Local Water Supply, Sanitation and Sewage

Country Report

Turkey

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MEDA Water

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SOCIETÀ GESTIONE IMPIANTI IDRICI

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1. SUMMARY

LOCAL WATER SUPPLY, SANITATION AND SEWAGE

TURKEY

GENERAL CONTEXT

- Average rainfall: 643 mm /yr
- Area: 780,580 sq km
- Total Population (2004)[1]: 68 893 918
- Population Growth Rate 2004[2]: 1,13 %
- Population Distribution:
  - Urban: 65%
  - Rural: 35%
- Currency: 1 Turkish New Lira (TRY) = 0.606 Euro
  (as of January 1, 2005, Turkey is using the New Turkish Lira, TRY)

INSTITUTIONAL SETTINGS

Policy Setting : Ministry of Energy and Natural Resources

Executive / Regulatory Level:

- General Directorate of State Hydraulic Works (DSI) (Municipalities over 100 000 inhabitants)
- General Directorate of Bank of Provinces (Iller Bank) (Municipalities under 100 000 inhabitants)
- Rural Areas: General Directorate of Rural Services (GDRS)

User Level: Local Water Utilities managed by the Municipalities

Some examples of Water Utilities: ISKI for Istanbul (the largest utility), ASKI for Ankara, IZSU for Izmir.

Private Sector Involvement:

- Izmit, BOT for Construction and Operation of a New Drinking Water Plant
- Management contract with Cesme and Alacati municipalities that will be responsible for the provision of water and wastewater services.

WATER STRATEGY

- Water Service Strategy as part of National Five Year Development Plans, under State Planning Office

WATER RESOURCES

- Average Annual Renewable Water Resources: 229 Bm³ (2004) [3]
- Renewable Water per Capita 2005: 3 124 m³ (2005)[4]
- Total annual water withdrawal: 42.0 Bm³ (2000)[5]
- Total Annual Water withdrawals and sources for domestic supply: 5 Bm³ (2002)[6]

Spring:	1.316.858	26.3 %
Lake:	88.146	1.8 %
River:	128.331	2.6 %
Dam :	1.965.355	39.3 %

[1] Source: The World Fact Book – Turkey - CIA
[2] Source: The World Fact Book – Turkey - CIA
[3] Source: PAI: Resources 2005
[4] PAI: Resources 2005
[5] FAO Aquastat - 2005
[6] Source: Republic of Turkey, Prime Ministry State Institute of Statistics, 2002

Well:	1.452.448	29.0 %
Artificial Lake:	52.081	1.0 %

WATER SUPPLY

- Estimated population access to Improved Water sources 2002 [7]:
  - Urban: 95 %
  - Rural: 82 %
- Estimated population access to Improved Water sources through Household Connections 2002 [8]:
  - Urban 64 %
  - Rural: 30 %
- Total Potable Water Supplied (Bulkwater): 5.0 billion m³/year (2002) [9]
- Potable water Supplied per capita: 198 l/cap/day
- Number of consumers: 50.899.198 (Municipal Population Receiving drinking water network services) (2002)
- Rate of population served by public drinking water networks of total population: 75% (2002) [10]
  - Urban: 95% (2002) [11]
  - Rural:_____%
- Potable Water Consumed per capita: 110 l/cap/day
- Unaccounted for water(UFW): _____%
- Service continuity: _____

SANITATION & SEWAGE

- Total population connected to public sanitation: 61.8 % (2002) [12]
  - Urban:78.4%
  - Rural:
- Estimated Rate of population with access to improved sanitation: 83 %(2002) [13]
  - Urban: 94 %
  - Rural: 62%

Wastewater Treatment [14]:

- Total Volume of Wastewater: 2.91 billion m³ (2002)
- Rate of wastewater undergoing treatment: 47.4 % (2002)
- Total Volume of Waste water undergoing treatment: 1 379 (Mm³) (2002)
  - Physical: 416 897 m³
  - Biological: 777 345 m³
  - Advanced: 185 518 m³
- Rate of total population served by waste water treatment plants: 39.3% (2002) [15]

[7] Source: WHO / UNICEF Joint Monitoring Programme for Water Supply and Sanitation, Coverage Estimates, Improved Drinking Water, Updated in July 2004, Turkey
[8] Source: WHO / UNICEF Joint Monitoring Programme for Water Supply and Sanitation, Coverage Estimates, Improved Drinking Water, Updated in July 2004, Turkey
[9] Source Republic of Turkey, Prime Ministry State Institute of Statistics, 2002
[10] Source Republic of Turkey, Prime Ministry State Institute of Statistics, 2002
[11] Source Republic of Turkey, Prime Ministry State Institute of Statistics, 2002
[12] Source: Republic of Turkey, Prime Ministry State Institute of Statistics, 2002
[13] Source: WHO / UNICEF Joint Monitoring Programme for Water Supply and Sanitation, Coverage Estimates, Sanitation, Updated in July 2004, Turkey
[14] Source: Republic of Turkey, Prime Ministry State Institute of Statistics, 2002
[15] Source: Republic of Turkey, Prime Ministry State Institute of Statistics, 2002

- Urban: 49.9%
- Rural:

WATER TARIFFS

Tariff system:

- Water Supply is not subsidized. Water is considered an economic good
- User Pay Principle. Tariffs should cover O&M, amortization expanding costs and a profit rate of not less than 10% of all expenditures. [16]
- Rate of O&M costs covered through tariffs:
- Medium Tariff for 1m³ of water:
- Metering:

Responsible institution for setting Tariffs[17]:

- Municipalities set their own water pricing policies, calculated for each month of the year by considering the Wholesale Price Indices defined by DIE together with the Metropolitan Municipality Council 'Tariffs Regulations".

[16] Source: Turkey Water Report, Prepared for the 3rd World Water Forum, March 2003, Republic of Turkey; World Water Council;

[17] Source: Turkey Water Report, Prepared for the 3rd World Water Forum, March 2003, Republic of Turkey; World Water Council;

2. GENERAL CONTEXT

2.1. Geography

Turkey has a total area of 779,452 km², of which 14,300 km² water surfaces. Turkey has influential geo-political status because its location serves as a natural bridge between Europe and Asia. It is surrounded by the Black see in the north, the Mediterranean sea in the south and the Aegean sea in the west. The actual surface area of the Turkey inclusive of its lakes, is 814,578 km², of which 790,200 are in Asia and 24,378 are located in Europe. There are 26 important hydrological basins in Turkey
Turkey is generally divided into seven regions: the Aegean, the Mediterranean, Central Anatolia, the East and Southeast Anatolia regions. Turkey has 81 provinces and 76,457 villages.

2.2. Climate

Turkey has a subtropical, semi-arid climate with extremes in temperatures. In the east, summers are hot and dry, winters are cold, rainy and snowy. Along the coastal area, a Mediterranean climate is dominant with long, hot, dry summers and short, mild, rainy winters. Rainfall shows great differences from one region to another. Average annual rainfall is 643 mm, ranging from 250 mm in the southeast to over 3 000 mm in the north-east Black Sea area. About 70% of the rain falls in the winter and spring seasons. Average runoff is about 37%.[18]

2.3. Social Context [19]

Total population
Population (July 2004 est.): 68,893,918[20]

Population Growth Rate
Population growth rate(2004 est.): 1.13%[21]

Population Distribution:

Total Urban Population:

Total Rural Population:

Currency:

- 1 Turkish New Lira (TRY) = 0.606 Euro (as of January 1, 2005, Turkey will be using the New Turkish Lira, TRY)

[18] Source: FAO Aquastat - Turkey - Water - 1997
[19] Source: The World Factbook, CIA , 2005
[20] Source: CIA - The World Fact Book – Turkey - 2004
[21] Source: CIA - The World Fact Book – Turkey - 2004

3. INSTITUTIONAL SETTINGS

The four main organisations responsible for development of water resources are General Directorate of State Hydraulic Works (DSI), General Directorate of Rural Services (GDRS), General Directorate of Bank of Provinces (Iller Bank), and General Directorate of Electric Power Resources Survey and Development Administration (EIE). [22]

The institutional framework has three levels:

- **Decision making level**: Prime ministry, State Planning Organisation, and ministries.
- **Executive & Regulatory level:** Governmental organizations under the ministries.
- **User Level** Both governmental and non-governmental organizations concerned with the operation and maintenance of the projects.

Level	Institution	Comment
Policy Setting	Ministry of Energy and Natural Resources	It is the ministry responsibility to set up policies for energy production, transmission, distribution, consumption and pricing. The ministry is also responsible for assessing the management and investment plans of its affiliated organizations (General Directorate of State Hydraulic Works and General Directorate of Electrical Power Resources Survey and Development Administration), for supporting them and monitoring their activities.
Regulatory Level	General Directorate of State Hydraulic Works(DSI)	• Established in 1954 under the Ministry of Energy and Natural Resources [23] • DSI's main responsibilities cover the issues of observation, field investigation, master-plan, pre-feasibility, feasibility, design, construction and management for irrigation, hydraulic energy generation, domestic water supply (for the cities with the population more than 100 000), flood control. [24] Development, management and conservation of ground-water resources are also exclusively under the responsibility of DSI [25] including basic investigations such as, flow gauging, soil classification, water quality monitoring, preparation of river basin development plans and formulation of proposals for construction financing and subsequent operation of these works. [26]
	General Directorate of the Bank of Provinces (Iller Bank)	The General Directorate of the Bank of Provinces (is authorized by its establishment Law, coded 4759)entered into force in 1975, to

[22] Source: Mediterranean Hydrological Cycle Observing System - Turkey - Water Resource Development in Turkey ,2000
[23] Source: Mediterranean Hydrological Cycle Observing System - Turkey - Water Resource Development in Turkey ,2000
[24] Source: General Directorate of State Hydraulic Works Web Page
[25] Source: Mediterranean Hydrological Cycle Observing System - Turkey - Water Resource Development in Turkey ,2000
[26] Source: General Directorate of State Hydraulic Works Web Page

		supply municipal water to all municipalities, irrespective of the size of the municipality. It is responsible for assisting the municipalities in financing, developing and construction the projects of infrastructure, including water supply and sewerage.[27]
User Level	Municipal Water Administrations[28]	Although DSI is the main executive agency for the government for overall water resources planning, execution, and operation, at the user level, distribution of drinking water supply and through inter-connected systems are undertaken by municipal water administrations. This Urban water and sewage administrations in metropolitan municipalities are in charge of such works as constructing, operating, and maintaining water supply and treatment facilities, and are responsible for networks of industrial establishments within the boundaries of metropolitan municipalities. In addition, Water and Sewage Administration connected to the municipalities (15 out of 80 provincial capital municipalities) have taken part in the implementation of pollution control policies, including water supply and construction and operation of wastewater treatment facilities. [29]. Some examples Water Utilities in Turkey are ISKI for Istanbul (the largest utility), ASKI for Ankara, IZSU for Izmir.
Other institutions	The Ministry of Environment	The main responsible body for [30] • Environmental management • for co-ordinate all national and international activities concerning water resources. • for setting policies, principles and rules, • inspecting activities, • coordinating studies, • enhancing public awareness on environmental aspects of water resources.
	Under secretariat of State Planning Office (SPO):	Its principal function is to prepare annual investment programs and five years development plans for various sectors of the economy. In line with the policies and principles set out in the development plans, SPO adjusts the national fund for the allocation of the

[27] Source: FAO Aquastat - Turkey - Water - 1997
[28] Source: Turkey Water Report, Prepared for the 3rd World Water Forum, March 2003, Republic of Turkey; World Water Council
[29] Source: General Directorate of State Hydraulic Works Web Page
[30] Source: Integrated Coastal Management (ICM) for all coastal states of Europe and Central Asia. Turkey - Coastal Management in Turkey , 2000

		projects and the programs which are under the responsibility of various ministries.[31]

3.1. Private sector involvement

- **Izmit - BOT-[32]**

Izmit, BOT for Construction and Operation of a New Drinking Water Plant.
Seven years of negotiation led, in 1995, to the signing of a $933 million BOT contract for the construction of a new drinking water plant in Izmit, a coastal town southeast of Istanbul. The plant will serve all 1.2 million of Izmit's residents. Thames Water of Britain is the lead investor in the consortium to build and operate the plant, which will revert to the state 15 years after operations begin.

- **Cesme and Alacati municipalities[33]**

World Bank is assisting to introduce a private company which under a management contract with Cesme and Alacati municipalities will be responsible for the provision of water and wastewater services. A private company has been selected through a competitive process and the management signed on February 9, 2003.

The municipalities will own the assets and supervise the operator to ensure improvements. The project also includes investments related to wastewater collection which will improve the environmental conditions in the two cities.

[31] Source: Turkey Water Report, Prepared for the 3rd World Water Forum, March 2003, Republic of Turkey; World Water Council
[32] Source: UNDP, Public-Private Partnership for the Urban Environment, PPPUE; Public-Private Cooperation in the Delivery of Urban Infrastructure Services, Options and Issues, Working Paper , New York, 1999
[33] Source: The World Bank Group, "Cesme-Alacati Water Supply and Sewerage Project", Project Page

4. LEGAL FRAMEWORK

The basic legislation in water sector is the Turkish Constitution, which states that water resources are natural wealth of the country and under the authority of the State, to be used for the benefit of public. Except some privately owned small springs, the development of water resources, including groundwater, are in general under the responsibility of the State. Nevertheless, utilization of groundwater resources is regulated by a specific law, which licenses the user upon request, within the limits of safe yield of relevant aquifer. Groundwater use rights can neither be transferred nor sold. [34]

4.1. Principal Laws in the Water Sector in Turkey[35]

Law	Comment
The Bank of Provinces Law, 1945	The Bank of Provinces was established with a mandate to assist all municipalities, irrespective of size, in the financing and construction of their infrastructure works including water supply (drinking water) and sewerage, under the Ministry of Public works and Resettlement.
Establishment of DSI, 1954	The law defines duties and authorities of DSI and determines its organizations. Water resources management and nation-wide responsibility for water sector planning is centralized within DSI, under the Ministry of Energy. DSI acts to some extent as a means of water sector integration, although this is not systematically established in the legislation.
Groundwater Law, 1968	According to this law, groundwater is the sole property of the State, and DSI is the only legal authority responsible for the investigation, use, and allocation of ground waters.
Drinking Water Supply Law, 1968	This law authorized DSI to provide drinking water to cities having a population of more than 100,000 provided that the government authorizes DSI and the concerned city council approves.
Rural Area Water Supply Law	Responsibility for supplying drinking water to villages was originally assigned to DSI, but later was transferred to GDRS.
The Law of Environment, 1983	Based on the principle of "polluter pays," this law deals with the issue of environment in a very broad scope. The aim of the law, which considers the environment as a whole, is not only to prevent and eliminate environmental pollution, but also to allow for the management of natural and historical values and land in such a way as to utilize and preserve such richness with concern for future generations as well.

Although there are separate enactments dealing respectively with matters such as rural and urban water supply, groundwater, irrigation and hydropower, DSI coordinates water use at the national level. Any agency with either need for a potential development project or is itself investing in a water-sector related activity has to cooperate with DSI and must obtain prior approval from DSI concerning the source and volume of water to be used for each project.

[34] Source: Mediterranean Hydrological Cycle Observing System - Turkey - Water Resource Development in Turkey, 2000

[35] Source: Turkey Water Report, Prepared for the 3rd World Water Forum, March 2003, Republic of Turkey; World Water Council;

5. WATER STRATEGY

The major systematic aspect of water related activities in Turkey is central planning. At the national level, Five Year Development Plans (FYDP) are aimed at ensuring the optimum distribution of all kinds of resources among various sectors of the economy. Every five years, State Planning Organization (DPT), with experts from all sectors prepares the Development Plan.36

Other National Plans and Programmes:

- National Environmental Action Plan (NEAP) – Integration of environmental considerations
- National Programme for Environmental Institutions and management in Turkey
- National Programme for EU integration

[36] Source: Turkey Water Report, Prepared for the 3rd World Water Forum, March 2003, Republic of Turkey; World Water Council;

6. WATER ASSESSMENT

6.1. Water Resources

- Average Annual Renewable Water Resources: 229 Bm³[37] (2004)
- Renewable Water per Capita 2005: 3 124 m³ (2005)[38]

- Total annual water withdrawal: 42.0 Bm³ (2000)

- Total Annual Water withdrawals and sources for domestic supply: 5 Bm³ (2002)[39]

- Water Resources: thousand (m³)

▪ Spring:	1.316.858	26.3 %
▪ Lake:	88.146	1.8 %
▪ River:	128.331	2.6 %
▪ Dam :	1.965.355	39.3 %
▪ Well:	1.452.448	29.0 %
▪ Artificial Lake:	52.081	1.0 %

6.2. Water Supply [40]

- According to the results of Municipal Drinking Water Statistics 2002, the rate of municipal population served by drinking water network is 95,3%.
- 1.71 billion m³ of the total abstraction was treated in water treatment plants. 2.5% received physical treatment and the rest, conventional treatment.
- Rate of municipal population served by drinking water networks: 95%[41]
- Estimated population access to Improved Water sources through Household Connections 2002[42]:
    - Urban 64 %
    - Rural: 30 %

- Service Continuity:

[37] PAI: Resources 2005
[38] PAI: Resources 2005
[39] Source: Republic of Turkey, Prime Ministry State Institute of Statistics, 2002
[40] Source: Republic of Turkey, Prime Ministry State Institute of Statistics, 2002
[41] Source Republic of Turkey, Prime Ministry State Institute of Statistics, 2002
[42] Source: WHO / UNICEF Joint Monitoring Programme for Water Supply and Sanitation, Coverage Estimates, Improved Drinking Water, Updated in July 2004, Turkey

Main Drinking Water Indicators of Municipalities, 2002	
Total population	67 803 927
Total number of municipalities	3 227
Total municipal population	53 421 379
Number of municipalities questionned	3 215
Number of municipalities receiving drinking water network services	3 140
Number of municipalities without drinking water network	75
Municipal population receiving drinking water network services	50 899 198
Rate of population served by drinking water network in total population (%)	75.07
Rate of population served by drinking water network in municipal population (%)	95.28
Amount of water supplied (thousand m^3/year)	5 003 219
Spring	1 316 858
Lake	88 146
River	128 331
Dam	1 965 355
Well	1 452 448
Artificial lake	52 081
Number of drinking water treatment plants	123
Physical	63
Conventional	59
Advanced	1
Total capacity of drinking water treatment plants (thousand m^3/year)	3 525 507
Physical	149 328
Conventional	3 375 674
Advanced	505
Amount of drinking water treated by treatment plants (thousand m3/year)	1 711 227
Physical	43 520
Conventional	1 667 707
Advanced	0
Number of municipalities served by drinking water treatment plants	252
Municipal population served by drinking water treatment plants	18 260 869
Rate of population served by drinking water treatment plants in total population (%)	26.93
Rate of population served by drinking water treatment plants in municipal population (%)	34.18

Source: Republic of Turkey, Prime Ministry State Institute of Statistics, 2002[43]

6.3. Sanitation and Sewage

State Institute of Statistics has been collecting data on the current status of wastewater services and wastewater treatment plants of all municipalities in Turkey within the scope of Environmental Statistics since 1994. Municipalities not being constituted in 2002 weren't covered. [44]

Service Coverage:

- In 2002, 2060 of 3215 municipalities were served by wastewater networks[45]

- **Treated Wastewater** [46]

  In 2002 was 47 % (1.38 billion m^3) of total volume 2.91 billion m^3 wastewater treated in wastewater treatment plants. 56.3% of this wastewater was treated biologically, 30.2% was treated physically and 13.5% was treated in advanced plants.

[43] Source: Republic of Turkey, Prime Ministry State Institute of Statistics, 2002
[44] Source: Republic of Turkey, Prime Ministry State Institute of Statistics, 2002
[45] Source: Republic of Turkey, Prime Ministry State Institute of Statistics, 2002
[46] Source: Republic of Turkey, Prime Ministry State Institute of Statistics, 2002

- 78.4 % of total municipal population was connected to sewerage systems 2002.
- 49,9 % of total municipal population was connected to wastewater treatment plants 2002.

Main Wastewater Indicators of Municipalities, 2002	
Total population	67 803 927
Total number of municipalities	3 227
Number of municipalities questionned	3 215
Total municipal population	53 421 379
Number of municipalities receiving sewerage services	2 060
Rate of population served by sewerage in total population (%)	61.8
Rate of population served by sewerage in municipal population (%)	78.4
Total amount of wastewater discharged (thousand m^3/year)	2 916 033
Sea	1 098 381
Lake	85 418
River	1 251 445
Land	98 640
Dam	121 991
Carstic formations	19 682
Septic tank	79 779
Other	160 697
Number of municipalities served by wastewater treatment plants	210
Number of waste water treatment plants	140
Physical treatment	43
Biological treatment	94
Advanced treatment	3
Number of municipalities having marine outfalls	46
Total capacity of wastewater treatment plants (thousand m^3/year)	2 469 958
Physical treatment	997 213
Biological treatment	1 178 143
Advanced treatment	294 602
Amount of wastewater treated (thousand m^3/year)	1 379 760
Physical treatment	416 897
Biological treatment	777 345
Advanced treatment	185 518
Municipal population served by wastewater treatment plants	26 657 268
Rate of population served by wastewater treatment plants in total population (%)	39.3
Rate of population served by wastewater treatment plants in municipal population (%)	49.9

Source: Republic of Turkey, Prime Ministry State Institute of Statistics, 2002 [47]

[47] Source: Republic of Turkey, Prime Ministry State Institute of Statistics, 2002

7. TARIFFS[48]

Municipalities set their own water pricing policies, with schemes varying from city to city. Water tariffs for domestic and industrial use together with other sector uses in metropolitan municipalities are undertaken by the decision of the Metropolitan Municipality Council according to the “Tariffs Regulations" defined by the Council of each metropolitan municipality.

In the identification of the drinking water and waste water tariffs; the O&M, amortization, rehabilitation and expanding costs are generally considered. Another factor is the profit rate of not less than 10% of all expenditures. This indicates that the water in Turkey is being priced not as a basic need but as an economic good.

The commercialisation of water supply services and profit-oriented approaches to the provision of water are becoming common even in other than metropolitan municipalities in Turkey.

Drinking water and waste water tariffs regarding domestic use and industrial use by public institutions within the boundaries of each metropolitan municipality are calculated for each month of the year by considering the Wholesale Price Indices defined by DIE together with the Metropolitan Municipality Council decision. The subscribers (households) for domestic water are classified under three groups defined by the water consumption value as m^3/day criteria.

In the identification of water consumption ratios for each household and industry, the consumption figures of the previous year; estimations about rainfall in following years, drought conditions, and seasonal fluctuations in the past and future are considered.

The mean prices of water have increased during recent years, due to the inclusion in the value of the water of all the costs of the production, and the costs of wastewater treatments.

By applying increasing block schedule, municipalities seek to charge differently for different groups of subscribers and to ensure water saving by this price differentiation.

[48] Source: Turkey Water Report, Prepared for the 3rd World Water Forum, March 2003, Republic of Turkey; World Water Council;

8. REFERENCES

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CIA - The World Fact Book - Turkey - 2004	http://www.cia.gov/cia/publications/factbook/print/tu.html
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