create separate financial accounts for water and wastewater</td>
<td>100%</td>
<td>88.5%</td>
<td>5</td>
<td>2</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>3.2.1</td>
<td>Repair and replace various equipments</td>
<td>100%</td>
<td>NA</td>
<td>5</td>
<td>1</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>3.2.2</td>
<td>Identify needed support and administrative needs.</td>
<td>100%</td>
<td>100%</td>
<td>5</td>
<td>1</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>3.2.3</td>
<td>Develop and implement preventive maintenance system</td>
<td>100%</td>
<td>100%</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>NA</td>
</tr>
<tr>
<td>3.2.4</td>
<td>Develop and implement maintenance and Materials management system</td>
<td>100%</td>
<td>100%</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>NA</td>
</tr>
<tr>
<td>3.2.5</td>
<td>Identify, obtain critical and necessary spare parts</td>
<td>100%</td>
<td>100%</td>
<td>1</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>
### 8.0 Achievements, Cont.

<table>
<thead>
<tr>
<th></th>
<th><strong>Promoting Institutional Development</strong></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Management and technical training program</td>
<td>100%</td>
<td>100%</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>4.2</td>
<td>Develop and implement computerized administrative systems – train</td>
<td>100%</td>
<td>100%</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>4.3</td>
<td>Develop and implement a safety program</td>
<td>1</td>
<td>5</td>
<td>NA</td>
<td>1</td>
</tr>
<tr>
<td>4.4</td>
<td>Develop and urgency operations “plan-train”</td>
<td>5</td>
<td>5</td>
<td>NA</td>
<td>1</td>
</tr>
<tr>
<td>4.5</td>
<td>Establish region wide association of water sector Personnel</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>NA</td>
</tr>
<tr>
<td>4.6</td>
<td>Develop and implement customer service system – train</td>
<td>5</td>
<td>1</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>4.7</td>
<td>Improve long range performance planning</td>
<td>5</td>
<td>1</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>4.8</td>
<td>Develop and implement water re-use from existing facilities</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>NA</td>
</tr>
</tbody>
</table>
9. Key Factors for Success

In general the implementation of the project throughout the entire life of six years was smooth. This is due to:

• The effective management practice and continuous follow up of the project’s management unit (PMU).

• The high technical standard of the operators’ personnel.

• Conducting the tasks of the project in a highly professional manner with the best Management Practice.

• The constructive cooperation between TCT (municipal team), LEKA, and the Palestinian Water Authority.

• The high level of support from the municipalities as their staff was involved in the various stages of the project preparation and implementation (Ownership felt).

• The incentive payment to the municipal TCT members.

• The incentive allocated to the operator. This incentive has a ceiling of more than 50% of the base fee and was performance driven.

• The professionalism of the auditor (Deloitte and Touche) which plays an important and neutral role in assessing the achievement by the end of each year and consequently evaluate the incentive to be paid to the operator.
10. Difficulties

- Outstanding conditions due to the rapid political changes in the region.
- The V.A.T. problems
- The relatively low level of expertise among the municipal employees.
- The lack of the authority to instruct and manage the municipal employees directly by the operator.
- Procurement problems due to continuous closures of borders.
- Some targets were not achievable like the decrease in accounts receivable and 100% disinfection.
11. Lessons Learned

• Well understanding of the terms of this contract enabled PWA and the operator to maximize the benefits of the fund allocated for this project.

• The incentive concept was an excellent tool towards encouraging the Operator and the municipal TCT members.

• The wide participation was a very important tool in bridging the gap between the sector requirements and the scope of work of the Operator.

• Sustainability of the water service could not be achieved if it is not conducted professionally by a high level of management expertise and in close cooperation of all concerned parties.
12. Sustainability

• Improving the system efficiency from 50% to 70% through:
  1. establishing systems for leak detection,
  2. meter repair and replacement,
  3. auditing the meter reading and data input,
  4. conducting training programs and installing district meters for better management,
  5. rising the level of expertise among the municipal staff, and
  6. increasing the system efficiency has a positive impact on the water industry financing.

• Improving the billing and collection departments conditions helped in increasing the customers willingness to pay.
• The project contributed in replacing more than 30% of the customer service connection. This has reduced the losses and reduced the vulnerability of the drinking water from pollution.

• beside reducing the unaccounted for water, meter replacement and repair (>50% of customer meters) helped in ensuring social equity and raise the concern of the of customers to conserve water.
12. Sustainability, Cont.

- The project resulted in the creation of the Coastal Municipalities Water Utility (CMWU). In order to strengthen the utility, the World Bank has expressed its commitment to finance a second phase known as Gaza II.

- The upgrading of the wastewater treatment plants and sewage system collection has raised the potential for wastewater reuse.

- The public health was of prime concern. This was done through implementing a very successful disinfection program for drinking water and disposed effluent to the bathing water in Gaza city.

- Throughout the project a comprehensive training program was conducted.