LOCAL ACTION

IMPROVING WATER MANAGEMENT

THE LYDEC CONCESSION

CASABLANCA - MOROCCO

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Thematic Session Partnerships on IWRM in the M.E
LA1332
Convener:
Outline of Presentation

Organization of the drinking water sector in Morocco

- Trends in resources.
- Water Supply in Casablanca.
- Key Figures.
- Purchases and Sales.
- Efficiency.
- Main Actions Undertaken.
- Modulation.
- Perspectives.
The Drinking Water Sector in Morocco

3,200,000 customers (2005)

- Office National de l’Eau Potable
  1,020,000 customers

- Municipal Water Utilities
  950,000 customers

- Private Service Providers:
  - 1997 ➔ Casablanca.
    710,000 customers (2005)
  - 1999 ➔ Rabat / Salé
    300,000 customers (2005)
  - 2001 ➔ Tanger/Tétouan
    220,000 customers (2005)
Comparison with Other Mediterranean Countries

**Water Resources in Morocco:**
- 2005 → 1,000 m³/capita/year
- 2025 → 590 m³/capita/year

<table>
<thead>
<tr>
<th>Year</th>
<th>Country</th>
<th>1955</th>
<th>1990</th>
<th>2035</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Greece</td>
<td>7406</td>
<td>5228</td>
<td>4840</td>
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<tr>
<td></td>
<td>Turkey</td>
<td>8509</td>
<td>3262</td>
<td>2186</td>
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<td></td>
<td>France</td>
<td>4260</td>
<td>3262</td>
<td>3044</td>
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<td></td>
<td>Spain</td>
<td>3801</td>
<td>2849</td>
<td>2733</td>
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<tr>
<td></td>
<td>Morocco</td>
<td>2763</td>
<td>1117</td>
<td>590</td>
</tr>
</tbody>
</table>
Water Supply in Casablanca

Total amount of water supplied in 2005: 169.9 million m$^3$:

- 66.6 Mm$^3$ : (39%) supplied by the Bou Regreg Treatment Plant
- 48.7 Mm$^3$ : (29%) supplied by the Daourat Treatment Plant in Oum Er Rbia
- 52.8 Mm$^3$ : (31%) supplied by the Sidi Saïd Maâchou Treatment plant
- 1.8 Mm$^3$ : supplied from local wells
### Key figures

**Casablanca / Morocco**

<table>
<thead>
<tr>
<th></th>
<th>1998</th>
<th>2005</th>
<th>% Evolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population ('000 inhabitants)</td>
<td>3,319</td>
<td>3,7</td>
<td>+ 11%</td>
</tr>
<tr>
<td>Number of customers ('000 inhabitants)</td>
<td>469</td>
<td>710</td>
<td>+ 51%</td>
</tr>
<tr>
<td>Million $m^3$ sold</td>
<td>117.5</td>
<td>122.2</td>
<td>+4%</td>
</tr>
<tr>
<td>Million $m^3$ supplied</td>
<td>183.5</td>
<td>169.9</td>
<td>-7%</td>
</tr>
<tr>
<td>Non revenue Water (million $m^3$)</td>
<td>65.7</td>
<td>47.6</td>
<td>-27%</td>
</tr>
<tr>
<td>Non Revenue Water ($m^3/km/d$)</td>
<td>47</td>
<td>31</td>
<td>-34%</td>
</tr>
</tbody>
</table>

**Customer satisfaction**: 1997: 55% ➞ 2005: 92%

**Service coverage ➞ 95% formal dwellings**
Circle of Lost Water - Casablanca

LOSSES BY TYPE

- Metering Losses
- Commercial Losses
- Invisible Leakage
- Visible Leakage
- Physical Losses
- Service Losses
- Exemptions form Payment
- Sales
- Other

22 décembre 2005
### Water Supplied and Water Billed - Casablanca

#### Trend in Purchases and Sales

<table>
<thead>
<tr>
<th>YEAR</th>
<th>1998</th>
<th>1999</th>
<th>2001</th>
<th>2003</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Supplied Mm$^3$</td>
<td>183.1</td>
<td>179.8</td>
<td>166.9</td>
<td>162.8</td>
<td>169.9</td>
</tr>
<tr>
<td>Water Distributed Mm$^3$</td>
<td>117.5</td>
<td>117.2</td>
<td>117.0</td>
<td>116.5</td>
<td>122.2</td>
</tr>
<tr>
<td>Non Revenue Water Mm$^3$</td>
<td>65.7</td>
<td>62.5</td>
<td>49.8</td>
<td>46.3</td>
<td>47.6</td>
</tr>
<tr>
<td>Number of Customers</td>
<td>466,000</td>
<td>486,000</td>
<td>523,000</td>
<td>611,000</td>
<td>710,000</td>
</tr>
</tbody>
</table>

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Improvement in Efficiency - Casablanca

WATER EFFICIENCY

PRR1:
- Supply meters
  + Network
  + Customer meters

PRR2/PRC:
- PRR1 continued
  + Feeders
  + Anomalies Fraud

PRR3/PRC:
- PRR2 improved
  + Fraud
  + Pressure management
  + Monitoring of night flows
  + Pressure control

60% 62% 64% 66% 68% 70% 72% 74%

<table>
<thead>
<tr>
<th>Year</th>
<th>Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-98</td>
<td>64.1%</td>
</tr>
<tr>
<td>12-99</td>
<td>65.2%</td>
</tr>
<tr>
<td>12-00</td>
<td>68.7%</td>
</tr>
<tr>
<td>12-01</td>
<td>70.1%</td>
</tr>
<tr>
<td>12-02</td>
<td>71.8%</td>
</tr>
<tr>
<td>12-03</td>
<td>71.6%</td>
</tr>
<tr>
<td>12-04</td>
<td>71.8%</td>
</tr>
<tr>
<td>12-05</td>
<td>72.0%</td>
</tr>
</tbody>
</table>

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Water Management - Casablanca, F. Djerrari, Mars, 10
Main actions Undertaken
1999-2005

Distribution System Efficiency in 1984 : 64.1%
Network Efficiency Improvement Project

- Improvement of source meter reliability.
- Repair of reservoir cracks.
- Leak detection on feeder mains.
- Leak detection on service pipes.
Main actions Undertaken
1999-2005

- Improvement of service meter reliability (individual meters and calibration).
- Reservoir crack repair: 900m of cracks treated.
Main actions Undertaken
1999-2005

- Leak detection on feeder mains:
  
  Pre-identification: inspection of 1,010 km of mains.
  “Sahara” Process: inspection of 204 km of mains.
Main actions Undertaken
1999-2005

- Leak detection on tertiary network:
  - Inspection of 22,000 km of network
  - Repair of 1,800 pipe leaks
  - 9000 fuites réparées sur branchements
  - Repair of 11,600 leaks in manholes.
Commercial Efficiency Project

- Inventory of all customers.
- Investigation of zero or abnormally low consumptions.
- Monitoring of falls in consumption.
- Investigation and disconnection of non-paying customers.
- Monthly, combined water and electricity meter reading.
- Cross analysis of water and electricity consumptions.
- Metering audit
Main actions Undertaken  
1999-2005

Commercial Efficiency Project

- Identification of illegal connections.
- Identification of meters that have been tampered with.
- Targeted inspections by area, construction site, standpipes, reoffenders, etc.
- Control of residual consumptions after “master meters”.
Main actions Undertaken
1999-2005

Commercial Efficiency Project

- Customer metering – number of meters:
  590,000 new meters installed between 1999 and 2005:
  - 55% replacements
  - 45% for new customers

Less than 130,000 meters are more than 8 years old.
Pressure Management

Principle:

- Reduce system input pressure while maintaining satisfactory service pressures at target nodes.
- The peak period is 3 to 5 hours per day and pressures at target nodes are therefore high in off-peak periods.
- Reducing excess pressures leads to water savings and reduction of leakage rates.
Pressure Management

Results: Savings of 5,400 m³/day

Stage 55 (32 km)
- 50% reduction in service pressure
- Night flow reduced from 130 m³/h to 85 m³/h
- Savings: 400 m³/d (Dh850,000 per year).

Stage 110 (207 km)
- 50% reduction in night pressure
- Night flow reduced from 330 m³/h to 250 m³/h
- Savings: 800 m³/d (Dh 1.5 million per year)

Stage 85 (1,145 km)
- 50% reduction in night pressure
- Savings: 4,200 m³/d (Dh 7.9 million per year)
Other On-going Actions

- Establishment of district metering areas and pressure management.
- Monitoring of night flows.
- Rapid repair of leaks when reported.
- Monitoring of housing estates and new developments.
- Supervision of works on network.
- Fraud control.
- Monitoring of large customers.
- Disconnection of unused supply points.
- Improvement of mapping data.
Lessons Learned from the LYDEC Experience

- A proactive policy of water conservation shows 10% savings in water resources can be achieved in just a few years.

- Service coverage has been rapidly and significantly expanded (up 50%), while reducing the amount of water abstracted.

- A policy of this kind is made possible by a PPP where the roles and responsibilities of the parties are clearly defined.