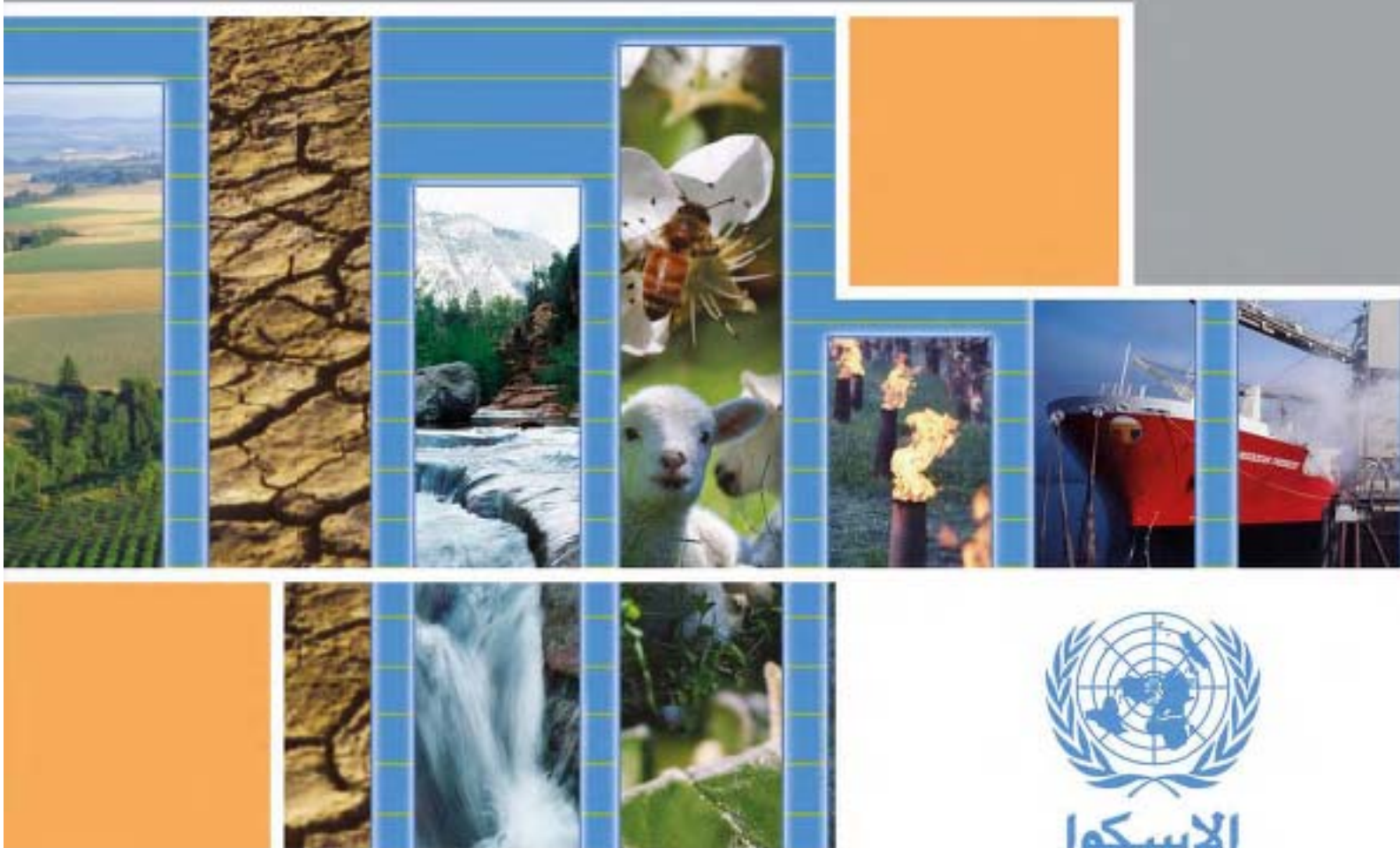


مجموعة الاحصاءات البيئية

في منطقة اللجنة الاقتصادية والاجتماعية لغربي آسيا ٢٠٠٨-٢٠٠٩

Compendium of Environment Statistics

in the ESCWA Region 2008-2009



الاسكوا
ESCWA

الأمم المتحدة - اللجنة الاقتصادية والاجتماعية لغربي آسيا
United Nations Economic and Social Commission for Western Asia

**ECONOMIC AND SOCIAL COMMISSION
FOR WESTERN ASIA**

**COMPENDIUM OF ENVIRONMENT STATISTICS
IN THE ESCWA REGION**

United Nations

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FOR WESTERN ASIA**

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IN THE ESCWA REGION**

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New York, 2009

2009

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IV

Preface

The economic development in the United Nations Economic and Social Commission for Western Asia (ESCWA) region is accompanied by an overexploitation of resources and adverse impacts on the environment, particularly in terms of deteriorating air and water quality, diminishing water resources, land degradation and desertification, and loss of biodiversity, all of which affect the sustainability and the quality of life in the region.

In order to address such problems and provide solutions, ESCWA member countries need to strengthen the environmental legislation and implement regulations and action plans for monitoring the state of environment mainly for water and air with emphasis on environmental accounts and defined goals on reaching regional and international environmental standards. A broad-based programme of environment statistics needs to be developed in order to compile and disseminate timely, reliable, relevant and comparable environment data; and build up a sound database related to various aspects of the environment for use by government officials, concerned stakeholders and the public. Environmental information and reporting are important in order to enhance environmental planning, integrate environmental concerns and economic growth into decision-making to promote sustainable development at the national and international levels, and evaluate national environmental performance.

The ESCWA has been assisting member countries in developing their environment statistics, indicators and accounts since 2004, benefiting from constant interaction with academicians, researchers, various governmental and private organizations as well as regional and other international agencies.

ESCWA published the first issue of the “*Compendium of Environment Statistics in the ESCWA Region*” in 2007, which contained comprehensive data and indicators on various environmental elements in the ESCWA region. This second issue addresses eight themes treated separately in each chapter, namely: (a) overview, (b) freshwater resources, (c) freshwater use, (d) water accounts and environmental protection expenditure, (e) waste management, (f) energy consumption, (g) air pollution, and (h) Goal 7 of the MDGs. Each chapter starts with an overview of the main issues and describes briefly the statistical tables. The data presented in this publication covers the 14 members of ESCWA when available including the Sudan which joined ESCWA in 2008.

The approach used for the collection of information relied on the 2008 United Nations Statistics Division (UNSD) environment statistics on waste and water. The data was complemented from national, regional and international publications and databases, with priority given to official national sources. The data collected, the related metadata and the selected indicators have been added to the ESCWA Statistics Information System (ESIS), available at: <http://esis.escwa.org.lb/>.

The economic section of ESCWA’s Statistics Division, in particular Wafa Aboul Hosn, team leader and Therese El-Gemayel, research assistant, worked on data collection and treatment, and prepared all the parts of the *Compendium* which was reviewed by Giovanni Savio, Chief of the Economic Statistics section. We extend our gratitude to officials from member countries for their collaboration; experts on environment statistics and accounts from the United Nations Statistics Division, Eszter Horvath, Alessandra Alfieri, Michael Vardon and Yongi Min, from MedStat Cécile Roddier Quéfélec, and ESCWA professionals in water and environment for sharing data, reports and the responses to the questionnaire on environment statistics as well as for the organization of workshops and ideas-sharing; and George J. Nasr, Professor at the Lebanese University for providing peer review.

ESCWA strives to improve the quality of its publications through the suggestions and comments of readers in the readership questionnaire sent along this publication to Ms. Wafa Aboul Hosn, Team Leader, at: aboulhossn@un.org.

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| 11 | () | -I.6 |
| 12 | (2000) | |
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| 19 | (/) | -II.2 |
| 20 | (/) | -II.3 |
| 21 | (/) | -II.4 |
| 22 | | -II.5 |
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| 74 | | | | -V.1 |
| 75 | | | | -V.2 |
| 84 | | | | -VI.1 |

Symbols and abbreviations

| | |
|---|-----------------|
| Billion cubic metre | Bcm |
| Chlorofluorocarbons | CFC |
| Cubic metre | m ³ |
| Not Produced or Not Available | ... |
| ESCWA: The Economic and Social Commission for Western Asia comprises Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Sudan, Syrian Arab Republic, United Arab Emirates and Yemen | ESCWA |
| Food and Agriculture Organization, Statistical Database | FAOSTAT |
| GCC: The Gulf Cooperation Council comprises Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates | GCC |
| Greenhouse gas | GHG |
| Gross domestic product | GDP |
| Hectare | HA |
| Hydrochlorofluorocarbons | HCFC |
| International Standard Industrial Classification of all Economic Activities | ISIC |
| Kilogram | kg |
| Kilometre | km |
| Kilowatt hour | kWh. |
| Liquefied petroleum gas | LPG |
| Metre | m |
| Metric ton | Mt |
| Millennium Development Goals | MDGs |
| Millimetre | Mm |
| Million cubic metre | Mcm |
| Negligible/Zero | - |
| Number | No. |
| Ozone depleting potential | ODP |
| Ozone depleting substance | ODS |
| Per cent | % |
| Purchasing power parity | PPP |
| Square kilometre | Km ² |
| Square metre | m ² |
| Thousand | 000' |
| Tons of oil equivalent | TOE |
| United States dollar | US\$ |
| World Health Organization | WHO |
| Year | Yr |

CHAPTER I. OVERVIEW OF GEOGRAPHY, CLIMATE, POPULATION AND ECONOMY

-

Statistical Highlights

1. The ESCWA region represents 5.5 per cent of the world total area and 3.6 per cent of the world's population
2. The annual average population growth rate in the ESCWA region was 2.36 per cent in 2007
3. The population in the ESCWA region was estimated at 244.5 millions in 2007, and is projected to rise to 342.9 millions in 2025, and 458.4 millions in 2050
4. The average population density in the ESCWA region was 33.3 inhabitants per km² in 2007
5. The urban population represented 70 per cent of the total population in the ESCWA region in 2005
6. The ESCWA region had 51 per cent of world proven oil reserves and 27 per cent of world proven natural gas resources in 2007
7. The ESCWA region contains only 0.56 per cent of the global renewable water resources and 70 per cent of the land is arid
8. The gross domestic product (GDP) at constant prices (2000=100) amounted to US\$ 765,299 billion in 2007
9. Growth rate of real GDP was 5.11 in the ESCWA region in 2007, compared to 6.11 in 2006

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| | 3.6 | | 5.5 | -1 |
| | 2007 | 2.36 | | -2 |
| | 342.9 | 2007 | 244.5 | -3 |
| | | | 2050 | 458.4 2025 |
| | 2007 | | 33.3 | -4 |
| | | | 70 | 2005 -5 |
| | 27 | | 51 | 2007 -6 |
| | 70 | | 0.56 | -7 |
| | 2007 | 765 299 (100=2000) | | -8 |
| 6.11 | 2007 | | 5.11 | -9 |
| | | | 2006 | |

Overview of Geography and Climate in the ESCWA Region

The ESCWA region comprises 14 ESCWA members, namely: Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, the Sudan, the Syrian Arab Republic, the United Arab Emirates and Yemen.

The region covers 7.3 million km², which represents 5.5 per cent of the world total area. The surface areas of individual ESCWA member countries range from 694 km² for Bahrain to 2.5 million km² for the Sudan. All ESCWA member countries have access to the sea, with the longest coastlines in Saudi Arabia and Egypt at 7,572 km and 5,898 km respectively while Jordan has a modest coastline of 27 km (table I.1). The highest altitudes are found in Yemen, Lebanon and the Sudan at 3,666 m, 3,090 m and 3,075 m respectively (table I.1).

The region is rich in oil and gas resources, representing in 2007 some 51 per cent of the world proven oil reserves and 27 per cent of the world proven natural gas resources.¹ However, the region suffers from water scarcity and aridity. The inland water surface covers only 1.6 per cent of the total ESCWA surface area.

The region contains merely 0.56 per cent of the global renewable water resources, while it accounts for 3.6 per cent of the world's population. Mean yearly precipitation is less than 100 mm per year in six ESCWA member countries, and between 100 and 300 mm per year in four other countries. Only Lebanon profits of an average precipitation of 646 mm per year, most of which, however, is unavailable due to seepage into the sea or flow into other countries. The water is unevenly distributed and shortages in water supplies in summer are also observed in most regions (table I.2).

Agricultural land represented 5.1 per cent of total land in ESCWA region for the year 2007 while it was estimated at 23.2 per cent for the year 2005 (ESCWA calculation based on country data and FAOSTAT database where agricultural land is considered to be cultivated land according to FAOSTAT definition).²

¹ ESCWA, Statistical Abstract of the ESCWA Region, Issue 28 (2009).

² <http://www.fao.org/nr/water/aquastat/data/query/index.html>, accessed on August 2009.

Table I.1
Main Geographical Features

| | Total Surface Area (km ²) ^{a/} | Inland Water Surface (km ²) ^{b/} | Length of coasts (Km) ^{b/} | Continental Shelf Area (km ²) ^{b/} | Maximum Altitude (m) ^{c/} |
|----------------------|--|--|---|--|--|
| | ^{a/} () | ^{b/} () | ^{b/} () | ^{b/} () | ^{c/} () |
| Bahrain | 694 | ... | 255 | 7,968 | 134 |
| Egypt | 1,001,450 | 2,462 | 5,898 | 50,066 | 2,637 |
| Iraq | 438,317 | 924 | 105 | 1,034 | ... |
| Jordan | 89,324 | 280 | 27 | 82 | 1,854 |
| Kuwait | 17,818 | ... | 756 | 6,526 | ... |
| Lebanon | 10,452 | 16 | 294 | 1,169 | 3,090 |
| Oman | 309,500 | ... | 2,810 | ... | 3,075 |
| Palestine | 6,020 | ... | 42 | 46,670 | 1,022 |
| Qatar | 11,493 | ... | 909 | 31,156 | 35 |
| Saudi Arabia | 2,149,690 | ... | 7,572 | 95,580 | 2,000 |
| Sudan | 2,505,813 | 114,000 | 717 | 15,861 | 3,000 |
| Syrian Arab Republic | 185,180 | 1,464 | 183 | 852 | 2,814 |
| United Arab Emirates | 83,600 | ... | 2,871 | 51,394 | ... |
| Yemen | 527,970 | ... | 3,149 | 65,341 | 3,666 |
| ESCWA Total | 7,337,321 | 119,146 | 25,546 | 373,699 | |

Sources: ^{a/} National data from statistical abstracts, Correspondence with ESCWA: for Oman (excluding international waters, including islands); for Qatar (excluding reclaimed land); and Yemen (excluding international waters and islands).

^{b/} Global Environment Outlook Data Portal, UNEP, 2006. For Iraq, FAO, Aquastat Database, 2005.

^{c/} National data from statistical abstracts, and FAOSTAT website.

Table I.2
Main Climatic Features (year 2007)
(2007)

| | Average Min. Annual Temperature (degrees Celsius) ^{a/} | Average Max. Annual Temperature (degrees Celsius) ^{b/} | Mean Yearly Precipitation (mm/yr) ^{a/} |
|----------------------|---|---|---|
| | ^{a/} () | ^{b/} () | ^{a/} () |
| Bahrain | ... | ... | 83 |
| Egypt | 8.75 | 40.68 | 51 |
| Iraq | 15.05 | 30.30 | 144 |
| Jordan | 12.40 | 23.80 | 111 |
| Kuwait | 19.60 | 34.20 | 77 |
| Lebanon | 12.68 | 28.24 | 646 |
| Oman | 10.00 | 42.60 | 135 |
| Palestine | 14.00 | 23.13 | 424 |
| Qatar | 23.70 | 33.90 | 74 |
| Saudi Arabia | 17.62 | 33.48 | 52 |
| Sudan ^{b/} | 21.16 | 35.61 | 416 |
| Syrian Arab Republic | -3.43 | 43.30 | 313 |
| United Arab Emirates | ... | ... | 78 |
| Yemen ^{b/} | 13.87 | 35.56 | 167 |

Sources: ^{a/} Several Country Statistical Abstracts and FAO Aqastat Database 2008.

^{b/} Average Minimum and Maximum Temperatures are for the year of 2006.

Population and Urbanization Overview

In 2003, the population in the ESCWA region was estimated at 222.5 millions and has grown at an average annual rate of 2.3 per cent, compared to a global average of 1.22 per cent, to reach 244.5 millions in 2007 (table I.3; figure I.1). Egypt is the most populated ESCWA country with 80.5 millions followed by the Sudan with 40.6 millions; the populations of Iraq, Saudi Arabia, the Syrian Arab Republic and Yemen range between 20 and 30 millions. The lowest population agglomeration was found in Bahrain with less than 1 million inhabitants in 2007.

| | | |
|------|-------|-------|
| 1.22 | 2003 | 222.5 |
| | | 2.3 |
| | 244.5 | |
| | .(1.1 | 1.3) |
| | 2007 | 2007 |
| | 40.6 | 80.5 |
| 30 | 20 | |
| | | |
| | .2007 | |

According to the medium variant estimate of the World Population Prospects 2008, the population in the ESCWA region is projected to reach 342.92 millions by 2025, with an increase of 40 per cent compared to 2007, and 458.38 millions by 2050.

| | | |
|--------|-------|--------|
| | 2025 | 2008 |
| 458.38 | 2007 | 342.92 |
| | | 40 |
| | .2050 | |

The average population density in the region was estimated at 38 inhabitants per km² in 2007. Bahrain has the highest population density, with 1,060 inhabitants per km², while Oman has the lowest, with 8.4 inhabitants per km² (table I.3). A special case is the Gaza governorate which has the highest population density in the world with 3,881 inhabitants per km².³ The characteristics of each of the ESCWA countries are very important parameters as to reflecting the actual population density and the uneven population distribution within and between counties.

| | | |
|-------|-------|---------|
| 38 | .2007 | |
| 2 | 1 060 | |
| 2 | 8.4 | |
| | | .(1.3) |
| 3 881 | | |
| | | .(3)2 |

Challenges Stemming from Population Growth

The total urban population in ESCWA increased from 69 per cent in 2000 to 70 per cent in 2005, adding some 15.5 million people into already overpopulated urban areas. The urban population forms approximately 85 per cent of the total population in the Gulf Cooperation Council (GCC) subregion and some 66 per cent in the Mashreq subregion of Egypt, Iraq, Jordan, Lebanon, Palestine and the Syrian Arab Republic. Moreover, 71 per cent of the population in Yemen and 57 per cent in Egypt are rural. Urban growth rates increased rapidly in the Arabian peninsula, where the urban population was only 38 per cent in 1970, compared to 52 per cent in the Mashreq subregion

| | | | |
|--|------|------|------|
| | 70 | 2000 | 69 |
| | 15.5 | | 2005 |
| | | 85 | |
| | 66 | | |
| | 57 | | 71 |
| | | 38 | |

³ Palestine in figure 2007.

excluding Egypt.⁴

52 1970
(4)

The population living within 100 km of the coast increased annually by 2.5 per cent from 1995 to 2005 to reach 79 millions.

100
2.5
79 2005 1995

The concentration of population in urban areas has resulted in increased poverty in those areas, inadequate solid waste collection and disposal, toxic and hazardous waste problems, poor or non-existent sanitation facilities and degradation of urban environment and coastal areas. In the absence of adequate infrastructure facilities, job opportunities and educational and health facilities, those problems present serious challenges to achieve the Millennium Development Goals (MDGs).

Box I.1. Population Growth and Distribution in Lebanon^{a/, b/}

Several studies showed the distribution of the Lebanese population on its territory. Only 10.4 per cent of the population was resident in Beirut in 2005, compared to 13.1 per cent in 1996 and 22.3 per cent in 1970. The highest populated district was Mount Lebanon with 40 per cent in 2005 compared to 39.2 per cent in 1970, followed by the North with 20.5 per cent compared to 17.2 per cent, Bekaa with 12.5 per cent compared to 9.6 per cent, and the South (including Nabatiyeh) with 16.6 per cent compared to 11.8 per cent.

Moreover, the average number of children born in Lebanese families decreased from 4.5 in 1970 to 2.9 in 1996 and even more to 2.8 in 2000; while the average number of Lebanese families decreased from 5.3 in 1970 to 4.3 in 1996. According to the trend in population growth and family expansion, Lebanon might reach a zero net growth population.

^{a/} "The Socio-Economic Situation in Lebanon", UNDP, Lebanon, 2004.

^{b/} "Mapping of Human Poverty and Living Conditions in Lebanon 2004", UNDP, Lebanon, 2008.

| a/, b/ | | -I.1 | |
|--------|------|------|------|
| | 2005 | | |
| 13.1 | | 10.4 | |
| 1970 | | 22.3 | 1996 |
| 40 | | | |
| 1970 | 39.2 | 2005 | |
| 20.5 | | | |
| 12.5 | | 17.2 | |
| () | 9.6 | | |
| 11.8 | 16.6 | | |
| 2.8 | 1996 | 2.9 | 1970 |
| | | | 4.5 |
| 1996 | 4.3 | 1970 | 5.3 |
| | | | 2000 |

Migration

Migration in ESCWA countries is a very common process. Of the 233.34 million inhabitants in ESCWA region in 2005, about 19.45 millions migrated to different countries. The migration rate increased 35 per cent between 1995 and 2005, while

233.34
19.45
35
2005

⁴ United Nations Environment Programme (UNEP), "GEO Data Portal, 2004", <http://geodata.grid.unep.ch>, accessed July 2009.

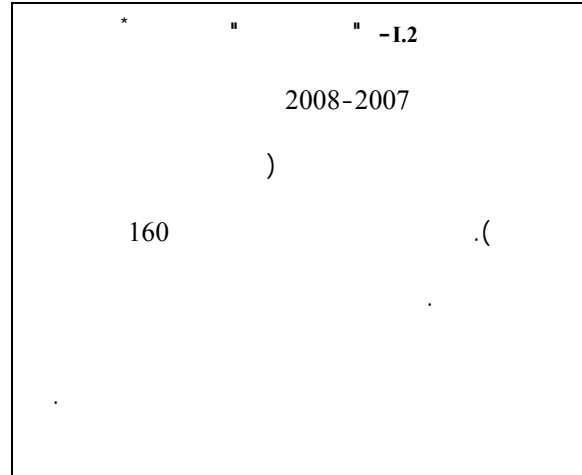
the highest rate of increase was recorded in the United Arab Emirates with 87 per cent. In absolute terms, the highest migration was registered in Saudi Arabia with 4.6 millions in 1995 and 6.4 millions in 2005 as shown in table I.4.

| Country | 1995 | 2005 |
|----------------------|------|------|
| Saudi Arabia | 4.6 | 6.4 |
| United Arab Emirates | 87 | 87 |

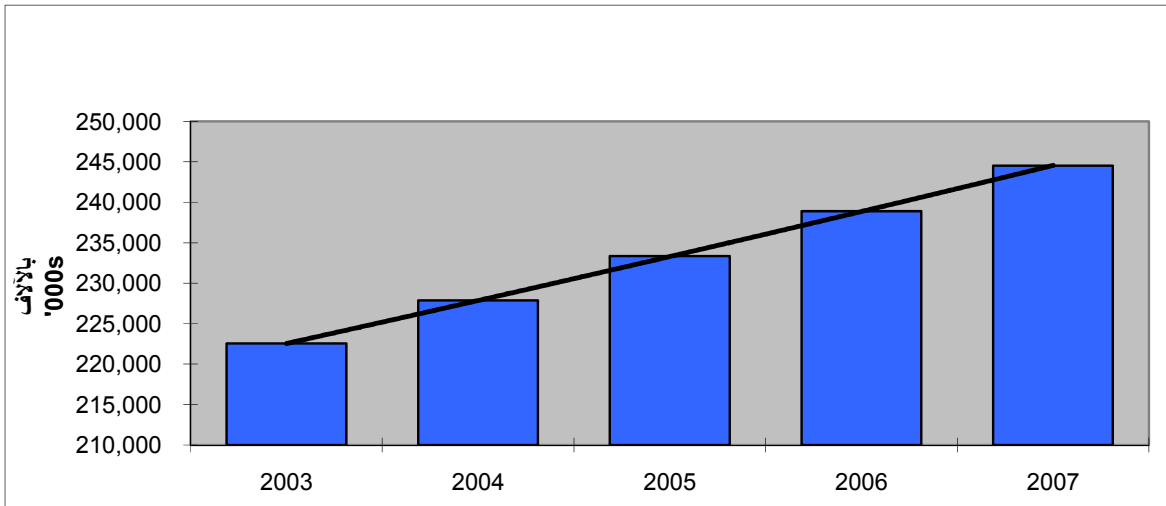
Box I.2. 'Climigration' in Syria*

In 2007/2008, the Syrian Arab Republic witnessed an intense drought that affected its rural areas. Concerns were raised due to harvest losses (more than half of the wheat harvest compared to the previous year and one third as for chickpeas and barley). As for human migration, it was reported that 160 villages in the Northeast of the Syrian Arab Republic were deserted and villagers headed towards urban cities due to severe drought. The impact of climate change might lead to overpopulation in urban cities thus to the exhaustion of already limited natural resources as it would affect the economy due to an increased number of job seekers in urban areas.

* "Rising Temperatures, Rising Tensions" Climate change and the risk of violent conflict in the Middle East, O. Brown and A. Crawford, International Institute for Sustainable Development, 2009.



**Figure I.1
Mid-year Population Estimates for ESCWA Countries**



Source: United Nations World Population Prospects: The 2008 Revision.

Table I.3
Population and Urbanization

| Year | Total Population in (000) ^{a/} | Population growth rate (percentage) (2005-2010) ^{a/} | Urban Population (percentage) ^{b/} | Rural Population (percentage) ^{b/} |
|-------------------------|---|---|---|---|
| | ^{a/} () | () ^{a/} (2010-2005) | ^{b/} () | ^{b/} () |
| Bahrain | 2005 730 | 2.19 | 88.4 | 11.6 |
| | 2007 762 | 2.11 | | |
| | 2010 810 | 1.92 | 88.6 | 11.4 |
| | 2005 77,563 | 1.87 | 42.6 | 57.4 |
| Egypt | 2007 80,510 | 1.83 | | |
| | 2010 84,987 | 1.75 | 42.8 | 57.2 |
| | 2005 28,383 | 2.33 | 66.9 | 33.1 |
| | 2007 29,625 | 2.07 | 66.5 | 33.5 |
| Iraq | 2010 31,598 | 2.41 | 66.4 | 33.6 |
| | 2005 5,601 | 3.12 | 78.3 | 21.7 |
| | 2007 5,976 | 3.28 | 82.6 | 17.4 |
| Jordan | 2010 6,506 | 2.18 | 78.5 | 21.5 |
| | 2005 2,705 | 2.99 | 98.3 | 1.7 |
| | 2007 2,856 | 2.45 | | |
| Kuwait | 2010 3,057 | 2.16 | 98.4 | 1.6 |
| | 2005 4,121 | 1.20 | 86.6 | 13.4 |
| | 2007 4,205 | 0.82 | | |
| Lebanon | 2010 4,303 | 0.75 | 87.2 | 12.8 |
| | 2005 2,626 | 1.91 | 71.6 | 28.5 |
| | 2007 2,735 | 2.11 | | |
| Oman | 2010 2,916 | 2.04 | 71.7 | 28.3 |
| | 2005 3,781 | 3.37 | 71.5 | 28.4 |
| | 2007 4,037 | 3.20 | | |
| Palestine | 2010 4,431 | 3.01 | 72.1 | 27.9 |
| | 2005 887 | 11.37 | 95.4 | 4.6 |
| | 2007 1,140 | 12.35 | | |
| Qatar | 2010 1,511 | 5.44 | 95.8 | 4.2 |
| | 2005 23,701 | 2.31 | 81 | 19 |
| | 2007 24,778 | 2.12 | | |
| Saudi Arabia | 2010 26,358 | 2.01 | 82.1 | 17.9 |
| | 2005 38,856 | 2.12 | 40.8 | 59.2 |
| | 2007 40,604 | 2.23 | | |
| Sudan | 2010 43,386 | 2.12 | 45.2 | 54.8 |
| | 2005 19,201 | 3.34 | 53.2 | 46.8 |
| Syrian Arab Republic | 2007 20,594 | 3.51 | | |
| | 2010 22,610 | 2.45 | 54.9 | 45.1 |
| | 2005 4,096 | 3.67 | 77.7 | 22.3 |
| United Arab Emirates | 2007 4,372 | 2.89 | | |
| | 2010 4,716 | 2.26 | 78 | 22 |
| | 2005 21,084 | 2.88 | 28.9 | 71.1 |
| | 2007 22,333 | 2.88 | | |
| Yemen | 2010 24,323 | 2.81 | 31.8 | 68.2 |
| 2005 | 233,335 | 2.39 | 70 | 30 |
| 2007 | 244,527 | 2.36 | ... | ... |
| ESCWA Total | 2010 261,512 | 2.19% | 71 | 29 |

Sources: ^{a/} United Nations: World Population Prospects: The 2008 Revision.

^{b/} United Nations: World Urbanization Prospects: The 2007 Revision.

Note: Data for the years of 2005 and 2007 are based on estimates, while data for the year 2010 have a medium variant.

Table I.3 الجدول (continued)

| | Year | Population Density (per Sq. km) ^{a/} | Population Within 100 Kilometres of Coast 2005 (000) ^{b/} |
|----------------------|-------------|--|--|
| | | ^{a/} () | ^{b/} () |
| | 2005 | 1,048.0 | 696 |
| Bahrain | 2007 | 1,060.1 | |
| | 2010 | 1,163.0 | |
| | 2005 | 73.2 | 34,868 |
| | 2007 | 75.8 | |
| Egypt | 2010 | 84.0 | |
| | 2005 | 64.0 | 1,411 |
| | 2007 | 66.3 | |
| Iraq | 2010 | 72.0 | |
| | 2005 | 62.0 | 1,670 |
| | 2007 | 64.5 | |
| Jordan | 2010 | 72.0 | |
| | 2005 | 152.0 | 2,178 |
| | 2007 | 160.0 | |
| Kuwait | 2010 | 171.0 | |
| | 2005 | 392.0 | 3,719 |
| | 2007 | 400.7 | |
| Lebanon | 2010 | 409.0 | |
| | 2005 | 8.1 | 3,875 |
| | 2007 | 8.4 | |
| Oman | 2010 | 9.0 | |
| | 2005 | 625.0 | 2,651 |
| | 2007 | 667.4 | |
| Palestine | 2010 | 732.0 | |
| | 2005 | 72.4 | 609 |
| | 2007 | 76.4 | |
| Qatar | 2010 | 137.0 | |
| | 2005 | 11.0 | 5,352 |
| | 2007 | 11.5 | |
| Saudi Arabia | 2010 | 12.0 | |
| | 2005 | 15.0 | 930 |
| | 2007 | 16.2 | |
| Sudan | 2010 | 17.0 | |
| | 2005 | 103.7 | 6,448 |
| | 2007 | 108.4 | |
| Syrian Arab Republic | 2010 | 122.0 | |
| | 2005 | 49.0 | 2,392 |
| | 2007 | 52.4 | |
| United Arab Emirates | 2010 | 56.0 | |
| | 2005 | 40.0 | 13,277 |
| | 2007 | 42.4 | |
| Yemen | 2010 | 46.0 | |
| | 2005 | 31.8 | 79,146 |
| | 2007 | 33.3 | |
| ESCWA Total | 2010 | 35.6 | |

Sources: ^{a/} United Nations: World Population Prospects: The 2008 Revision.

^{b/} UNEP (2009). The GEO Data Portal. UNEP. <http://geodata.grid.unep.ch>.

Table I.4
Migration in ESCWA Countries (Thousands)
 ()

| | 1995 | 2005 |
|----------------------|-----------------|-----------------|
| Bahrain | 218.9 | 295.5 |
| Egypt | 172.3 | 166 |
| Iraq | 133.7 | 28.4 |
| Jordan | 1,618.2 | 2,224.9 |
| Kuwait | 996.1 | 1,669 |
| Lebanon | 593.8 | 656.7 |
| Oman | 573.5 | 627.6 |
| Palestine | 1201.0 | 1,680.1 |
| Qatar | 405.9 | 636.8 |
| Saudi Arabia | 4,610.7 | 6,360.7 |
| Sudan | 1,111.1 | 638.6 |
| Syrian Arab Republic | 800.9 | 984.6 |
| United Arab Emirates | 1,716 | 3,211.7 |
| Yemen | 228.3 | 264.8 |
| ESCWA Total | 14,380.4 | 19,445.4 |

Source: United Nations: International Migration Report 2006: A Global Assessment.

Economic Growth Overview

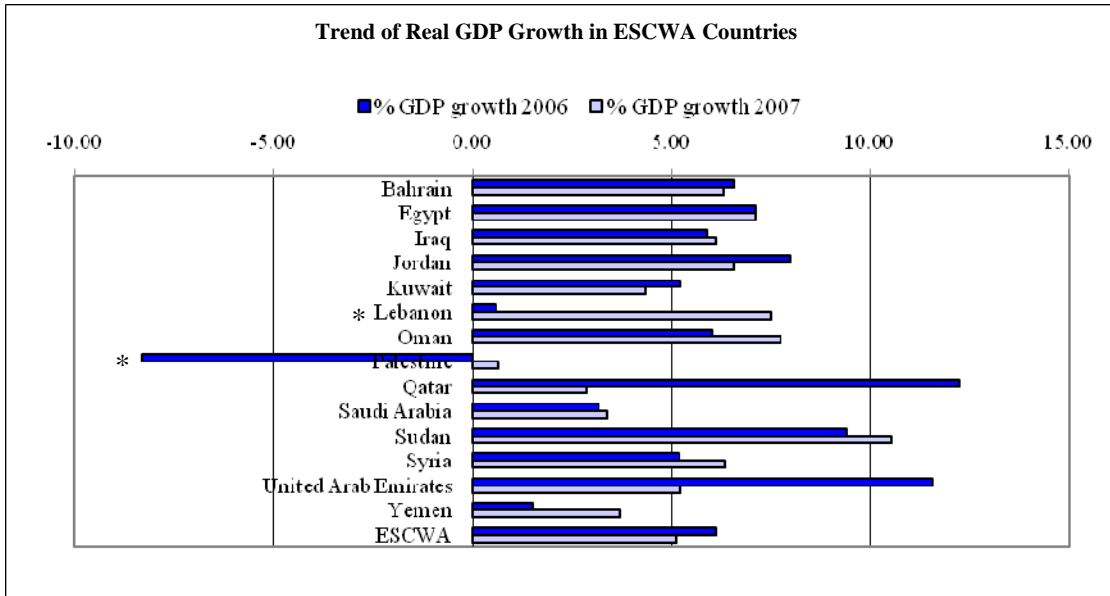
ESCWA's average growth rate of real GDP decreased from 6.11 per cent in 2006 to 5.11 per cent in 2007 (table I.5) with the highest rate of increase observed in Qatar in 2006 and in the Sudan in 2007 and the lowest rate in Palestine (figure I.2). GDP increased from US\$ 623,757 billion in 2004 to US\$ 765,299 billion in 2007 (table I.5). Such an improvement was mainly witnessed in the GCC subregion, whose average rate of growth increased markedly between 2006 and 2007.

2006 6.11
 .(I.5) 2007 5.11
 2006
 .(I.2) 2007
 623 757
 765 299 2004
 .(I.5) 2007
 .2007 2006

In addition, real GDP per capita in the ESCWA region recorded a slight annual increase in 2007 from US\$ 3,157 to US\$ 3,249 (table I.6). However, this indicator shows a deceleration in average per capita income growth in some countries, which can be mainly attributed to their high population growth rate that absorbed a percentage of their positive rates of real GDP.

3 249 3 157 2007
 .(I.6)

Figure I.2



Source: UN-ESCWA Statistical Abstract, 28th Issue. 2009.

* This is due to political instability and could not be systemic.

Table I.5

**Gross Domestic Product in ESCWA Countries at Constant Prices
(base year 2000) and Growth Rates of real GDP (Million US\$)**
()
()

| | 2004 | 2005 | 2006 | 2007 | % GDP growth 2006 | % GDP growth 2007 |
|----------------------|----------------|----------------|----------------|----------------|-------------------|-------------------|
| Bahrain | 9,990 | 10,775 | 11,480 | 12,203 | 6.54 | 6.30 |
| Egypt | 110,724 | 118,303 | 126,688 | 135,683 | 7.09 | 7.10 |
| Iraq | 16,458 | 18,104 | 19,172 | 20,341 | 5.90 | 6.10 |
| Jordan | 9,627 | 10,408 | 11,239 | 11,977 | 7.98 | 6.56 |
| Kuwait | 50,564 | 55,881 | 58,794 | 61,350 | 5.21 | 4.35 |
| Lebanon | 20,278 | 20,492 | 20,614 | 22,161 | 0.60 | 7.50 |
| Oman | 21,721 | 22,784 | 24,150 | 26,019 | 6.00 | 7.74 |
| Palestine | 4,274 | 4,562 | 4,183 | 4,210 | -8.30 | 0.64 |
| Qatar | 24,585 | 26,080 | 29,270 | 30,102 | 12.23 | 2.85 |
| Saudi Arabia | 215,291 | 227,247 | 234,423 | 242,370 | 3.16 | 3.39 |
| Sudan | 18,641 | 20,257 | 22,164 | 24,495 | 9.41 | 10.52 |
| Syrian Arab Republic | 23,481 | 24,896 | 26,191 | 27,849 | 5.20 | 6.33 |
| United Arab Emirates | 88,111 | 115,655 | 129,026 | 135,774 | 11.56 | 5.23 |
| Yemen | 10,014 | 10,226 | 10,381 | 10,765 | 1.51 | 3.70 |
| ESCWA Total | 623,757 | 685,669 | 727,775 | 765,299 | 6.11 | 5.11 |

Source: UN-ESCWA Statistical Abstract, 28th Issue. 2009.

Table I.6
Gross Domestic Product Per Capita in ESCWA Countries at
Constant Prices (base year 2000) in US\$

(2000)

| | 2004 | 2005 | 2006 | 2007 |
|----------------------|--------------|--------------|--------------|--------------|
| Bahrain | 14,067 | 14,866 | 15,536 | 16,214 |
| Egypt | 1,547 | 1,624 | 1,708 | 1,797 |
| Iraq | 599 | 647 | 673 | 702 |
| Jordan | 1,792 | 1,877 | 1,962 | 2,022 |
| Kuwait | 19,321 | 20,697 | 21,159 | 21,518 |
| Lebanon | 5,114 | 5,109 | 5,083 | 5,406 |
| Oman | 8,763 | 9,088 | 9,484 | 10,026 |
| Palestine | 1,176 | 1,213 | 1,076 | 1,048 |
| Qatar | 32,167 | 32,756 | 35,638 | 35,809 |
| Saudi Arabia | 9,341 | 9,624 | 9,697 | 9,799 |
| Sudan | 516 | 549 | 588 | 635 |
| Syrian Arab Republic | 1,277 | 1,318 | 1,350 | 1,397 |
| United Arab Emirates | 22,323 | 28,179 | 30,370 | 30,996 |
| Yemen | 489 | 485 | 478 | 481 |
| ESCWA Total | 2,828 | 3,041 | 3,157 | 3,249 |

Source: UN-ESCWA Statistical Abstract, 28th Issue. 2009.

CHAPTER II. FRESHWATER RESOURCES

-

Statistical Highlights

1. The ESCWA region comprised 0.56 per cent of the global renewable water resources in 2007
2. The ESCWA region enclosed 304.3 Billion cubic metres (Bcm) of conventional water resources, mostly found in Iraq, the Sudan, Egypt and the Syrian Arab Republic in 2007
3. Nine per cent of the total conventional water resources in the ESCWA region are groundwater
4. Almost all renewable water comes from groundwater sources in Bahrain, Kuwait, Palestine and Qatar
5. Non-conventional water represented 31 times the total quantity of conventional water in Kuwait in 2007
6. The ESCWA region produced 1.7 Bcm per year of desalinated water in 2007 and had a desalination capacity of 18,588 Bcm per year in 2006
7. 61.9 per cent of the desalinated water in the ESCWA region came from Saudi Arabia and 30.8 per cent from Kuwait in 2007
8. A total of 8 out of 14 ESCWA members have an acute scarcity situation, with less than 500 cubic metres per capita
9. Conventional water resources per capita in the ESCWA region were estimated at 1,244 m³ in 2007 compared to 1,022 m³ in 2005

| | | | | |
|------|-------|-------|--------|----|
| | | 0.56 | 2007 | -1 |
| | | 304.3 | 2007 | -2 |
| | | | 9 | -3 |
| | | | | -4 |
| 2007 | 31 | | | -5 |
| | 2007 | | 1.7 | -6 |
| | | 2006 | 18 588 | |
| | | 61.9 | 2007 | -7 |
| | | | 30.8 | |
| | 500 | | | -8 |
| 2007 | 1 244 | | | -8 |
| | | 2005 | 1 022 | |

Overview of Water Resources in the ESCWA Region

The ESCWA region faces major water challenges. Most of the member countries suffer from scarcity, uneven availability of freshwater resources, and deteriorating water quality. While accounting for 3.6 per cent of the world's population in 2005, the ESCWA region comprised only 0.56 per cent of the global renewable water resources. Moreover, almost 58 per cent of these resources are concentrated in Iraq and the Sudan at 37 and 21 per cent respectively. Consequently, the region is considered among the poorest in the world in terms of absolute and per capita water resources.

Conventional Freshwater Resources

Precipitation in the region is very low and variable, ranging from 51 mm/yr in Egypt to 646 mm/yr in Lebanon (table I.2). The precipitation in volume, calculated by multiplying the precipitation by the surface area of the country, varied between 47.3 Mcm per year in Bahrain and 1,196 Bcm per year in the Sudan for the year 2007 (table II.1). However, due to drought, which occurs approximately every decade, resources are more limited. Evapotranspiration is very high in the region, reaching, for example, 56 times the average precipitation in Kuwait, thereby resulting in a substantial deficit in surface water runoff and infiltration.

Surface water is relatively abundant in Egypt (56.8 Bcm), Iraq (34 Bcm), the Sudan (28 Bcm) and the Syrian Arab Republic (22.7 Bcm) (table II.2). Surface water resources per capita in these four countries amounted to 1,147.6 m³/c/yr in Iraq, 1,102.3 m³/c/yr in the Syrian Arab Republic, 705.5 m³/c/yr in Egypt and 689.6 m³/c/yr in the Sudan. The variation between the total surface water resources and the per capita values is due to the country population.

Groundwater resources in the ESCWA region were estimated at 27.6 Bcm in 2007 (table II.3) representing 9 per cent of total conventional water (table II.4). Some are non-renewable aquifers containing fossil water, such as the basalt aquifer underlying Jordan and Saudi Arabia; and that

| | | | |
|-------|--------|---------|--------|
| | | 3.6 | |
| | | 0.56 | 2005 |
| | 58 | | |
| 37 | | | |
| | 21 | | |
| | | | |
| | | 51 | |
| (I.2) |) | | 646 |
| | | 47.3 | |
| | | 1 196 | |
| | (II.1) |) | 2007 |
| 56 | | | |
| | | | |
| | 56.8) | | |
| 28) | (| 34) | (|
| 22.7) | | (| |
| | | (II.2) |) |
| | | 1 147.6 | |
| | | 1 102.3 | |
| | | 689.6 | 705.5 |
| | | | |
| |) | 27.6 | |
| | 2007 | | |
| | | 9 | (II.3) |
| | | (II.4) |) |

underlying the Arabian Peninsula shared by Iraq, Jordan and the Syrian Arab Republic.⁵

(5)

At the country level, the range of variability is very wide. The ratio of groundwater to total renewable resources was almost 100 per cent in Bahrain, Kuwait and Qatar as shown in figure II.1. It exceeded 50 per cent in Jordan, Lebanon, Oman, Palestine, Saudi Arabia and the United Arab Emirates, while the rest of the ESCWA countries had ratios below 50 per cent.

(II.1) 100
50
50

Total conventional water resources from surface and groundwater are estimated at 304 Bcm (table II.4). Only four countries, namely the Syrian Arab Republic, Egypt, the Sudan and Iraq have more than 30 Bcm, most of which comes from external flows with very little change between 2005 and 2007 (figure II.2).

304
(II.4)
30
2007 2005
(II.2)

The dependency on renewable freshwater, surface and groundwater resources is shifting towards having water from non-conventional sources, with the main focus on desalination.

Non-Conventional Freshwater Resources

Non-conventional water resources are mainly derived from seawater desalination, which is practiced on a large scale in the Gulf subregion, mainly in Saudi Arabia, where production reached 1,093 Mcm/yr (table II.5), forming 62 per cent of ESCWA production. The desalination capacity in ESCWA countries is increasing with new projects emerging every year. The highest desalination installed capacities were found in Saudi Arabia, the United Arab Emirates and Kuwait with 7.5 Mcm, 5.7 Mcm and 2 Mcm per day respectively (table II.5). On the other hand, due to the lack of water data from countries, a comparison between earlier years and 2007 could not be established. Although desalination capacities are increasing, desalination by-products such as the disposal of highly saline hot water that contains chemical residues have adverse impacts on the environment.

(II.5) 1 093
62
2 5.7 7.5
(II.5)
.2007

Treated wastewater reuse is mainly practiced in Egypt, providing approximately 3 Bcm and 0.5

3

⁵ United Nations Development Programme. Arab Human Development Report 2009. p. 36.

Bcm in the Syrian Arab Republic, and at a much lesser scale in other ESCWA member countries (table II.6).

0.5

.(II.6)

Non-conventional water resources in the ESCWA region amounted to approximately 13.9 Bcm in 2007 (table II.7). Supply from non-conventional water resources represented 31 times the supply from total conventional freshwater in Kuwait.

13.9

.(II.7) 2007

31

Box II.1. Desalination in Saudi Arabia*

On 29 April 2009, the biggest desalination plant in the world started operating in Jubail Industrial City, Eastern Provinces, Saudi Arabia. The Independent Water and Power Plant (IWPP) is formed of 27 units that produce 29,630 m³/d of water. The overall water production will be 800,000 m³/d based on the multiple effect desalination (MED) technology and will be producing 2,745 MW of electricity based on the Combined Cycle Gas turbines. The main fuel used will be natural gas. The completion of the project is set to be in 2010 and will cost US\$ 3.5 billion.

* Independent Water and Power Plant (IWPP), Power and Water Utility Company for Jubail and Yanbu. Accessed on May 28, 2009 from http://www.marafiq.com.sa/e_projects.htm.

| | | | | | |
|--|-------|------|--------|-------|--|
| | | | | | |
| | * | | | -II.1 | |
| | | 2009 | 29 | | |
| | | | 29 630 | 27 | |
| | | | 800 | | |
| | 2 745 | | | | |
| | 2010 | | | | |
| | | | | 3,5 | |

The total conventional and non-conventional water resources in the ESCWA countries increased by 28.4 per cent from 2005 till 2007 to reach 318 Bcm (table II.8). However, the ratio of non-conventional to conventional water was 4.6 per cent in 2007, indicating that the use of non-conventional water is not yet widely integrated within ESCWA countries water behaviors (figure II.3).

2005

28.4

.(II.8)

318 2007

4.6

2007

.(II.3)

Indicators of Freshwater Resources

Since the Sudan joined ESCWA, the average per capita renewable water resources in the ESCWA region increased from 913 m³ per year in 2003 to 1,244 in 2007, compared to the world average of 8,135 m³ per year. Nine ESCWA member countries had per capita renewable water resources below 500 m³ per year, which indicates acute water scarcity. Four countries namely Lebanon, the Sudan, Iraq and the Syrian Arab Republic exceeded 1,000 m³ per capita per year, which represents the chronic water scarcity limit.

1 244 2003

913

8 135

2007

500

1 000

Table II.10 shows the percentage of water scarcity in ESCWA countries, as well as the number of population affected by it. 120 millions or 49.32 per cent of the ESCWA population were affected in 2007.

Non-conventional water resources per capita raised in the ESCWA region by 4.4 per cent in 2007 to 1,301 m³ (figure II.5).

II.10
 120 2007
 49.32
 2007 4.4
 (II.5) 1 301

| Box II.2. Per capita Water Resources 2007 | |
|---|---|
| Freshwater (m ³ per capita per year) | Countries |
| Acute Scarcity: <500 | Bahrain, Jordan, Kuwait, Oman, Palestine, Saudi Arabia, Qatar, United Arab Emirates, Yemen. |
| Scarcity: 500-1000 | Egypt |
| Stress: 1000-1700 | Lebanon, Sudan |
| Abundance:> 1700 | Iraq, Syrian Arab Republic |

| 2007 | -II.2 |
|------|-----------------|
| |) |
| | (|
| | 500 |
| | 1 000 - 500 : |
| | 1 700 - 1 000 : |
| | 1 700 |

Trends

Constraints on water resources persist, as population growth rates continue to rise. Projections of the per capita water resources for 2025 reveal an alarming situation whereby most ESCWA member countries will have an annual rate of less than 500 m³ (except for Egypt, Iraq, Lebanon, the Sudan and the Syrian Arab Republic). Consequently, several technological innovations have been adopted, particularly in the GCC subregion, including desalination, bio-saline agriculture, and groundwater assessment and development for arid climates. However, as the gap between water availability and demand widens, planning and integrated sustainable management of water resources and demand, reducing consumption and improving efficiencies, reusing water and applying new technologies are absolute priorities for the ESCWA region.

2025
)
 (500

Conflicts and instability, however, continue to cause major obstacles in terms of developing long-term plans for sustainable management of water resources in the area.

Table II.1
Average Precipitation in Volume (Mcm/yr)
 (/)

| | 2004 | 2005 | 2006 | 2007 |
|----------------------|----------------------|-----------------------|-------------------------|-------------------------|
| Bahrain | 59.8 ^{a/} | 74.2 ^{a/} | 212.1 ^{a/} | 47.3 ^{a/} |
| Egypt | 1,300 ^{a/} | 1,300 ^{a/} | 1,300 ^{a/} | 1,300 ^{a/} |
| Iraq | 75,050 ^{a/} | 59,980 ^{a/} | 96,636 ^{a/} | 64,801 ^{a/} |
| Jordan | 6,951 ^{a/} | 9,304 ^{a/} | 6,258 ^{b/} | 7,683 ^{a/} |
| Kuwait | 216.8 ^{a/} | 187.6 ^{a/} | ... | 2,160 ^{c/} |
| Lebanon | ... | ... | ... | 6,870 ^{c/} |
| Oman | ... | ... | ... | 26,600 ^{c/} |
| Palestine | ... | ... | ... | ... |
| Qatar | ... | ... | ... | 811 ^{c/} |
| Saudi Arabia | ... | ... | ... | 127,000 ^{c/} |
| Sudan | ... | 885,950 ^{d/} | 1,070,980 ^{d/} | 1,196,170 ^{d/} |
| Syrian Arab Republic | 6,397 ^{e/} | 5,405 ^{e/} | 41,991 ^{e/} | 39,059 ^{e/} |
| United Arab Emirates | ... | ... | ... | 6,530 ^{c/} |
| Yemen | ... | ... | ... | 88,300 ^{c/} |

Sources: ^{a/} UNSD/UNEP Questionnaire on Environment Statistics 2008.

^{b/} Water Balance 2006, Ministry of Water and Irrigation, Jordan, 2006.

^{c/} Aquastat 2007.

^{d/} Sudan Statistical Yearbook, 2007.

^{e/} UNSD/UNEP Questionnaire on Environment Statistics 2008 Syria (preliminary version).

Note: These figures are long term averages.

Table II.2
Total Surface Water (Mcm/yr)
(/)

| | 2004 | 2005 | 2007 |
|----------------------|-------------------------|-------------------------|----------------------------|
| Bahrain | ... | ... | 4 ^{a/} |
| Egypt | 56,800 ^{b/, 1} | 56,800 ^{b/, 2} | 56,800 ^{e/} |
| Iraq | 64,960 ^{d/} | 54,690 ^{d/} | 34,000 ^{a/} |
| Jordan | 1,180 ^{e/} | ... | 593 ^{f/, 3} |
| Kuwait | ... | ... | ... |
| Lebanon | 2,200 ^{a/} | ... | 4,100 ^{a/} |
| Oman | ... | ... | 1,050 ^{a/} |
| Palestine | ... | ... | ... |
| Qatar | ... | ... | ... |
| Saudi Arabia | 5,000 ^{b/} | ... | 2,200 ^{a/, 4} |
| Sudan | ... | ... | 28,000 ^{a/} |
| Syrian Arab Republic | 9,880 ^{i/} | ... | 22,700 ^{a/} |
| United Arab Emirates | ... | ... | 150 ^{a/} |
| Yemen | ... | ... | 2,000 ^{a/} |
| ESCWA | 137,820 | | 151,004⁵ |

Sources: a/ Aquastat 2007.

b/ Egypt Statistical Yearbook 2008.

c/ Available Water Resources and Usage in Egypt, CAPMAS, June 2009.

d/ Ministry of Planning, Central Statistics Organization Iraq.

e/ UNSD/UNEP Questionnaire on Environment Statistics 2008.

f/ Water Balance 2006, Ministry of Water and Irrigation, Jordan, 2006.

g/ ESCWA Water Development Report 2: State of Water Resources in the ESCWA Region, 2007.

h/ Ministry of Water and Electricity Kingdom of Saudi Arabia (Documents) water affairs 2004 AD.

i/ Office of the Prime Minister. Central Bureau of Statistics, Syrian Arab Republic.

Notes: 1. Data are for 2004-2005.

2. Data are for 2005-2006.

3. Figures refer to the year of 2005/2006.

4. FAO Estimate.

5. Excluding Kuwait, Palestine and Qatar.

Table II.3
Groundwater Recharge (Mcm/yr)
(/)

| | 2004 | 2005 | 2006 | 2007 |
|----------------------|---------------------|-------------------|----------------------|---------------------|
| Bahrain | ... | ... | ... | 112 ^{a/} |
| Egypt | 2,300 ^{b/} | ... | ... | 1,300 ^{a/} |
| Iraq | ... | ... | ... | 3,280 ^{a/} |
| Jordan | 507 ^{c/} | 533 ^{d/} | 288 ^{e/, 1} | 550 ^{a/} |
| Kuwait | ... | ... | ... | 20 ^{a/} |
| Lebanon | 150 ^{e/} | ... | ... | 3,200 ^{a/} |
| Oman | ... | ... | ... | 1,300 ^{a/} |
| Palestine | ... | ... | ... | 750 ^{a/} |
| Qatar | ... | ... | ... | 58 ^{a/} |
| Saudi Arabia | 3,000 ^{f/} | ... | ... | 2,200 ^{a/} |
| Sudan | ... | ... | ... | 7,000 ^{a/} |
| Syrian Arab Republic | 4,894 ^{g/} | ... | ... | 6,170 ^{a/} |
| United Arab Emirates | ... | ... | ... | 120 ^{a/} |
| Yemen | ... | ... | ... | 1,500 ^{a/} |
| ESCWA | | | | 27,560 |

Sources: a/ Aquastat 2007.

b/ Regional Survey on the Status and Achievements of ESCWA Member Countries towards Improved Water Supply and Sanitation.

c/ ESCWA Water Development Report 2: State of Water Resources in the ESCWA Region, 2007.

d/ Water Resources in Jordan, National Water Master Plan, GTZ, 2004.

e/ Water Balance 2006, Ministry of Water and Irrigation, Jordan, 2006.

f/ Ministry of Water and Electricity Kingdom of Saudi Arabia (Documents) water affairs 2004 AD.

g/ Office of the Prime Minister. Central Bureau of Statistics, Syrian Arab Republic.

Note: 1. Figures refer to the year of 2005/2006.

Table II.4
Total Freshwater from Conventional Sources (Mcm/yr)
(/)

| | 2005 | 2006 | 2007 | Ratio of Underground to total water resources % 2007 |
|---------------------------------------|----------------------|-----------------------|-----------------------|---|
| Bahrain | 100 ^{a/} | ... | 116 ^{b/} | 97% |
| Egypt | 58,848 ^{c/} | 59,184 ^{c/} | 58,714 ^{c/} | 2% |
| Iraq | 75,000 ^{a/} | 153,277 ^{c/} | 111,906 ^{c/} | 3% |
| Jordan | 1,000 ^{a/} | ... | 932 ^{b/} | 59% |
| Kuwait | 20 ^{a/} | ... | 20 ^{b/} | 100% |
| Lebanon | 4,000 ^{a/} | ... | 4,500 ^{b/} | 71% |
| Oman | 1,000 ^{a/} | ... | 2,350 ¹ | 55% |
| Palestine | 800 ^{a/} | ... | 1,100 ^{c/} | 68% |
| Qatar | 100 ^{a/} | ... | 58 ¹ | 100% |
| Saudi Arabia | 2,400 ^{a/} | ... | 2,400 ^{b/} | 92% |
| Sudan | 65,000 ^{a/} | ... | 64,500 ^{b/} | 11% |
| Syrian Arab Republic | 26,000 ^{a/} | 57,073 ^{f/} | 53,465 ^{f/} | 12% |
| United Arab Emirates | 200 ^{a/} | ... | 220 ^{c/} | 55% |
| Yemen | 4,000 ^{a/} | ... | 4,000 ^{c/} | 38% |
| ESCWA | 238,468 | | 304,281 | 9% |
| World^{a/} | | | 55,025,590 | |
| ESCWA share of World total (%) | | | 0.56 | (%) |

Sources: ^{a/} Water a Shared Responsibility: The United Nations World Water Development Report 2, 2006.

^{b/} Aquastat 2007.

^{c/} UNSD/UNEP Questionnaire on Environment Statistics 2008.

^{d/} ESCWA Water Development Report 2: State of Water Resources in the ESCWA Region, 2007.

^{e/} Global Water Market 2008.

^{f/} UNSD/UNEP Questionnaire on Environment Statistics 2008 Syrian Arab Republic.

^{g/} Global Environment Outlook Data Portal. UNEP.

Note: 1. ESCWA calculation.

**Table II.5 الجدول
Desalination Production and Capacity**

| | Production (Mcm) | | | | Capacity (m ³ /d) |
|----------------------|----------------------|----------------------|----------------------|---------------------|---------------------------------|
| | () | | | | () |
| | 2004 | 2005 | 2006 | 2007 | 2006 ⁱ |
| Bahrain | 23 ^{a/} | 19.66 ^{a/} | 33 ^{a/} | 35 ^{a/} | 518,596 |
| Egypt | 60 ^{a/} | 60 ^{a/} | 60 ^{a/} | 60 ^{a/} | 431,872 |
| Iraq | ... | ... | ... | 7 ^{b/} | 447,201 |
| Jordan | 5 ^c | 9.8 ^{b/} | 40 ^{d/} | ... | 239,532 |
| Kuwait | 476 ^{a/} | 506.9 ^{a/} | 521 ^{a/} | 544 ^{a/} | 2,081,135 |
| Lebanon | ... | 47.3 ^{b/} | ... | ... | 29,610 |
| Oman | ... | ... | 109 ^{b/} | ... | 377,488 |
| Palestine | ... | ... | ... | ... | 10,976 |
| Qatar | 132 ^{e/, 1} | 128 ^{e/, 1} | 136 ^{e/, 1} | ... | 1,197,148 |
| Saudi Arabia | 1,056 ^{f/} | 1,025 ^{f/} | 1,033 ^{f/} | 1,093 ^{f/} | 7,410,462 |
| Sudan | ... | ... | ... | 0.4 ^{b/} | 38,635 |
| Syrian Arab Republic | 0 ^{a/} | ... | ... | 0 ^{b/} | 15,576 |
| United Arab Emirates | 1,008 ^{h/} | 950 ^{b/} | ... | ... | 5,730,009 |
| Yemen | ... | ... | ... | 25 ^{b/} | 60,370 |
| ESCWA | | | | 1,765.4 | 18,588,610 |

Sources: ^{a/} UNSD/UNEP Questionnaire on Environment Statistics 2008.

^{b/} Aquastat 2007.

^{c/} ESCWA Water Development Report 2: State of Water Resources in the ESCWA Region, 2007.

^{d/} An Environmental Profile for Jordan 2006. Ministry of Environment.

^{e/} Qatar Annual Abstract 2007.

^{f/} Saudi Arabia Annual Report, Ministry of Water and Electricity, 2007.

^{g/} Office of the Prime Minister. Central Bureau of Statistics, Syrian Arab Republic.

^{h/} Ministry of Electricity and Water website. United Arab Emirates.

^{i/} Global Water Market 2008.

Note: 1. Conversion factor used is 0.003785 to convert from US gallons to cubic metres.

Table II.6
Water Reuse (Mcm/yr)
(/)

| Treated Wastewater Reuse | | | | |
|--------------------------|------------------------|------------------------|------------------------|---------------------|
| | 2004 | 2005 | 2006 | 2007 |
| Bahrain | ... | 16 ^{a/} | ... | ... |
| Egypt | 1,100 ^{b/, 1} | 1,200 ^{b/, 2} | 1,300 ^{b/, 3} | 2,970 ^{a/} |
| Iraq | ... | ... | ... | 0 ^{a/} |
| Jordan | 74 ^{e/} | 79 ^{d/} | 86 ^{e/} | 98 ^{e/} |
| Kuwait | ... | ... | ... | 78 ^{a/} |
| Lebanon | ... | ... | ... | 2 ^{a/} |
| Oman | ... | ... | 37 ^{f/} | ... |
| Palestine | ... | ... | ... | ... |
| Qatar | ... | ... | ... | 43 ^{a/} |
| Saudi Arabia | 360 ^{g/} | ... | ... | 166 ^{a/} |
| Sudan | ... | ... | ... | 0 ^{a/} |
| Syrian Arab Republic | 1,280 ^{h/} | ... | ... | 550 ^{a/} |
| United Arab Emirates | 234 ^{i/} | ... | ... | 248 ^{a/} |
| Yemen | ... | ... | ... | 6 ^{a/} |
| ESCWA | 3,048 | | | 4,161 |

Sources: a/ Aquastat 2007.

b/ Egypt Statistical Yearbook 2008.

c/ Development Report 2: State of Water Resources 2007.

d/ Jordan Water Authority, Annual Report 2006.

e/ Jordan Water Authority, Annual Report 2007.

f/ Aquastat 2006.

g/ Ministry of Water and Electricity Kingdom of Saudi Arabia (Documents) water affairs 2004 AD.

h/ Office of the Prime Minister. Central Bureau of Statistics, Syrian Arab Republic.

i/ Ministry of Electricity and Water. United Arab Emirates.

Notes: 1. Data are for 2004-2005.

2. Data are for 2005-2006.

3. Data are for 2006-2007.

Table II.7
Total Non-Conventional Water (Mcm/yr)
 (/)

| | 2004 | 2005 | 2006 | 2007 |
|----------------------|--------------------|--------------------|--------------------|---------------------|
| Bahrain | 23 ¹ | 36 ² | 33 ¹ | 35 ¹ |
| Egypt | 6,260 ⁴ | 6,660 ⁴ | 7,060 ⁴ | 11,030 ² |
| Iraq | ... | ... | ... | 7 ² |
| Jordan | 79 ² | 89 ² | 127 ² | 98 ³ |
| Kuwait | 476 ¹ | 507 ¹ | 521 ¹ | 622 ² |
| Lebanon | ... | 47 ¹ | ... | 2 ³ |
| Oman | ... | ... | 146 ² | ... |
| Palestine | ... | ... | ... | ... |
| Qatar | 132 ¹ | 128 ¹ | 137 ¹ | 43 ³ |
| Saudi Arabia | 1,456 ⁴ | 1,025 ¹ | 1,033 ¹ | 1,259 ² |
| Sudan | ... | ... | ... | 0.4 ² |
| Syrian Arab Republic | 3,526 ⁴ | ... | ... | 550 ² |
| United Arab Emirates | 1,242 ⁴ | 950 ¹ | ... | 248 ³ |
| Yemen | ... | ... | ... | 31 ² |
| ESCWA | 13,194 | | | 13,925.4 |

Source: ESCWA calculation.

- Notes:*
1. Desalinated water only.
 2. Treated Wastewater Reuse and desalinated water.
 3. Treated Wastewater Reuse only.
 4. Desalinated water, treated wastewater reuse and agricultural drainage reuse.

Table II.8
Total Conventional and Non-Conventional Water Resources (Mcm/yr)
 (/)

| | 2004 | 2005 | 2006 | 2007 | Change 2005-2007 (percentage) | Ratio of Non- Conventional to Conventional Water Resources 2007 (percentage) |
|-------------------------|--------|---------------------|----------------------|--------------------|-------------------------------------|--|
| | () | () | () | () | () | () |
| Bahrain | 23 | 136 | 33 ² | 151 | 11.0% | 30.17% |
| Egypt | 64,744 | 65,508 | 66,244 | 69,744 | 6.5% | 18.79% |
| Iraq | ... | 75,000 ¹ | 153,278 ¹ | 111,913 | 49.2% | 0.01% |
| Jordan | 1,079 | 1,089 | ... | 1,030 | -5.4% | 10.52% |
| Kuwait | 476 | 527 | 521 ² | 642 | 21.8% | 3110% |
| Lebanon | ... | 4,000 | ... | 4,502 | 11.2% | 0.04% |
| Oman | ... | 1,146 ¹ | ... | 2,350 ¹ | 135.0% | - |
| Palestine | ... | 800 ¹ | ... | 1,100 ¹ | 37.5% | - |
| Qatar | 132.16 | 228 | 137 ² | 101 | -55.7% | 74.14% |
| Saudi Arabia | 9,456 | 3,425 | ... | 3,659 | 6.8% | 52.46% |
| Sudan | ... | 65,000 ¹ | ... | 64,500 | -0.8% | - |
| Syrian Arab Republic | 22,748 | 26,000 ¹ | 57,073 ¹ | 54,015 | 107.8% | 1.03% |
| United Arab Emirates | 1,242 | 1,150 | ... | 468 | -59.3% | 112.73% |
| Yemen | ... | 4,000 ¹ | ... | 4,031 | 0.8% | 0.78% |
| ESCWA | ... | 247,910 | ... | 318,206 | 28.4% | 4.58% |

Source: ESCWA calculation.

Notes: 1: This includes Conventional Water Resources only due to unavailability of Non-Conventional Water Resources data.

2: This includes Non-Conventional Water Resources only due to unavailability of Conventional Water Resources data.

Table II.9
Selected Indicators on Water Resources

| | Per Capita Water Resources from Conventional Resources (cubic metre/yr) | | Per Capita Water Resources from Conventional and Non- Conventional Resources (cubic metre/yr) | | Per Capita Total Water Resources Change (percentage) |
|-------------------------|---|---------------|--|------------------|---|
| | (/) 2005 | (/) 2007 | (/) 2005 | (/) 2007 | () 2005-2007 |
| Bahrain | 137 | 152 | 186 | 198 | 6.4% |
| Egypt | 759 | 729 | 845 | 866 | 2.6% |
| Iraq | 2,642 | 3,777 | 2,642 ¹ | 3,778 | 43.0% |
| Jordan | 179 | 156 | 194 | 172 | -11.4% |
| Kuwait | 7 | 7 | 195 | 225 | 15.4% |
| Lebanon | 971 | 1,070 | 982 | 1,071 | 9% |
| Oman | 381 | 859 | 381 ¹ | 859 ¹ | 125.6% |
| Palestine | 212 | 272 | 212 ¹ | 272 ¹ | 28.8% |
| Qatar | 113 | 46 | 257 | 84 | -65.5% |
| Saudi Arabia | 101 | 97 | 145 | 148 | 2.2% |
| Sudan | 1,673 | 1,589 | 1,673 ¹ | 1,589 | -5.0% |
| Syrian Arab Republic | 1,354 | 2,596 | 1,354 ¹ | 2,623 | 93.7% |
| United Arab Emirates | 49 | 50 | 281 | 107 | -61.9% |
| Yemen | 190 | 179 | 190 ¹ | 180 | -4.9% |
| ESCWA | 1,022 | 1,244 | 1,062 | 1,301 | 22.5% |

Source: ESCWA calculations, Population based on the United Nations: World Population Prospects: The 2008 Revision.

Note: 1. Values are the same due to unavailability of Non-Conventional Water Resources data.

Table II.10
Percentage and Number of Population Affected by Water Scarcity in 2007
2007

| | Scarcity (percentage) ^{a/} | Scarcity Population ^{b/} |
|----------------------|-------------------------------------|-----------------------------------|
| Bahrain | 100% | 762,000 |
| Egypt | 30% | 24,153,000 |
| Iraq | 15% | 447,800 |
| Jordan | 100% | 5,976,000 |
| Kuwait | 100% | 2,856,000 |
| Lebanon | 5% | 210,250 |
| Oman | 100% | 2,735,000 |
| Palestine | 80% | 3,229,600 |
| Qatar | 100% | 1,140,000 |
| Saudi Arabia | 100% | 24,778,000 |
| Sudan | 35% | 14,211,400 |
| Syrian Arab Republic | 65% | 13,386,100 |
| United Arab Emirates | 100% | 4,372,000 |
| Yemen | 100% | 22,333,000 |
| ESCWA Total | 49.32% | 120,590,150 |

Sources: ^{a/} Global Water Market 2008, Global Water Intelligence.

^{b/} United Nations: World Population Prospects: The 2008 Revision.

Figure II.1
Available Surface and Ground Water as Percentage of Total Renewable Water Resources

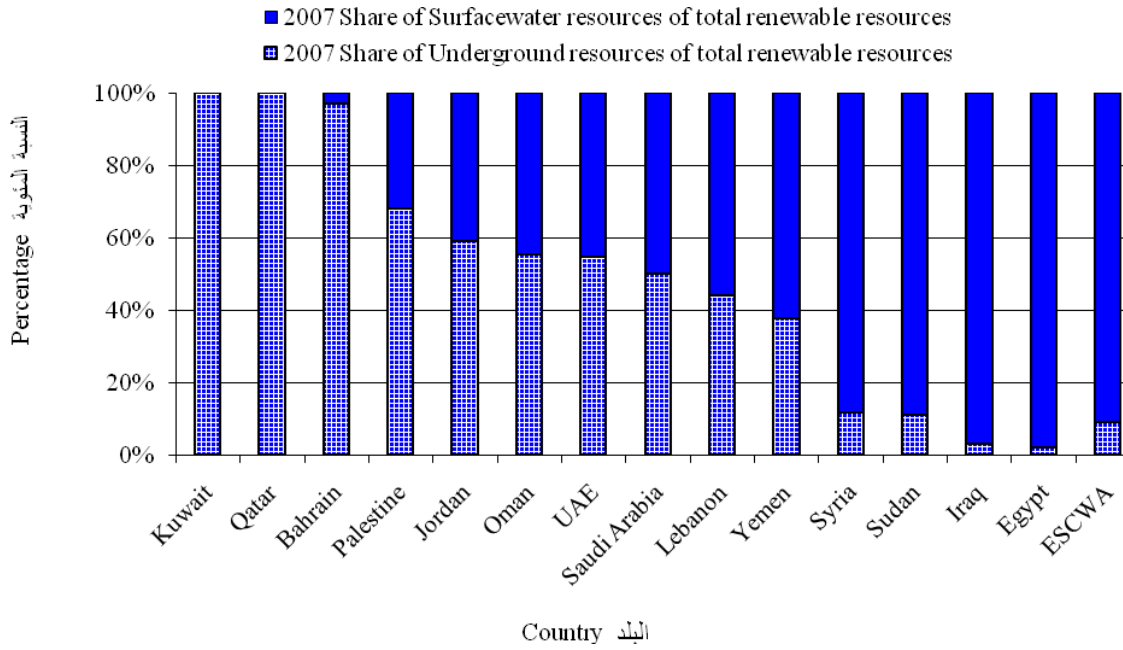
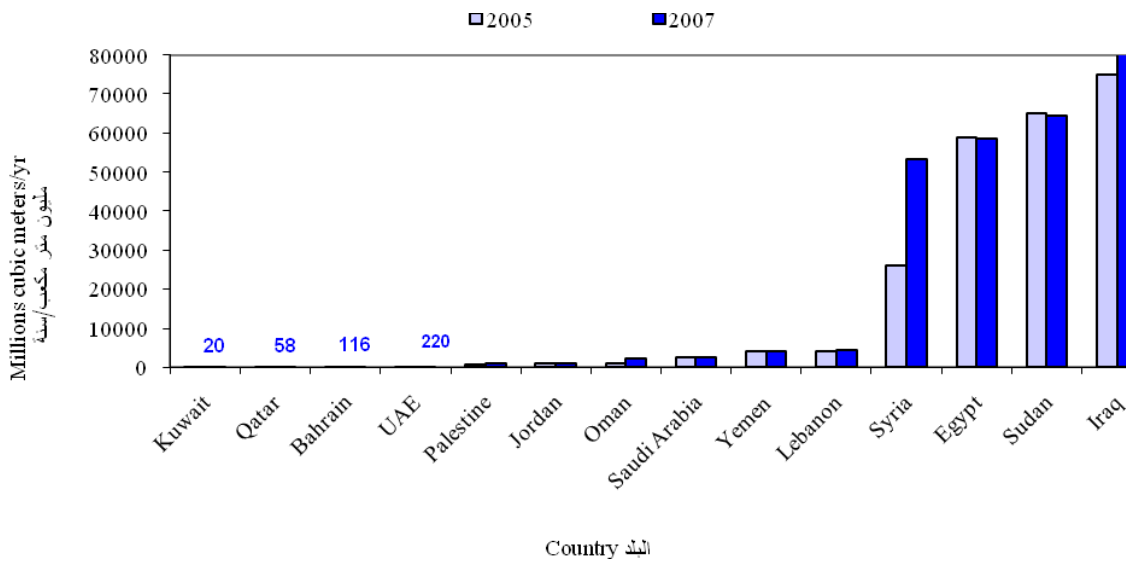


Figure II.2
Total Renewable Freshwater from Conventional Sources 2005-2007



الشكل II.3
Total Conventional to non-Conventional Water Resources

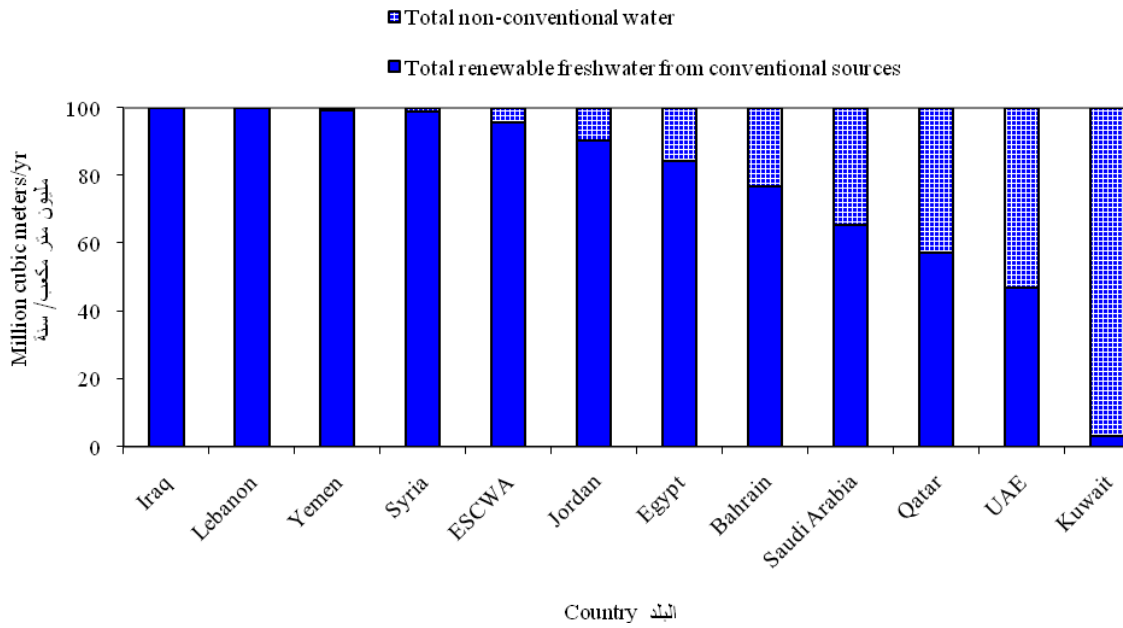


Figure II.4
Share of Water Resources in the ESCWA Region, 2007

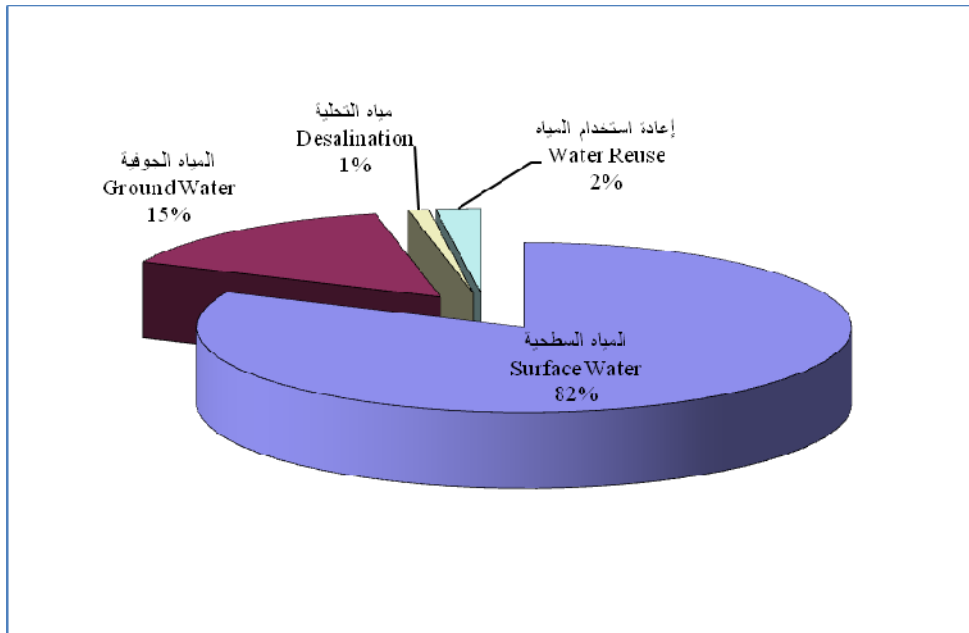
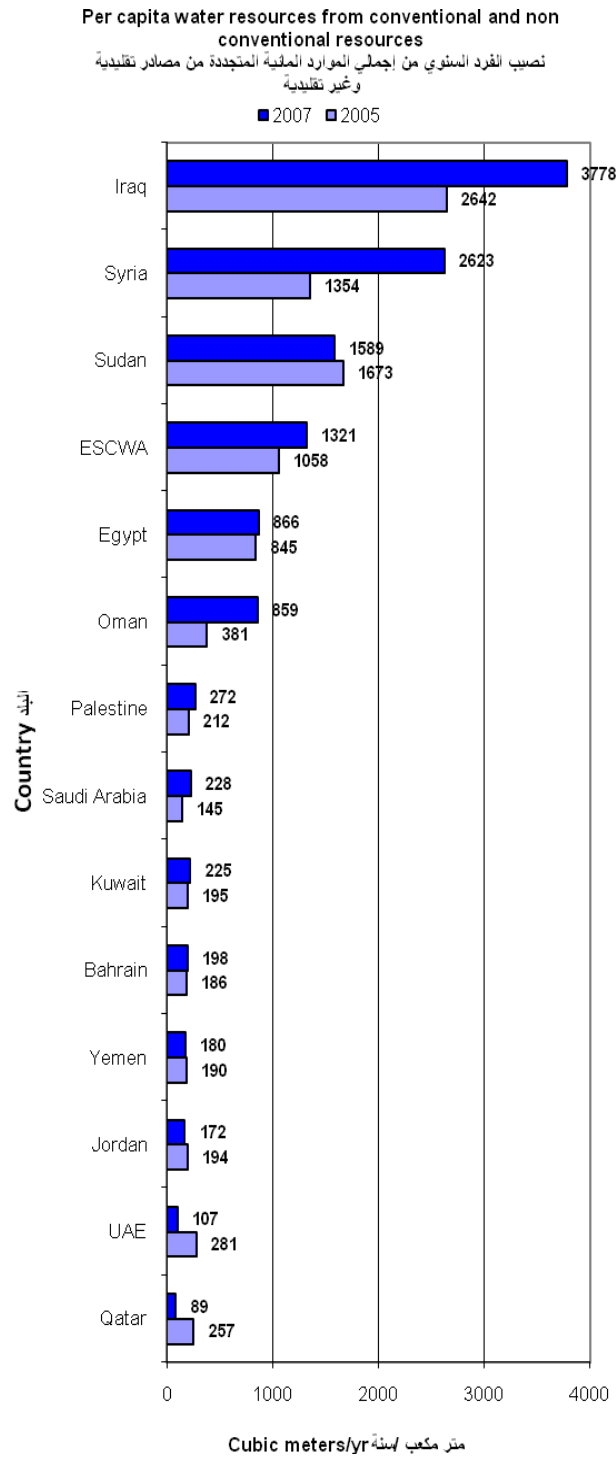
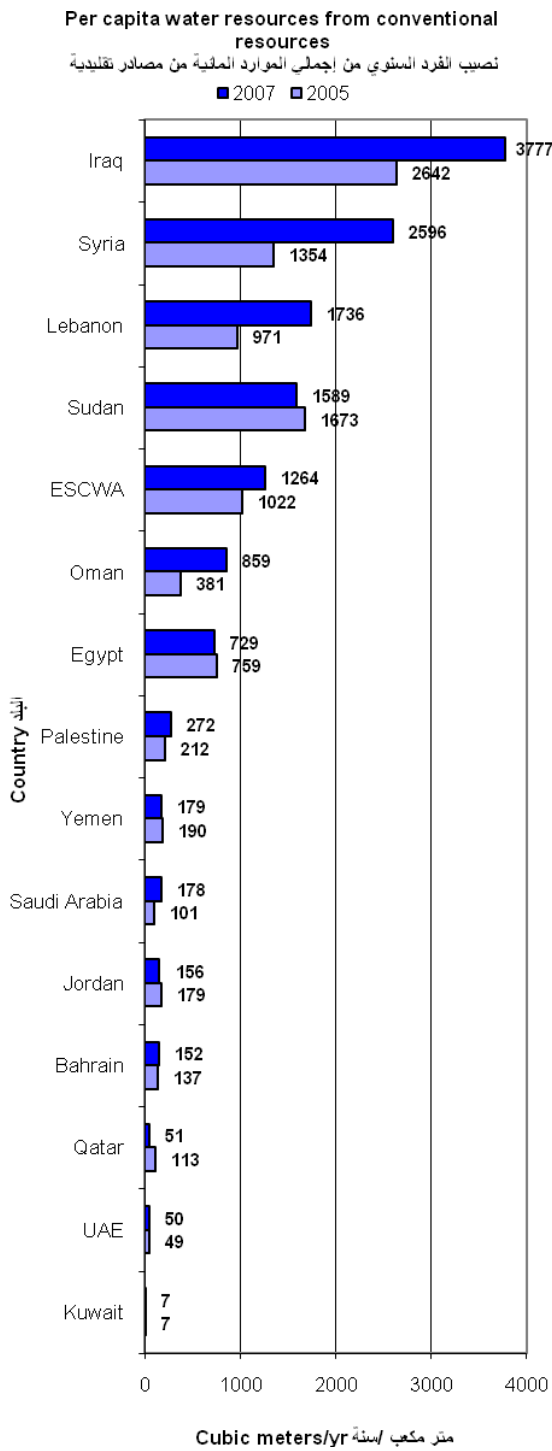


Figure II.5
Per Capita Water Resources from Available Water Resources



CHAPTER III. FRESHWATER MANAGEMENT

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Statistical Highlights

1. In the ESCWA region, the total quantity of water abstracted in 2007 was 227 Bcm
2. In the ESCWA region, the average per capita water use was 927 m³ in 2007
3. In the ESCWA region, total water use was distributed in 2007 as follows: 87 per cent for agriculture use, 7 per cent for industrial use and 6 per cent for domestic use
4. Average water use intensity was 73 per cent in the ESCWA Region in 2007 and as high as 2,525 per cent in Kuwait, 1,025 in Saudi Arabia and 622 in the United Arab Emirates
5. Water deficit was 1,643 cubic metres per capita per year in Saudi Arabia in 2007 and 263 in the United Arab Emirates
6. Groundwater dependency reached 100 per cent in Jordan
7. Wastewater reuse amounted to 2,970 Mcm in Egypt
8. In the ESCWA region, US\$ 3.5 billion will be invested in drinking water services and US\$ 654 million in the wastewater sector

| | | | | | |
|-------|------|-----|-------|-------|----|
| | 2007 | | 227 | | -1 |
| | 2007 | | 927 | | -2 |
| 7 | | 87 | 2007 | 6 | -3 |
| | | | | | |
| 2 525 | 2007 | | 73 | | -4 |
| | | 622 | | 1 025 | |
| 263 | | | 1 643 | | -5 |
| | | | 2007 | | |
| | | | 100 | | -6 |
| | | | 2 970 | | -7 |
| | | 654 | | 3.5 | -8 |

Overview of Freshwater Abstraction in the ESCWA Region

Groundwater abstraction in the ESCWA region reached about 33 Bcm in 2005 excluding Iraq and the Sudan, while data on surface water abstraction is missing for most of the countries (table III.1).

2005 33
(III.1)

The agricultural sector used 174.6 Bcm in 2007, compared to 137 Bcm in 2003,¹¹ and accounted for 87 per cent of total water use. Industrial use accounted for 7 per cent in 2007 while domestic water consumption was limited to 6 per cent (figure III.1; table III.2).

174.6 137 2007 87 (6)2003
7
6 2007
(III.2 III.1)

The total water abstracted in the ESCWA region amounted to 226,664 Bcm in 2007 (table III.3). At the national level, the agricultural sector accounted for more than 75 per cent of total water consumption in Egypt, Iraq, Oman, Saudi Arabia, the Sudan, the Syrian Arab Republic and Yemen (table III.2). However, and according to a FAO study in 2004,¹² the agricultural share in total water use is expected to decline with the increased pressure from the domestic sector owing to rising population, increasing urbanization and the rapidly growing industrial sector.

(III.3) 226 664
75
(III.2)
(7)2004

Average water abstracted per capita in the ESCWA region was estimated at 927 m³ in 2007, compared to 499 m³ in 2005 (figure III.2). However, the high population growth rate in the region exceeded by far the rate of water resources development. As a result, the annual per capita share of water resources is decreasing sharply. ESCWA member countries are using more than their internal renewable water resources either by overexploiting groundwater, desalinating seawater or recycling wastewater. The rate of average water use intensity in ESCWA was 73 per cent in 2007, with the highest intensities registered in Kuwait at 2,525 per cent, Saudi Arabia at 1,025 per cent and the United Arab Emirates at 622 per cent (table III.4).

2007 927 499
(III.2) 2005
2007 73
2 525
1 025
(III.4) 622

¹¹ UNESCWA. Compendium of Environment Statistics in the ESCWA Region first issue. 2007.

¹² FAO. 2004. Economic valuation of water resources in agriculture. From the sectoral to a functional perspective of natural resource management.

Groundwater Dependency and Water Deficit

The annual water deficit in 2007 was of the order of 1,643 m³ per capita in Saudi Arabia, 263 m³ in the United Arab Emirates, 212 m³ in Qatar and 170 m³ in Kuwait (table III.4).

Groundwater dependency, which indicates the ratio of groundwater abstracted to total freshwater abstracted, reached 100 per cent in Jordan and Palestine in 2007. Comparison between recharged groundwater (27 Bcm) and abstracted groundwater (10 Bcm) in 2007 indicates that the mining of groundwater reserves in the ESCWA region was about 17 Bcm per year.

At a national level, Egypt's depletion rate stands at 4,584 Mcm per year while the recharged groundwater in other ESCWA countries reached 1,281 Mcm in Saudi Arabia, 1,273 Mcm in Yemen, 1,200 Mcm in Lebanon and 102 Mcm in the United Arab Emirates.

| | | |
|----------|-------|-------|
| 1 643 | 2007 | |
| 263 | | |
| 212 | | |
| 170 | | |
| (III.4) | | |
| 27) | 100 | 2007 |
| 10) | (| (|
| 17 | 2007 | (|
| | | |
| | 4 584 | |
| 1 200 | | 1 281 |
| | | 1 273 |
| | 102 | |

Wastewater Treatment

Due to the unavailability of data, the total wastewater volume produced in 2007 could not be calculated. Nonetheless, the treated wastewater volume amounted to 1,618 Mcm in eight of the 14 ESCWA countries for the year of 2005 (table III.5).

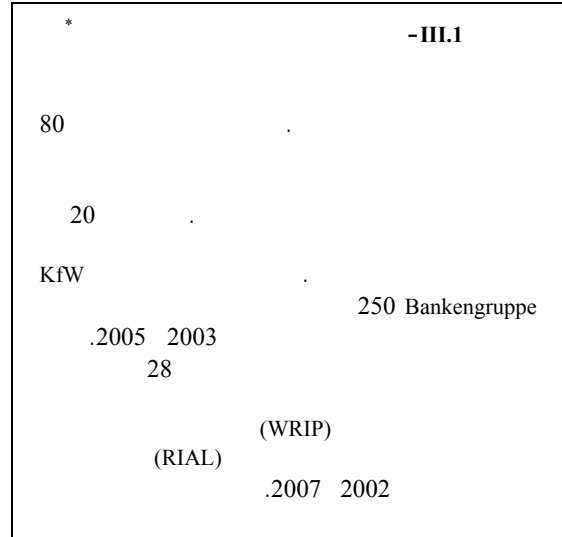
The total volume of wastewater reused in the region was estimated at 4.2 Bcm in 2007. Wastewater reuse was the highest in Egypt at 2,970 Mcm, followed by the Syrian Arab Republic at 550 Mcm. While it is most needed in the Gulf subregion, wastewater reuse in Saudi Arabia was as modest as 166 Mcm while it registered 248 Mcm in the United Arab Emirates. In Saudi Arabia, reclaimed wastewater is used for irrigation of non-cash crops, landscape irrigation and industrial cooling. In Bahrain, Kuwait, Oman and the United Arab Emirates, it is used for municipal irrigation of landscaped areas, while Qatar exploits it to irrigate animal-food crops (table III.5). However, the number of wastewater treatment plants in the ESCWA region remains insufficient (table III.6).

| | | |
|----------|-------|--------|
| | 2007 | |
| | 1 618 | |
| (III.5) | 2005 | |
| | 2007 | |
| 4.2 | | |
| 2 970 | | |
| 550 | | |
| 166 | | |
| 248 | | |
| | | |
| | | |
| | | |
| (| | (III.5 |
| (III.6) | | |

Box III.1. Wastewater reuse in Jordan*

In Jordan, the reuse of treated wastewater reached one of the highest levels in the world. About 80 per cent of the treated effluent is discharged in Zerqa river where it is collected and stored downstream in King Talal Dam and used for restricted irrigation in the southern part of the Jordan Valley. The remaining 20 per cent which is not located within the Zerqa river watershed, is reused on-site. The Water Authority of Jordan was awarded 250,000 Euro from KfW Bankengruppe for 2003-2005 to develop water treatment facilities. USAID contributed with \$28 millions to design and build a wastewater treatment facility with Water Reuse Implementation (WRIP) and The Reuse for Industry, Agriculture and Landscaping (RIAL) projects that ran between 2002 and 2007.

* "Jordan's experience in treated wastewater reuse", UNEP-Division of Technology, Industry and Economics.



Water Market

Estimates of annual current account expenditure on the water sector include an element of cost of capital. The total water market for the ESCWA countries amounted to US\$ 8.6 billion in 2007 (table III.7). The market included drinking water services, the rehabilitation of existing facilities, new pipelines and pumping stations, deep wells and desalination plants. The water sector amounted to US\$ 3.5 billion and the wastewater sector reached US\$ 654 million. While numbers are expected to treble over the coming decade, the pressure of growing population densities, the potential for water reuse and expectations for higher environmental standards require more investment in this sector.

During the next eight years, the water sector will quadruple in Jordan, triple in Saudi Arabia and is estimated to double in Egypt, Lebanon, Oman, Qatar and the United Arab Emirates. On the other hand, the wastewater sector will grow by 8.5 times in Saudi Arabia, and 5.8 times in Egypt while the lowest growth rates are estimated to be in the Sudan and the Syrian Arab Republic¹³ (table III.8).

The highest water cost in the ESCWA countries was observed in Oman (US\$ 1.37 per cubic metre), Qatar (US\$ 1.21 per cubic metre) and Palestine (US\$ 1.00 per cubic metre). The highest percentage of unaccounted for water is observed

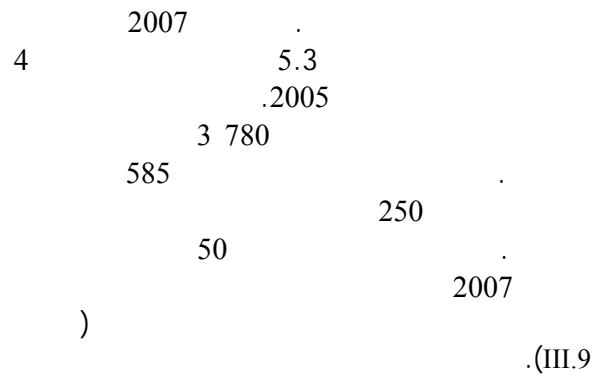


¹³ Global Water Market, 2008.

in Jordan with 45 per cent, Qatar with 45 to 50 per cent and both Oman and the Sudan with 35 per cent (table III.9).

50 45
(III.9)

Existing wastewater treatment facilities in the region face difficulties in handling increasing volumes of wastewater generated by increased water consumption and urbanization. Wastewater discharge from major urban centers is polluting shallow alluvial aquifers and the coastline, and has caused urban water tables to rise. Rather than being treated and reused, wastewater is merely disposed of, owing to the extensive capital investment required. Total treatment plants capacity reached some 5.3 Bcm in 2007, compared to 4 Bcm in 2005. The highest wastewater treatment capacity is found in Egypt at 3,780 Mcm per year. This capacity drops sharply to 585 Mcm in Qatar and 250 Mcm in Saudi Arabia. Moreover, several countries including Bahrain, Jordan, Oman, Palestine, the Sudan, the United Arab Emirates and Yemen, had capacities the equal to or less than 50 Mcm in 2007 (table III.9).



The most important markets for desalination in the world are found in the countries of the Gulf subregion, five of which are among the top ten, with Saudi Arabia and the United Arab Emirates as the biggest investors in desalination. The desalination industry was worth US\$ 28 billion in 2007.

2007
28

Table III.1
Total Freshwater Abstracted (Mcm/yr)
(/)

| | Total Surface Water Abstracted | | | | Total Groundwater Abstracted | | | |
|----------------------|--------------------------------|----------------------|----------------------|----------------------|------------------------------|---------------------------|----------------------|------------------------|
| | 2004 | 2005 | 2006 | 2007 | 2004 | 2005 | 2006 | 2007 |
| Bahrain | ... | ... | ... | ... | 48 ^{a/, 1} | 50 ^{a/, 1} | 48 ^{a/, 1} | 40 ^{b/, 1, 2} |
| Egypt | 51,800 ^{a/} | 52,000 ^{a/} | 52,500 ^{a/} | 52,030 ^{a/} | 5,884 ^a | 5,884 ^{a/} | 5,884 ^{a/} | 5,884 ^{a/} |
| Iraq | ... | ... | ... | ... | ... | ... | ... | ... |
| Jordan | ... | 941 ^{b/} | ... | ... | 501 ^{a/} | 506 ^{a/} | 480 ^{a/} | 504 ^{a/} |
| Kuwait | 0 ^{a/} | 0 ^{a/} | 0 ^{a/} | 0 ^{a/} | 0 ^{a/} | 0 ^a | 0 ^{a/} | 0 ^{a/} |
| Lebanon | 1,250 ^{a/} | 1,088 ^{c/} | ... | ... | ... | 700 ^{c/, 3} | ... | 2,000 ^{d/} |
| Oman | ... | ... | ... | ... | ... | 53 ^{a/} | ... | ... |
| Palestine | ... | ... | ... | ... | 249 ^{a/} | 268 ^{a/} | 27 ^{a/} | 286 ^{a/} |
| Qatar | ... | 444 ^{d/} | ... | ... | ... | 221 ^{e/} | ... | ... |
| Saudi Arabia | 20,270 ^{e/} | ... | 23,700 ^{f/} | ... | 13,940 ^{f/} | 13,940 ^{f/, 4} | 21,400 ^{a/} | 919 ^{b/} |
| Sudan | ... | ... | ... | ... | ... | ... | ... | ... |
| Syrian Arab Republic | 17,669 ^{e/} | ... | ... | ... | ... | 8,339 ^{i/} | ... | ... |
| United Arab Emirates | ... | ... | ... | ... | 12 ^{i/, 5} | ... | 15 ^{i/, 5} | 18 ^{i/, 5} |
| Yemen | ... | ... | ... | ... | 201 ^{a/} | 214 ^{a/} | 221 ^{a/} | 227 ^{a/} |
| ESCWA | ... | ... | ... | ... | 20,835 | 32,976⁶ | ... | ... |

Sources: a/ UNSD/UNEP Questionnaire on Environment Statistics 2008.

b/ Aquastat 2005.

c/ ESCWA calculation.

d/ Aquastat 2007.

e/ Ministry of Water and Electricity Kingdom of Saudi Arabia (Documents) water affairs 2004 AD.

f/ Aquastat 2006.

Sources: a/ UNSD/UNEP Questionnaire on Environment Statistics 2008.

b/ Bahrain Ministry of Energy and Water Website.

c/ Aquastat 2005.

d/ Lebanon Statistical Yearbook 2007.

e/ Water Statistical Book for the GCC, 2008.

f/ Ministry of Water and Electricity Kingdom of Saudi Arabia (Documents) water affairs 2004 AD.

g/ Aquastat 2006.

h/ Saudi Arabia Annual Report, Ministry of Water and Electricity, 2007.

i/ Office of the Prime Minister. Central Bureau of Statistics, Syrian Arab Republic.

j/ Dubai Electricity and Water Authority. United Arab Emirates.

Notes: 1. Groundwater Abstracted by Water Supply Industry (ISIC 36) only.

2. Conversion factor used for Bahrain is 0.004545 to convert from MIG into Cubic metre.

3. These are not per capita values.

4. 2004 figures are used for 2005.

5. This figure refers to Dubai only. Data for the United Arab Emirates is not available.

6. Excluding Iraq and Sudan.

Table III.2 الجدول
Sectoral Water Consumption (Mcm/yr)
الاستهلاك القطاعي للمياه (مليون متر مكعب/سنة)

| | Domestic Water Consumption | | | | Agricultural Water Consumption | | | | |
|---|----------------------------|----------------------|----------------------|---------------------|--------------------------------|-----------------------|-----------------------|----------------------|---|
| | 2004 | 2005 | 2006 | 2007 | 2004 | 2005 | 2006 | 2007 | |
| Bahrain* | ... | 161 | 166 | 171 | ... | 158 | 160 | 161 | * |
| Egypt | 5,800 ^{a/1} | 6,100 ^{a/2} | 6,500 ^{a/3} | 5,496 ^{b/} | 58,500 ^{a/1} | 59,000 ^{a/2} | 59,300 ^{a/3} | 53,586 ^{b/} | |
| Iraq | ... | ... | ... | 1,281 ^{b/} | ... | ... | ... | 39,284 ^{b/} | |
| Jordan | ... | 284 ^{c/} | 291 ^{d/4} | 210 ^{b/} | ... | 501 ^{c/} | 431 ^{d/} | 750 ^{b/} | |
| Kuwait | 332 ^{c/} | 354 ^{c/} | 371 ^{c/} | 379 ^{c/} | 17 ^{c/} | 18 ^{c/} | 19 ^{c/} | 20 ^{c/} | |
| Lebanon | ... | ... | ... | 462 ^{b/} | ... | ... | ... | 938 ^{b/} | |
| Oman | ... | ... | ... | 98 ^{b/} | ... | ... | ... | 1,274 ^{b/} | |
| Palestine | 143 ^{c/} | 153 ^{c/} | 160 ^{c/} | 176 ^{c/} | ... | ... | ... | 239 ^{f/} | |
| Qatar | ... | ... | ... | ... | ... | ... | ... | ... | |
| Saudi Arabia | ... | ... | ... | 1,730 ^{b/} | ... | ... | ... | 15,397 ^{b/} | |
| Sudan | ... | ... | ... | 1,119 ^{b/} | ... | ... | ... | 36,181 ^{b/} | |
| Syrian Arab Republic | ... | ... | ... | 597 ^{f/} | ... | ... | ... | 18,905 ^{c/} | |
| United Arab Emirates | 148 ^{g/5} | ... | 175 ^{g/5} | 529 ^{b/} | ... | ... | ... | 1,564 ^{b/} | |
| Yemen | ... | ... | ... | 264 ^{b/} | ... | ... | ... | 6,270 ^{b/} | |
| ESCWA | 12,511 ⁶ | | | | 174,569 ⁴ | | | | |
| Share of Total Water Consumption | 6.25 | | | | 87.16 | | | | |

Sources: *Ministry of Water Bahrain, Country paper presented in the ESCWA-MEDSTAT training on Water Accounts, Jordan, March 2008.

a/ Egypt Statistical Yearbook 2008.

b/ Global Water Market 2008.

c/ Status of Agricultural Sector Report for 2005, Jordan.

d/ Water Balance 2006, Ministry of Water and Irrigation, Jordan, 2006.

e/ UNSD/UNEP Questionnaire on Environment Statistics 2008.

f/ ESCWA calculation.

g/ Dubai Electricity and Water Authority. United Arab Emirates.

- Notes:
1. Data are for 2004-2005.
 2. Data are for 2005-2006.
 3. Data are for 2006-2007.
 4. Includes drinking water.
 5. This figure refers to Dubai only. Data for the United Arab Emirates is not available.
 6. Excluding Qatar.

Sources: a/ Egypt Statistical Yearbook 2008.

b/ Global Water Market 2008.

c/ Status of Agricultural Sector Report for 2005, Jordan.

d/ M.Y. Sbeih. 2007. Water Balance 2006, Ministry of Water and Irrigation, Jordan, 2006. In Water demand management in the Mediterranean, progress and policies ZARAGOZA, 19-21/03/2007.

e/ UNSD/UNEP Questionnaire on Environment Statistics 2008.

f/ Pricing the Irrigation Water in The Jordan Valley as a Mean Of Water Saving in Palestine.

g/ ESCWA calculation.

- Notes:
1. Data are for 2004-2005.
 2. Data are for 2005-2006.
 3. Data are for 2006-2007.
 4. Excluding Qatar.

Table III.2 (continued)

| | Industrial Water Consumption | | | | Other Sectors Consumption (Commercial, Government...) | | | | |
|---|------------------------------|-----------------------|-----------------------|---------------------|---|---------------------|---------------------|------------------|---|
| | 2004 | 2005 | 2006 | 2007 | 2004 | 2005 | 2006 | 2007 | |
| Bahrain* | ... | 10 | 10 | 10 | ... | ... | ... | ... | * |
| Egypt | 1,150 ^{a/,1} | 1,150 ^{a/,2} | 1,150 ^{a/,3} | 9,618 ^{b/} | 200 ^{a/,1} | 200 ^{a/,2} | 200 ^{a/,3} | ... | |
| Iraq | ... | ... | ... | 2,135 ^{b/} | ... | ... | ... | ... | |
| Jordan | ... | 32 ^{c/} | 40 ^{d/} | 40 ^{b/} | ... | ... | ... | ... | |
| Kuwait | 37 ^{e/} | 39 ^{e/} | 41 ^{e/} | 42 ^{e/} | 57 ^{b/} | 60 ^{b/} | 63 ^{b/} | 65 ^{b/} | |
| Lebanon | ... | ... | ... | 14 ^{b/} | ... | ... | ... | ... | |
| Oman | ... | ... | ... | 28 ^{b/} | ... | ... | ... | ... | |
| Palestine* | ... | ... | ... | 19.3 | ... | ... | ... | 19.2 | * |
| Qatar | ... | ... | ... | ... | ... | ... | ... | ... | |
| Saudi Arabia | ... | ... | ... | 173 ^{b/} | ... | ... | ... | ... | |
| Sudan | ... | ... | ... | 373 ^{b/} | ... | ... | ... | ... | |
| Syrian Arab Republic | ... | ... | ... | 398 ^{e/} | ... | ... | ... | ... | |
| United Arab Emirates | 11 ^{a/,4} | ... | 15 ^{a/,4} | 207 ^{b/} | 84 ^{a/,4} | ... | 105 ^{a/,4} | ... | |
| Yemen | ... | ... | ... | 66 ^{b/} | ... | ... | ... | ... | |
| ESCWA | 13,124 ⁵ | | | | ... | ... | ... | ... | |
| Share of Total Water Consumption | 6.55 | | | | 0.04 | | | | |

Sources: * Country paper presented in the ESCWA-MEDSTAT training on Water Accounts, Jordan, March 2008. Ministry of Water Bahrain, and Palestinian Central Bureau of Statistics.

a/ Egypt Statistical Yearbook 2008.

b/ Global Water Market 2008.

c/ Status of Agricultural Sector Report for 2005, Jordan.

d/ Water Balance 2006, Ministry of Water and Irrigation, Jordan, 2006.

e/ UNSD/UNEP Questionnaire on Environment Statistics 2008.

f/ ESCWA calculation.

- Notes:
1. Data are for 2004-2005.
 2. Data are for 2005-2006.
 3. Data are for 2006-2007.
 4. This figure refers to Dubai only. Data for the United Arab Emirates is not available.
 5. Excluding Qatar.

Sources: a/ Egypt Statistical Yearbook 2008.

b/ UNSD/UNEP Questionnaire on Environment Statistics 2008.

f/ Dubai Electricity and Water Authority. United Arab Emirates.

- Notes:
1. Data are for 2004-2005.
 2. Data are for 2005-2006.
 3. Data are for 2006-2007.
 4. This figure refers to Dubai only. Data for the United Arab Emirates is not available. Includes Commercial consumption.

Table III.3
Total Freshwater Abstracted

| | 2004 | 2005 | 2006 | 2007 |
|----------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Bahrain | 106 ^{a/, 1} | 110 ^{a/, 1} | 121 ^{a/, 1} | 173 ^{b/, 1, 2} |
| Egypt | 57,684 ^{a/, 1} | 57,884 ^{a/, 1} | 58,384 ^{a/, 1} | 68,700 ^{g/, 1} |
| Iraq | ... | ... | ... | 42,700 ^{g/, 1} |
| Jordan | 866 ^{a/, 1} | 825 ^{d/, 1} | 925 ^{e/} | 1,000 ^{g/, 1} |
| Kuwait | 596 ^{f/, 3} | 632 ^{f/, 3} | 645 ^{f/, 3} | 661 ^{f/, 3} |
| Lebanon | 1,250 ^{a/, 1} | 1,788 ⁴ | ... | 2,000 ⁵ |
| Oman | ... | ... | ... | 1,400 ^{g/, 1} |
| Palestine | 249 ⁵ | 269 ⁵ | 275 ⁵ | 286 ⁵ |
| Qatar | ... | 665 ⁵ | ... | 300 ^{g/, 1} |
| Saudi Arabia | 34,210 ⁵ | ... | 45,100 ⁵ | 45,100 ⁶ |
| Sudan | ... | ... | ... | 37,300 ^{c/, 1} |
| Syrian Arab Republic | 17,669 ⁷ | 8,339 ⁵ | ... | 19,900 ^{g/, 1} |
| United Arab Emirates | 1,003 ^{g/, 4} | 1,144 ^{g/, 4} | 1,249 ^{g/, 4} | 1,369 ^{g/, 4} |
| Yemen | ... | ... | ... | 6,600 ^{g/, 1} |
| ESCWA | ... | ... | ... | 227,489 |

Sources: a/ UNSD/UNEP Questionnaire on Environment Statistics 2008.

b/ Bahrain Ministry of Energy and Water Website.

c/ Global Water Market 2008.

d/ Status of Agricultural Sector Report for 2005, Jordan.

e/ Water Balance 2006, Ministry of Water and Irrigation, Jordan, 2006.

f/ Annual Statistical Abstract 2007, Central Statistical Office of Kuwait.

g/ Yearly Statistical Report for Electricity and Water, United Arab Emirates, 2003-2007.

- Notes:
1. Value as reported by source.
 2. Conversion factor used for Bahrain is 0.004545 to convert from MIG into Cubic metre.
 3. Includes potable and brackish water.
 4. ESCWA calculation: sum of surface and groundwater values.
 5. ESCWA Calculation: Groundwater values only.
 6. Estimated same as 2006.
 7. ESCWA calculation: surface water values only.

Figure III.1
Sectoral Water Withdrawal (Mcm/yr)
 (/)

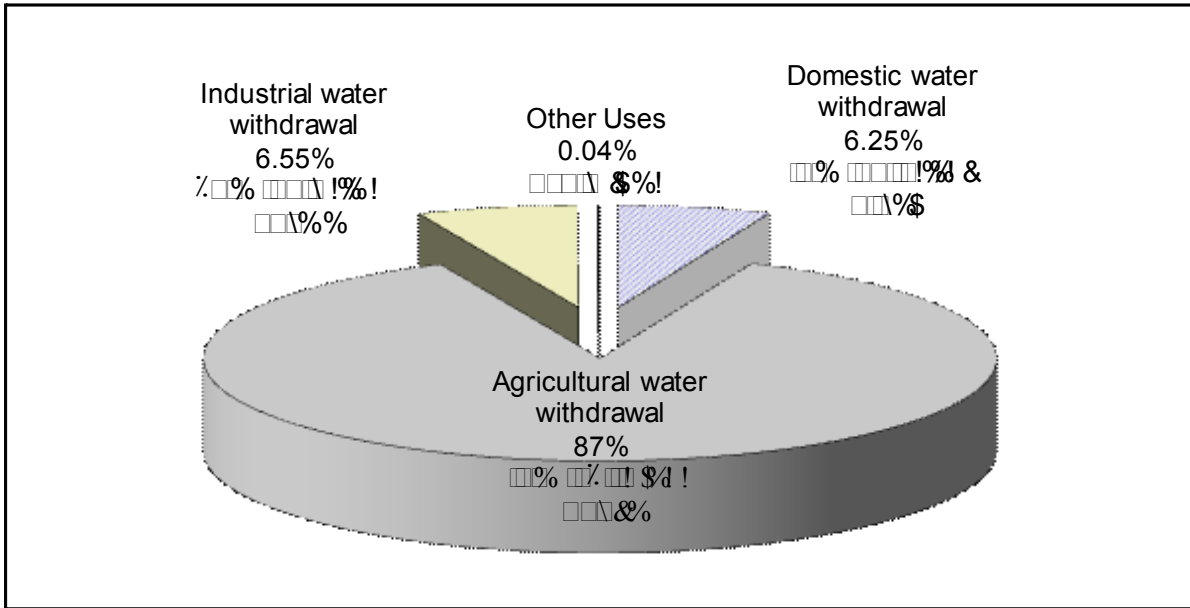


Figure III.2
Per Capita Total Water Withdrawal

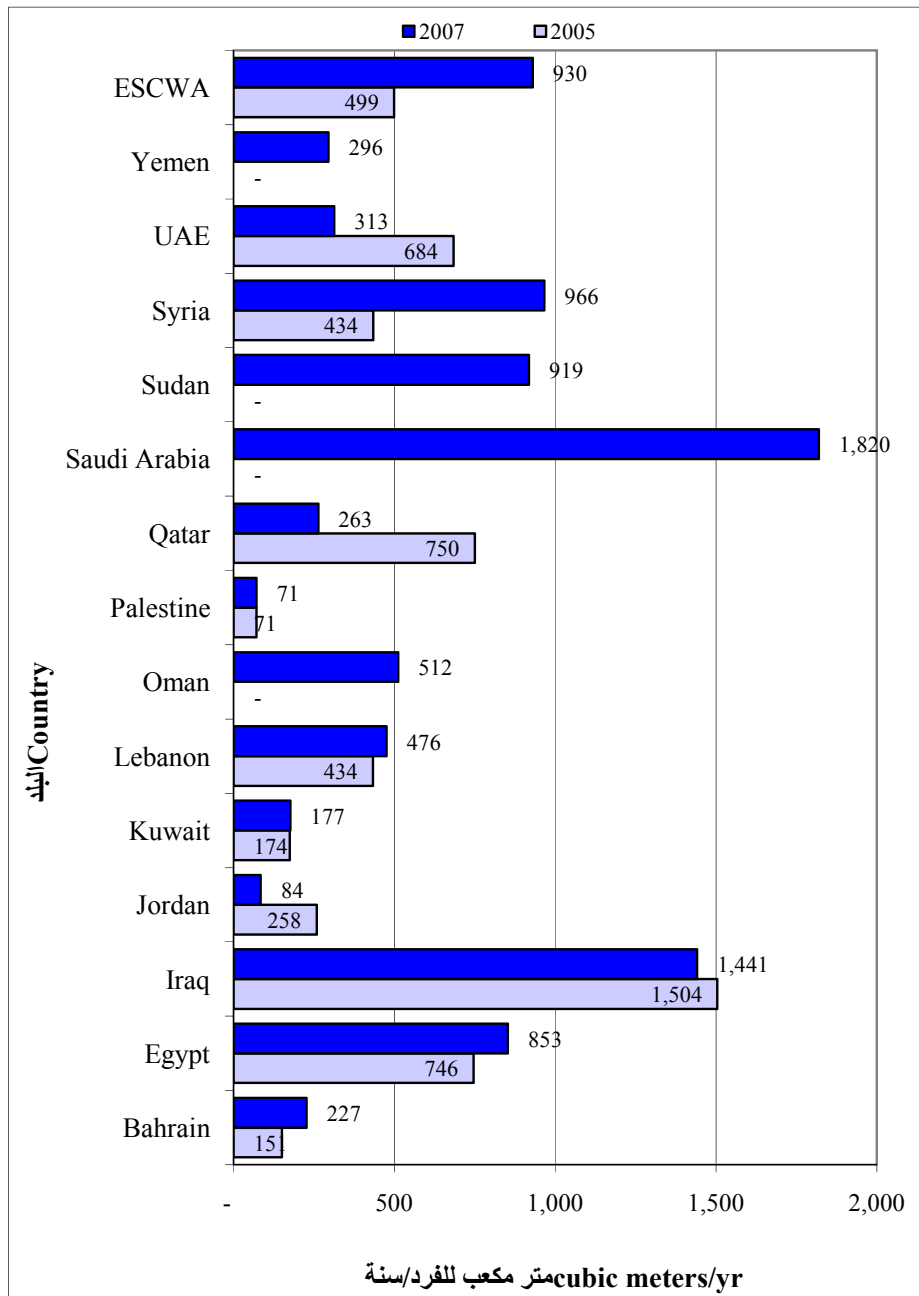


Table III.4
Water Use Indicators

| | Per Capita Total Water Abstracted (cubic metre/p/yr) | | Water Deficit ¹ (cubic metre/p/yr) | | Water Use Intensity ² (percentage) | | Groundwater Dependency |
|-------------------------|--|------------|--|------------|---|------------|---------------------------|
| | (/) | (/) | (/) | (/) | () | () | () |
| | 2005 | 2007 | 2005 | 2007 | 2005 | 2007 | 2007 |
| Bahrain | 151 | 227 | -14 | -75 | 110% | 149% | 30% |
| Egypt | 746 | 853 | 12 | -124 | 98% | 117% | 9% |
| Iraq | 1,504 | 1,441 | 1,138 | 2,336 | 57% | 38% | ... |
| Jordan | 258 | 84 | -80 | 72 | 145% | 54% | 100% |
| Kuwait | 174 | 177 | -167 | -170 | 2360% | 2525% | ... |
| Lebanon | 434 | 476 | 537 | 1,260 | 45% | 27% | 100% |
| Oman | ... | 512 | ... | 347 | ... | 60% | ... |
| Palestine | 71 | 71 | 141 | 202 | 34% | 26% | 100% |
| Qatar | 750 | 263 | -637 | -212 | 665% | 517% | ... |
| Saudi Arabia | ... | 1,820 | ... | -1,643 | ... | 1025% | 2% |
| Sudan | ... | 919 | ... | 670 | ... | 58% | ... |
| Syrian Arab Republic | 434 | 966 | 920 | 1,630 | 32% | 37% | ... |
| United Arab Emirates | 684 | 313 | -635 | -263 | 1400% | 622% | 1% |
| Yemen | ... | 296 | ... | -116 | ... | 165% | 4% |
| ESCWA | 499 | 927 | 523 | 337 | 49% | 73% | 5% |

Source: ESCWA calculation.

Notes: 1. Water deficit is the difference between water resources available per capita per year and the water abstracted per capita per year.

2. Water use intensity is the ratio of water abstracted per capita per year to the water resources available per capita per year.

Table III.5
Wastewater Management

| | Wastewater Produced (Mcm/yr) | Wastewater Treated (Mcm/yr) | Treated Wastewater Reuse (Mcm/yr) |
|-------------------------|---------------------------------|--------------------------------|--------------------------------------|
| | (/) | (/) | (/) |
| | 2005 | 2005 | 2007 |
| Bahrain | ... | 62 ^{a/} | 16.3 ^{a/} |
| Egypt | 3,760 ^{a/, 1} (2000) | ... | 2,970 ^{a/} |
| Iraq | 790 ^{b/} (2007) | 364 ^{b/} (2007) | 0 ^{a/} |
| Jordan | 114 ^{c/} (2007) | 107 ^{a/} | 83.5 ^{a/} |
| Kuwait | ... | 250 ^{a/} | 78 ^{a/} |
| Lebanon | ... | 4 ^{a/} (2006) | 2 ^{a/} |
| Oman | 9.49 ^{d/} | 12 ^{e/} | 37 ^{a/} |
| Palestine | ... | ... | ... |
| Qatar | 2 ^{a/} (2006) | 43 ^{a/, 1} | 43 ^{a/} |
| Saudi Arabia | 730 ^{a/, 1} (2000) | 548 ^{a/, 1} | 166 ^{a/} |
| Sudan | ... | ... | 0 ^{a/} |
| Syrian Arab Republic | 825 ^{a/, 1} (2000) | 550 ^{a/, 1} | 550 ^{a/} |
| United Arab Emirates | 881 ^{a/, 1} (2000) | 289 ^{a/} (2006) | 248 ^{a/} |
| Yemen | 74 ^{a/, 1} (2000) | 46 ^{a/, 1} | 6 ^{a/} |

Sources: a/ Aquastat 2000.

b/ Report of Environment Statistics in Iraq for 2007, COSIT, 2008.

c/ Water Authority of Jordan, Annual Report 2007.

d/ ESCWA calculation.

e/ Qatar Annual Abstract 2007.

f/ Oman Water Statistics 2008.

Note: 1. Average 1998-2002.

Table III.6
Wastewater Treatment Plants

| | Conventional Treatment Plants | | Non-Conventional Treatment Plants |
|----------------------|-------------------------------|------|-----------------------------------|
| | Number | Year | Number |
| Bahrain | ... | ... | 0 (2005) |
| Egypt | 67 ^{a/} | 1999 | ... |
| Iraq | 0 ^{b/} | 2006 | ... |
| Jordan | 13 ^{c/} | 2000 | 6 (2000) |
| Kuwait | ... | ... | ... |
| Lebanon | ... | ... | ... |
| Oman | 10 ^{d/} | 2000 | ... |
| Palestine | ... | ... | 11 (2007) |
| Qatar | 4 ^{e/} | 1998 | 0 (2005) |
| Saudi Arabia | 30 ^{f/} | 1995 | ... |
| Syrian Arab Republic | 5 ^{g/} | 2002 | ... |
| United Arab Emirates | 4 ^{c/} | 2000 | ... |
| Yemen | 11 ^{a/} | 1999 | 9 (2007) |
| ESCWA | 149 | | ... |

Sources: a/ Aquastat 1999.

b/ Report of Environment Statistics in Iraq for 2007, COSIT, 2008.

c/ Aquastat 2000.

d/ Aquastat 2001.

e/ Aquastat 1998.

f/ Aquastat 1996.

g/ Aquastat 2002.

Table III.7
Water Market 2007 (Million US\$)
() 2007

| | Municipal Water | | Municipal Wastewater | | Total Water Market |
|----------------------|------------------------|-------------------------|----------------------|------------|--------------------|
| | Opex ¹ 2007 | Capex ² 2007 | Opex 2007 | Capex 2007 | |
| | 1 | 2 | | | 2007 |
| Bahrain | 93 | 180 | 14 | 14 | 310 |
| Egypt | 490 | 488 | 8.2 | 110 | 1,352 |
| Iraq | 81.8 | 266.7 | 200 | 13.3 | 377.8 |
| Jordan | 30.5 | 75.9 | 26 | 28.3 | 167.9 |
| Kuwait | 297 | 240 | 30 | 65 | 684.7 |
| Lebanon | 36.6 | 26.3 | 27.3 | 20.7 | 123.4 |
| Oman | 84 | 200 | 21 | 18 | 343.1 |
| Palestine | 29.6 | 14.6 | 2.8 | 9.2 | 59.7 |
| Qatar | 141 | 157.5 | 35.3 | 61.1 | 408.9 |
| Saudi Arabia | 925 | 831 | 231.3 | 134.4 | 2,455 |
| Sudan | 133.4 | 25 | 5.6 | 2 | 176.9 |
| Syrian Arab Republic | 73.4 | 46.3 | 18.4 | 7.7 | 159.7 |
| United Arab Emirates | 648 | 900 | 97.2 | 170 | 1,908.4 |
| Yemen | 55.4 | 27 | 4.6 | 0.1 | 93.9 |

Source: Global Water Market 2008.

Notes: 1. Opex is the Operation Expenditure.
2. Capex is the Capital Expenditure.

Table III.8
Municipal Water and Wastewater Capital Expenditure Forecast (Million US\$)
 ()

| | Water Capital Expenditure | | | Wastewater Capital Expenditure | | |
|----------------------|---------------------------|---------|---------|--------------------------------|-------|---------|
| | 2008 | 2012 | 2016 | 2008 | 2012 | 2016 |
| Bahrain | 201.3 | 285.2 | 344.3 | 15.8 | 30.8 | 78.4 |
| Egypt | 520.5 | 720.2 | 1,110.2 | 128.3 | 276.3 | 744.6 |
| Iraq | 257.0 | 232.9 | 228.7 | 11.3 | 9.8 | 18.8 |
| Jordan | 84.8 | 150.8 | 329.7 | 29.9 | 41.1 | 67.0 |
| Kuwait | 272.7 | 404.0 | 494.9 | 70.3 | 97.7 | 138.4 |
| Lebanon | 28.8 | 40.4 | 54.8 | 22.5 | 32.0 | 45.9 |
| Oman | 226.0 | 334.2 | 422.2 | 20.6 | 43.6 | 127.8 |
| Palestine | 15.0 | 17.9 | 24.2 | 9.2 | 11.2 | 18.9 |
| Qatar | 177.9 | 267.5 | 354.5 | 67.2 | 103.5 | 173.5 |
| Saudi Arabia | 990.4 | 1,861.8 | 3,115.3 | 183.4 | 578.8 | 1,559.9 |
| Sudan | 25.5 | 28.1 | 31.9 | 2.0 | 2.3 | 2.7 |
| Syrian Arab Republic | 49.0 | 62.8 | 83.9 | 8.0 | 10.0 | 13.1 |
| United Arab Emirates | 1,062.7 | 1,698.1 | 1,974.2 | 191.5 | 309.7 | 504.6 |
| Yemen | 27.9 | 38.7 | 73.0 | 0.1 | 0.1 | 0.3 |

Source: Global Water Market 2008.

Table III.9
Water Market in the ESCWA Region

| | Average Tariff ^{a/} , ¹ (\$) | Water Coverage ^{a/} (percentage) | Wastewater Coverage ^{a/} (percentage) | Wastewater Total Treatment Capacity ^{a/} (million m ³ /yr) | UFW Unaccounted for Water ^{b/} (percentage) |
|-------------------------|--|---|--|---|---|
| Bahrain | 0.07 | 100% | 75% | 50 | 23.5 |
| Egypt | 0.06 | 70% | 55% | 3,780 | 34 |
| Iraq | 0.00 | 60% | 20% | 108 | ... |
| Jordan | ... | 84% | 44% | 43 | 45 |
| Kuwait | ... | 86% | 65% | 132 | 5 |
| Lebanon | ... | 82% | 35% | 85 | 25% - 65% ² |
| Oman | 1.37 | 80% | 16% | 11 | 35 |
| Palestine | 1.00 | 89% | 35% | 42 | 34 |
| Qatar | 1.21 | 78% | 65% | 585 | 45-50% ³ |
| Saudi Arabia | ... | 26% | 2% | 250 | ... |
| Sudan | 0.04 | 86% | 30% | 19 | 35 |
| Syrian Arab Republic | 0.07 | 60% | 38% | 199 | 25 - 40% ⁴ |
| United Arab Emirates | 0.22 | 93% | 60% | 19 | 13 |
| Yemen | ... | 32% | 5% | 17 | 26.4 |

Sources: a/ Global Water Market 2008.
b/ Water Market Middle East 2010.

Notes: 1. Price of 1 m³/ month for the first 15 m³. Price as of June 2007.
2. Depending on Municipality.
3. Estimation.
4. Depending on Governorate.

Freshwater Quality

Monitoring water quality is used to define the condition of a water body in order to understand its status quo and recommend better solutions for its improvement. Water quality indicators are based on the physical, chemical and biological measurements of a defined water body, period and amount of samples.

Water quality monitoring programmes are still insufficiently developed in ESCWA member countries. Those programmes on water quality changes allow a better understanding of the causes of change in the short and long terms. In addition, water quality is affected by the use of fertilizers. The region relies heavily on chemical fertilizers. In 2002, the regional average use of fertilizers amounted to 111 kilograms per hectare, compared to a world average of 92 kilograms per hectare.¹⁴

111
92

2002

(9)

Generally, water quality indices and environmental standards are adopted from the World Health Organization (WHO) or according to other international standards without modifications to suit national conditions. The WHO Regional Centre for Environmental Health Activities disseminates water quality, namely drinking water and wastewater reuse standards for the eastern Mediterranean region. Moreover, the United Nations Global Environment Monitoring System Water Programme (GEMS) provides environmental water quality data and information used in water assessments and capacity-building initiatives across the world.

The variables collected to monitor water quality are several including calcium, chloride, fluoride, magnesium, potassium, sodium and sulfate in addition to metals namely aluminum, arsenic, boron, cadmium, chromium, total chromium, copper, iron, lead, manganese, mercury, nickel, selenium and zinc. On the microbiological level, faecal and total coliform are the most widely monitored due to their effect on humans. As for nutrients, ammonia, nitrate, nitrite, total nitrogen and total phosphorus are important to check. Biochemical Oxygen Demand (BOD), total organic carbon and chemical oxygen demand, as well as total alkalinity (CaCO₃), dissolved oxygen,

¹⁴ UNESCWA Statistical Abstract of the ESCWA Region 2005.

electrical conductance, pH, temperature and suspended solids at 105°C and 180°C are highly required to be monitored. 180 105

For instance, Bahrain monitored the quality of water from 2003 till 2005 (table III.10). Egypt and Palestine are two ESCWA countries that publish water quality data. Tables III.11 and III.12 show the water quality in Cairo and Alexandria from 2004 till 2007 in Egypt, and that of the West Bank, Ramallah and Al-Bireh in 2004, 2006 and 2007.

(III.10) 2005 2003

III.12 III.11
2007 2004

.2007 2006 2004

Data presented in tables III.13, III.14 and III.15 on water quality parameters in the countries of the GCC provide a general overview. However, it is difficult to present an analysis of water quality given that the temporal and spatial information is not available, which renders it impossible to establish comparisons across sites, background sites and polluted sites throughout time. The 2005 water data was published in 2008 for the first time by the Gulf Cooperation Council in a regular water statistics report for the GCC countries.

III.15 III.14 III.13

2008

2005

Discharge of organic water pollutants in the ESCWA countries was monitored based on the World Development Indicator throughout the years. Tables III.16 and III.17 show the concentration of these pollutants between 2000 and 2003 on one hand, and between 2000 and 2004 on the other.

III.17 III.16
2004 2000 2003 2000

Table III.10
Selected Indicators for Groundwater Quality in Bahrain

| | 2003 | 2004 | 2005 | |
|--|------------------|------------------|------------------|----------------------|
| Annual Average Flow (000 m ³ /s) | 26,299 | 29,188 | 21,699 | (/ 3 000) |
| Biochemical Oxygen Demand (BOD) (mg O ₂ /l) | 30 ¹ | 30 ¹ | 30 ¹ | (O ₂ /l) |
| Chemical Oxygen Demand (COD) (mg O ₂ /l) | 50 ² | 50 ² | 50 ² | (O ₂ /l) |
| Dissolved Oxygen (DO) (mg O ₂ /l) | 0.1 | 0.1 | 0.1 | (O ₂ /l) |
| Total Dissolved Solids (TDS) (mg/l) | 1,296 | 1,260 | 1,260 | (/) |
| Conductivity Level of Ground Water (µmhos/cm) | 1,966 | 1,960 | 1,960 | (/) |
| Total Phosphorus (mg P/l) | <0.2 | <0.2 | <0.2 | (P/l) |
| Total Nitrogen of Ground Water in Site 1 (mg N/l) | <20 ³ | <20 ³ | <20 ³ | (N/l) |
| Concentration of Faecal Coliform of Ground Water (Colonies/100 ml) | 0 | 0 | 0 | |
| Number of Deaths from Water borne-Diseases (No./1000) | 9 | 5 | 4 | |

Source: Central Informatics Organization. Bahrain. Reply to ESCWA Questionnaire on Environment, 2005.

Notes: 1. <30.
2. <50.
3. <20.

Table III.11
Selected Indicators for Surface Water Quality in Egypt

| | 2004 | 2005 | 2006 | 2007 | |
|--|------|------|------------|------|-------|
| Name of Site 1 | | | Cairo | | 1 |
| Biochemical oxygen demand (BOD) of Surface Water in Site 1 (mg O ₂ /l) | 6 | 7 | 4 | 4 | (BOD) |
| Dissolved oxygen (DO) of Surface Water in Site 1 (mg O ₂ /l) | 3 | 3 | 7 | 7 | (DO) |
| Chemical oxygen demand (COD) of Surface Water in Site 1 (mg O ₂ /l) | 10 | 15 | 14 | 16 | (COD) |
| Total dissolved solids (TDS) of Surface Water in Site 1 (mg/l) | 307 | 254 | 229 | 231 | (TDS) |
| Name of Site 2 | | | Alexandria | | 2 |
| Biochemical oxygen demand (BOD) of Surface Water in Site 2 (mg O ₂ /l) | 5 | 5 | 3 | 3 | (BOD) |
| Dissolved oxygen (DO) of Surface Water in Site 2 (mg O ₂ /l) | 3 | 3 | 5 | 6 | (DO) |
| Chemical oxygen demand (COD) of Surface Water in Site 2 (mg O ₂ /l) | 14 | 20 | 20 | 15 | (COD) |
| Total dissolved solids (TDS) of Surface Water in Site 2 (mg/l) | 329 | 225 | 204 | 188 | (TDS) |

Source: Egypt Statistical Yearbook 2008.

Note: Samples are taken from the Nile River in these locations.

Table III.12
Selected Water Quality Indicators in Palestine

| | 2004 | 2006 | 2007 | |
|---|------------------------|------------------------|------------------------|-------|
| Concentration of Nitrate of Ground Water in Site 1 (mg/l) | ... | 34 ^{b/, 2} | 25 ^{c/, 2} | |
| Concentration of Faecal Coliform of Ground Water in Site 1 (Colonies/100 ml) | ... | 43 ^{b/, 2} | ... | |
| Total dissolved solids (TDS) of Ground Water in Site 1 (mg/l) | 377 ^{a/, 1} | ... | ... | (TDS) |
| Conductivity level of Ground Water in Site 1 (micromhos per centimetre (µmhos/cm)) | 745 ^{a/, 3} | 1,044 ^{b/, 2} | ... | |
| Concentration of Bicarbonate of Groundwater in Site 1 (mg/l) | ... | 232.7 ^{b/, 2} | 198.7 ^{c/, 2} | 1 |
| Concentration of Nitrate of Surface Water in Site 1 (mg/l) | ... | 39 ^{b/, 2} | ... | |
| Concentration of Faecal Coliform of Surface Water Site 1 (Colonies/100 ml) | ... | 43 ^{b/, 2} | ... | |
| Conductivity level of Surface Water in Site 1 (micromhos per centimetre (µmhos/cm)) | ... | 997 ^{b/, 2} | ... | |
| Concentration of Sulfates of Groundwater in Site 1 (mg/l) | ... | 32.6 ^{b/, 2} | 43.6 ^{c/, 2} | 1 |
| Concentration of Free Chlorine of Groundwater in Site 1 (mg/l) | ... | 169.3 ^{b/, 2} | 166.7 ^{c/, 2} | 1 |
| Conductivity level of Ground Water in Site 2 (micromhos per centimetre (µmhos/cm)) | 2,153 ^{a/, 6} | 524 ^{b/, 5} | 427.9 ^{c/, 5} | |
| Total dissolved solids (TDS) of Ground Water in Site 2 (mg/l) | 1,387 ^{a/, 4} | ... | ... | 2 |
| Concentration of Nitrate of Ground Water in Site 2 (mg/l) | ... | 18 ^{b/, 5} | 16 ^{c/, 5} | |
| Concentration of Faecal Coliform of Ground Water in Site 2 (Colonies/100 ml) | ... | 12 ^{b/, 5} | 5 ^{c/, 5} | |
| Concentration of Nitrate of Surface Water in Site 2 (mg/l) | ... | 31 ^{b/, 5} | 103 ^{c/, 5} | |
| Concentration of Faecal Coliform of Surface Water Site 2 (Colonies/100 ml) | ... | 12 ^{b/, 5} | 5 ^{c/, 5} | |
| Conductivity level of Surface Water in Site 2 (micromhos per centimetre (µmhos/cm)) | ... | 692 ^{b/, 5} | 1,018 ^{c/, 5} | |

Sources: *a/* PCBS reply to questionnaire – July 2005.
b/ PCBS Water Tables for the Palestinian Territory 2006.
c/ PCBS Water Statistics in the Palestinian Territory 2007.

Notes: 1. Site 1 = West Bank, figure for TDS in wells.
2. Site 1 = West bank.
3. Site 1 = West Bank, figure for conductivity level in water wells.
4. Site 2 = Gaza Strip, TDS in wells.
5. Site 2 = Ramallah and Al-Bireh.
6. Site 2 = Gaza Strip, conductivity in water wells.

Table III.13
Water Quality Indicators in the Gulf Countries: Bahrain and Kuwait
 :

| Pollutant | Average | |
|--|---------|-------|
| Bahrain | | |
| Magnesium (mg/l) (Mg) | 51 | (/) |
| Calcium (mg/l) (Ca) | 113 | (/) |
| Total Dissolved Solids TDS (mg/l) | 1,779 | (/) |
| Sodium (mg/l) (Na) | 444 | (/) |
| Chlorides (mg/l) | 806 | (/) |
| Sulfates (mg/l) (SO ₄) | 245 | (/) |
| Aluminum (mg/l) (Al) | 0.102 | (/) |
| Iron (mg/l) (Fe) | 0.052 | (/) |
| Copper (mg/l) (Cu) | 0.032 | (/) |
| Manganese (mg/l) (Mn) | 0.005 | (/) |
| Zinc (mg/l) (Zn) | 0.006 | (/) |
| Kuwait | | |
| Total Dissolved Solids (mg/l) (TDS) | 258 | (/) |
| pH unit | 7.47 | |
| Calcium Carbonate (CaCO ₃) (ppm) | 122 | (/) |
| Magnesium (mg/l) (Mg) | 9.28 | (/) |
| Calcium (mg/l) (Ca) | 33.66 | (/) |
| Sodium (mg/l) (Na) | 47.24 | (/) |
| Potassium (mg/l) (K) | 1.55 | (/) |
| Ammonia (mg/l) (NH ₄) | 0.07 | (/) |
| Aluminum mg/l (Al) | 10.94 | (/) |
| Iron (mg/l) (Fe) | 49.85 | (/) |
| Copper (mg/l) (Cu) | 64.67 | (/) |
| Zinc (mg/l) (Zn) | 16.52 | (/) |
| Manganese (mg/l) (Mn) | 3.84 | (/) |
| Arsenic (mg/l) | 2.17 | (/) |
| Cadmium (mg/l) (Cd) | 1.37 | (/) |
| Mercury (mg/l) (Hg) | <0.5 | (/) |
| Selenium (mg/l) | 6.07 | (/) |
| Lead (mg/l) (Pb) | 1.31 | (/) |
| Fluoride (mg/l) | 0.18 | (/) |

Source: Water Statistical Book for the GCC, 2008.

Table III.14
Water Quality Indicators in the Gulf Countries: Oman and Qatar

:

| Pollutant | Average | |
|--|-----------|-------|
| Oman | | |
| Calcium Carbonate (ppm) (CaCO ₃) | 100-500 | (/) |
| Calcium (mg/l) (Ca ⁺⁺) | 75-200 | (/) |
| Chlorides (mg/l) | 200-600 | (/) |
| Sulfates (mg/l) (SO ₄) | 200-400 | (/) |
| Nitrate (mg/l) (NO ₃ ⁻) | 0-45 | (/) |
| Total Dissolved Solids (TDS) (mg/l) | 500-1,500 | (/) |
| Free Chlorine (mg/l) (Cl) | 0.2-0.5 | (/) |
| Iron mg/l (Fe ⁺⁺) | 0.1-1 | (/) |
| Copper (mg/l) (Cu ⁺⁺) | 0.05-1.5 | (/) |
| Manganese (mg/l) (Mn) | 0.5 | (/) |
| Cadmium (mg/l) (Cd) | 0-0.003 | (/) |
| Lead (mg/l) (Pb) | 0-0.01 | (/) |
| Qatar | | |
| Aluminum (mg/l) (Al) | 0-0.2 | (/) |
| pH unit | 6.5-8.5 | |
| Magnesium (mg/l) (Mg) | 0-50 | (/) |
| Arsenic (mg/l) | 0-0.01 | (/) |
| Copper (mg/l) (Cu) | 0-0.05 | (/) |
| Cadmium (mg/l) (Cd) | 0-0.003 | (/) |
| Iron (mg/l) (Fe) | 0-0.3 | (/) |
| Lead (mg/l) (Pb) | 0-0.01 | (/) |
| Manganese (mg/l) (Mn) | 0-0.4 | (/) |
| Total Dissolved Solids (TDS)(mg/l) | 75-200 | (/) |
| Selenium (mg/l) | 0-0.01 | (/) |
| Cyanide (mg/l) | 0-0.07 | (/) |
| Free Chlorine (mg/l) (Cl) | 0.08-1 | (/) |
| Chlorides (mg/l) | 0-35 | (/) |
| Sulfates (mg/l) (SO ₄) | 0-10 | (/) |
| Nitrate (mg/l) (NO ₃ ⁻) | 0-0.1 | (/) |
| Nitrite (mg/l) (NO ₂ ⁻) | 0-3 | (/) |

Source: Water Statistical Book for the GCC, 2008.

Table III.15
Water Quality Indicators in the Gulf Countries: Saudi Arabia
and the United Arab Emirates
 :

| Pollutant | Average | |
|--|---------|-------|
| Saudi Arabia | | |
| pH unit | 7.8-8.2 | |
| Electrical Conductance (mhos/cm) | 380-450 | (/) |
| Magnesium (mg/l) (Mg) | 0-0.005 | (/) |
| Sodium (mg/l) (Na) | 23-46 | (/) |
| Chlorides (mg/l) | 43-50 | (/) |
| Sulfates (mg/l) (SO ₄) | 80-90 | (/) |
| Nitrate (mg/l) (NO ₃ ⁻) | 0-1.1 | (/) |
| United Arab Emirates* | | |
| pH unit | 8.3 | |
| Calcium Carbonate (ppm) | 110.56 | (/) |
| Magnesium (mg/l) (Mg) | - | (/) |
| Sodium (mg/l) (Na) | 13 | (/) |
| Chlorides (mg/l) | 18.3 | (/) |
| Bicarbonate (mg/l) (HCO ₃) | 52.5 | (/) |
| Aluminum (mg/l) (Al) | 30 | (/) |
| Lead (mg/l) (Pb) | 0.5 | (/) |
| Iron (mg/l) (Fe) | 0.02 | (/) |
| Total Dissolved Solids (TDS) (mg/l) | 120 | (/) |

Source: Water Statistical Book for the GCC, 2008.

* Samples taken from Abu Dhabi, desalination plant.

Table III.16
Discharge of Organic Water Pollutants (Total and from Different Sectors)
 ()

| | Egypt | | Jordan | | | Kuwait | | Lebanon | | |
|--|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|-----|
| | 2000 ^{a/} | 2003 ^{b/} | 2000 ^{a/} | 2003 ^{b/} | 2004 ^{c/} | 2000 ^{a/} | 2003 ^{b/} | 2000 ^{a/} | 2003 ^{b/} | |
| Discharge of Organic Water Pollutants (000 kg/d) | 203.6 | 186.1 | 16.1 | 23.5 | 25.3 | 11.4 | 11.9 | 14.9 | 14.9 | |
| Discharge of Organic Water Pollutants from Primary Metals Ind. (%) | 12 | 10.8 | 4 | 5.1 | 2.7 | 2 | 2.1 | 1 | 0.9 | (%) |
| Discharge of Organic Water Pollutants from Paper and Pulp Ind. (%) | 8 | 8.2 | 16 | 12.7 | 6.5 | 16 | 16.6 | 15 | 15.6 | (%) |
| Discharge of Organic Water Pollutants from Chemicals Ind. (%) | 8 | 9 | 14 | 10.8 | 15.5 | 11 | 11.1 | 3 | 4 | (%) |
| Discharge of Organic Water Pollutants from Food and Beverages Ind. (%) | 50 | 50.7 | 51 | 53.4 | 21.8 | 49 | 50.2 | 61 | 60.7 | (%) |
| Discharge of Organic Water Pollutants from Stone, Ceramics, and Glass Ind. (%) | ... | 0.3 | ... | 0.4 | 11.6 | ... | 0.4 | 0 | 0.5 | (%) |
| Discharge of Organic Water Pollutants from Textiles Ind. (%) | 19 | 17.7 | 7 | 10.8 | 16.9 | 12 | 11.6 | 10 | 10.2 | (%) |
| Discharge of Organic Water Pollutants from Wood Ind (%) | 0 | 0.6 | 3 | 3.3 | 2.4 | 3 | 2.8 | 5 | 4.6 | (%) |
| Discharge of Organic Water Pollutants from Other Ind. (%) | 3 | 2.8 | 3 | 3.4 | 22.7 | 6 | 5.2 | 3 | 3.4 | (%) |

Sources: a/ World Development Indicator. The World Bank, 2004.

b/ World Development Indicator. The World Bank, 2007.

c/ World Development Indicator. The World Bank, 2008.

Table III.16 (continued)

| | Oman | | Sudan | Syrian Arab Republic | | Yemen | | |
|--|--------------------|--------------------|--------------------|----------------------|--------------------|--------------------|--------------------|-----|
| | 2000 ^{a/} | 2003 ^{b/} | 2003 ^{b/} | 2000 ^{a/} | 2003 ^{b/} | 2000 ^{a/} | 2004 ^{c/} | |
| Discharge of Organic Water Pollutants (kg/d) | 5.8 | 5.8 | 38.6 | 15.1 | 15.1 | 7.8 | 15.4 | |
| Discharge of Organic Water Pollutants from Primary Metals Industry (%) | 6 | 7.3 | 0.7 | 4 | 4.1 | 0 | ... | (%) |
| Discharge of Organic Water Pollutants from Paper and Pulp Industry (%) | 13 | 13.3 | 2.5 | 2 | 1.5 | 9 | 7.7 | (%) |
| Discharge of Organic Water Pollutants from Chemicals Industry (%) | 7 | 10.1 | 3.1 | 8 | 3.9 | 13 | 6.8 | (%) |
| Discharge of Organic Water Pollutants from Food and Beverages Industry (%) | 50 | 54.3 | 88.6 | 70 | 69.8 | 71 | 74.6 | (%) |
| Discharge of Organic Water Pollutants from Stone, Ceramics, and Glass Industry (%) | 20 | 0.9 | 0.4 | 1 | 0.9 | 0 | 0.4 | (%) |
| Discharge of Organic Water Pollutants from Textiles Industry (%) | 14 | 8.3 | 3.2 | 19 | 19.4 | 5 | 7.6 | (%) |
| Discharge of Organic Water Pollutants from Wood Industry (%) | 0 | 2.4 | 0.6 | 0 | 0.2 | 1 | 0.9 | (%) |
| Discharge of Organic Water Pollutants from Other Industry (%) | 6 | 3.4 | 1.1 | ... | 0.2 | 1 | 2 | (%) |

Sources: ^{a/} World Development Indicator. The World Bank, 2004.

^{b/} World Development Indicator. The World Bank, 2007.

^{c/} World Development Indicator. The World Bank, 2008.

CHAPTER IV. INTEGRATED ENVIRONMENTAL AND ECONOMIC ACCOUNTING

WATER ACCOUNTS AND ENVIRONMENTAL PROTECTION EXPENDITURE

-

Statistical Highlights

1. Two out of the 14 ESCWA countries compiled pilot water accounts tables: Jordan for 2007, and Bahrain for 2005
2. Egypt published water balance at the country level from 2002 till 2007
3. The environmental expenditure in Jordan increased by 60.8 per cent from 2000 till 2007
4. 3.7 per cent of the public expenditure in Jordan was allocated for environment expenditures
5. The environmental expenditure in Lebanon decreased by 74.8 per cent between 2001 and 2004
6. The total cost of environmental degradation in Lebanon for the year of 2000 was estimated at US\$ 565 thousands
7. The oil spill created by the July 2006 hostilities in Lebanon was estimated between 12,000 tons and 15,000 tons of heavy crude oil and residual products
8. The economic impact of the July 2006 hostilities on the Lebanese environment was estimated between 411.3 million US\$ and 418.9 million US\$

| | | | | | | |
|--------|------|-------|-------|--------|----|----|
| 2005 | 2007 | | | | -1 | |
| | | 2007 | 2002 | | -2 | |
| | | 2007 | 2000 | 60.8 | -3 | |
| | | | | 3.7 | -4 | |
| | | 2004 | 2001 | 74.8 | -5 | |
| | | | 565 | 2000 | -6 | |
| 12 000 | | 2006 | / | | -7 | |
| | | | | 15 000 | | |
| | | 418.9 | 411.3 | 2005 | / | -8 |

Overview of Integrated Environmental Economic Accounting in the ESCWA Region

Recognizing the increasing importance of integrating environmental issues into development and the need to account for the complex interactions between all sectors of the economy and the environment, the United Nations Statistics Division (UNSD) developed in 1993, as a satellite to the 1993 System of National Accounts, the Integrated Environmental and Economic Accounting (SEEA) system which measures the contribution of the environment to the economy and the impact of the economy on the environment, as it provides an information system for strategic planning and policy analysis to identify more sustainable paths of development.

1993

.1993

The SEEA supplements the SNA by separately identifying expenditures related to environmental issues and by incorporating environmental assets and changes therein in the supply, use and asset accounts of the SNA.¹⁵

(10)

At the 'Beyond GDP' conference held in November 2007, the EU concluded that in the long term, integrated environmental and economic accounting is likely to be the "strongest tool" for supporting the promotion of well-being and progress.¹⁶

"

"

2007

/

(11)

"

The Statistics Division at the United Nations Economic and Social Commission for Western Asia (ESCWA) implemented in 2008-2009 a project to assist member countries in enhancing their national capacities in environment statistics indicators and accounts in order to integrate environmental concerns into economic development, thus supporting progress towards achieving sustainable development and related international agreed development goals in coordination with regional and international agencies in particular the UNSD, ECLAC, MEDSTAT and UNEP.

2009-2008

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ESCWA published the "Framework for environmental economic accounting in the ESCWA region"¹⁷ in 2009 proposing the SEEA to ESCWA countries with some adaptation to take into account

(12)

2009

¹⁵ United Nations Department of Economic and Social Affairs (DESA), and United Nations Environment Programme, 2000. Integrated Environmental and Economic Accounting: An Operational Manual, Handbook of National Accounting, Series F, No. 78, New York.

¹⁶ Consult <http://www.beyond-gdp.eu/> for information.

¹⁷ UNESCWA. Framework for environmental economic accounting in the ESCWA region. 2009

priorities and specificities of the region. In particular, water resources, energy, soil, as well as land and ecosystems sub-accounts were considered important for sustainable development in the energy-rich, water-scarce region.

The proposed SEEA addresses, in the context of environmental accounting, scarce water resources, land degradation and exploitation of oil and gas resources, which are considered as main constraints in achieving sustainable development.

Given the unavailability of data to build a comprehensive SEEA in ESCWA member countries, priorities identified by countries pertained to physical flow accounts, assets accounts (physical stocks), monetary accounts and environmental protection expenditures.

The principle of the System of Integrated Environmental and Economic Accounting for Water (SEEAW) consists of accounting for the hydrological and economic information: all the water that has entered the environment and the water that has emerged from the economy. Whether the water is used for supply or consumption, water accounts tables, prepared on the national level, summarize the complete water process. The indicators can be divided by Industries (ISIC classification) and by water source (groundwater, surface water, desalinated water...).

In the ESCWA region, two out of the 14 ESCWA countries compiled pilot studies water accounts: Bahrain for 2005 and Jordan for 2007. Other member countries such as Palestine, Oman, and Egypt are preparing their pilot water accounts for the upcoming year. The water accounts are presented in tables IV.1, IV.2, IV.3, IV.4 and IV.5.

Water balance, on the other hand, consists of evaluating inflows and outflows of water in the country. It tracks water that has been produced and consumed by the different sectors.

Among ESCWA countries, the Egyptian government has been preparing and publishing yearly water balances since 2002 (table IV.6).

()

:
()
(...)

2005
IV.3 IV.2 IV.1

.2007
IV.5 IV.4

(IV.6) 2002

Table IV.1
Pilot SEEAW Physical Water Use Table, Jordan, 2007 (Mcm)
() 2007

| | | Industries by ISIC Categories | | | | | Households | Rest of the world | Total | | |
|------------------------------|--|-------------------------------|--|------------|------------|--------------|------------|-------------------|--------------|-----------|--------|
| | | ISIC 1 | ISIC 2-33, 38, 39, 41- 43, 45-99 | ISIC 36 | ISIC 37 | Total | | | | | |
| From the environment | i Total abstraction (i.a+i.b) | 506 | 49 | 294 | 0 | 849 | 0 | | 849 | (-1+ -1) | -1 |
| | i.a Abstraction for own use | 506 | 49 | 0 | 0 | 555 | 0 | | 555 | | -1 |
| | i.b Abstraction for distribution | 0 | 0 | 294 | 0 | 294 | 0 | | 294 | | -1 |
| | i.b.1 From water resources: | 506 | 49 | 294 | 0 | 849 | 0 | | 849 | : | 1- -1 |
| | i.b.1.I Surface water | 261 | 4 | 80 | 0 | 345 | 0 | | 345 | | -1- -1 |
| | i.b.1.II Groundwater | 245 | 45 | 214 | 0 | 504 | 0 | | 504 | | -1- -1 |
| | i.b.1.III Soil water | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | | -1- -1 |
| | i.b.2 From other sources | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | | 2- -1 |
| | i.b.2.I Collection of precipitation | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | | -2- -1 |
| | i.b.2.II Abstraction from the sea | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | | -2- -1 |
| Within the economy (i+ii) | ii Use of water received from other economic units (ii.a+ii.b) | 91 | 0 | 0 | 113 | 204 | 147 | | 351 | | -2 |
| | ii.a of which: Reused water | 91 | 0 | 0 | 0 | | 0 | | 91 | | -2 |
| | ii.b of which: Wastewater to sewerage | 0 | 0 | 0 | 113 | 0 | 0 | | 0 | | -2 |
| | Total use of water | 597 | 49 | 294 | 113 | 1,053 | 147 | | 1,200 | | |

Source: Experiences in Water Statistics and Accounts (Mahmoud Alkhalwale, Department of Statistics, Jordan). 2009. World Water Forum 2009. Istanbul, Turkey. Session 6.4.2. <http://unstats.un.org/unsd/envaccounting/workshops/wwf2009/lod.htm>.

Table IV.2
Pilot SEEAW Physical Supply, Jordan, 2007 (Mcm)
() 2007

| | | Industries by ISIC Categories | | | | | Househ olds | Rest of the world | Total | | |
|-------------------------------------|--|-------------------------------|---------|---------|------------------------------------|----------------|----------------|----------------------|-------------|-------------|--------------|
| | | ISIC 1 | ISIC 36 | ISIC 37 | ISIC 2-33, 38, 39, 41-43, 45-99 | Total Industry | | | | | |
| Within the economy | i. Supply of water to other economic units (i.a+i.b) | 0 | 147 | 91 | 23 | 261 | 90 | | 351 | (-1+ -1) : | -1 |
| | <i>of which:</i> | | | | | | | | | | |
| | i.a Reused water | | | | | 0 | | | 0 | | -1 |
| | i.b Wastewater to sewerage | 0 | 0 | 0 | 23 | 23 | 90 | | 113 | | -1 |
| To the environment | ii. Total returns (ii.a+ii.b) | 60 | 140 | 6 | 5 | 211 | 0 | | 211 | (-2+ -2) | -2 |
| | ii.a To water resources | 60 | 140 | 6 | 5 | 211 | 0 | | 211 | | -2 |
| | ii.a.1 Surface water | 5 | 10 | 6 | 5 | 26 | 0 | | 26 | 1- -2 | |
| | ii.a.2 Groundwater | 50 | 10 | 0 | 0 | 60 | 0 | | 60 | 2- -2 | |
| | ii.a.3 Soil water | 5 | 120 | 0 | 0 | 125 | 0 | | 125 | 3- -2 | |
| | ii.b To other sources (e.g. sea water) | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | () | -2 |
| Total supply of water (i+ii) | | 60 | | | | | | | 562 | | (2+1) |
| Consumption | | | | | | | | | -562 | | |

Source: Experiences in Water Statistics and Accounts (Mahmoud Alkhalwalde, Department of Statistics, Jordan). 2009. World Water Forum 2009. Istanbul, Turkey. Session 6.4.2. <http://unstats.un.org/unsd/envaccounting/workshops/wwf2009/lod.htm>.

Table IV.3
Matrix of Flows within the Economy in Jordan, 2007 (Mcm)
() 2007

| To use | | | | Others | Total | Households | Total supply | |
|------------------|-----------|----------|------------|----------|------------|------------|--------------|---------|
| From supply | ISIC 1 | ISIC 36 | ISIC 37 | | | | | |
| ISIC 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ISIC 1 |
| ISIC 36 | 0 | 0 | 0 | 0 | 0 | 147 | 147 | ISIC 36 |
| ISIC 37 | 91 | 0 | 0 | 0 | 91 | 0 | 91 | ISIC 37 |
| Others | 0 | 0 | 23 | 0 | 23 | 0 | 23 | |
| Total | 91 | 0 | 23 | 0 | 114 | 147 | 261 | |
| Households | 0 | 0 | 90 | 0 | 90 | 0 | 90 | |
| Total use | 91 | 0 | 113 | 0 | 204 | 147 | 351 | |

Source: Experiences in Water Statistics and Accounts (Mahmoud Alkhalwale, Department of Statistics, Jordan). 2009. World Water Forum 2009. Istanbul, Turkey. Session 6.4.2. <http://unstats.un.org/unsd/envaccounting/workshops/wwf2009/lod.htm>.

Table IV.4
Mean Annual Water Consumption for All Uses in Bahrain (1985-2005) (Mcm)
() 2005-1985

| Year | X | 1000 | L/D | Groundwater | | | Desalinated water | | | Treated water | | | Grand total | | | Use % | | | |
|------|-----|------|-----|-------------|-------------|------------|-------------------|----------|-------------|---------------|-------|-------------|-------------|-------------|------------|-------|----------|-------------|------------|
| | | | | Domestic | Agriculture | Industrial | Total | Domestic | Agriculture | Industrial | Total | Agriculture | Domestic | Agriculture | Industrial | Total | Domestic | Agriculture | Industrial |
| 1985 | 383 | 573 | | 44 | 100 | 5 | 149 | 41.0 | 0.4 | 1.9 | 43 | 0 | 85 | 100 | 7 | 192 | 44 | 52 | 4 |
| 1986 | 391 | 596 | | 42 | 109 | 5 | 157 | 47.4 | 0.5 | 2.2 | 50 | 0 | 90 | 109 | 8 | 207 | 43 | 53 | 4 |
| 1987 | 400 | 617 | | 53 | 117 | 6 | 176 | 42.2 | 0.4 | 2.0 | 44 | 0 | 95 | 118 | 8 | 220 | 43 | 53 | 3 |
| 1988 | 408 | 634 | | 52 | 108 | 6 | 166 | 47.0 | 0.5 | 2.2 | 49 | 2 | 99 | 110 | 8 | 217 | 46 | 51 | 4 |
| 1989 | 417 | 656 | | 58 | 114 | 6 | 178 | 46.4 | 0.5 | 2.2 | 49 | 2 | 105 | 117 | 8 | 230 | 46 | 51 | 3 |
| 1990 | 426 | 658 | | 55 | 123 | 6 | 184 | 51.7 | 0.5 | 2.4 | 54 | 4 | 107 | 128 | 8 | 243 | 44 | 53 | 3 |
| 1991 | 436 | 631 | | 51 | 121 | 5 | 178 | 53.5 | 0.6 | 2.5 | 56 | 6 | 105 | 128 | 8 | 241 | 44 | 53 | 3 |
| 1992 | 454 | 636 | | 50 | 136 | 6 | 192 | 59.1 | 0.6 | 2.8 | 62 | 8 | 109 | 144 | 8 | 262 | 42 | 55 | 3 |
| 1993 | 472 | 648 | | 60 | 139 | 6 | 205 | 55.7 | 0.6 | 2.6 | 58 | 8 | 116 | 148 | 9 | 273 | 43 | 54 | 3 |
| 1994 | 491 | 617 | | 58 | 151 | 6 | 215 | 57.1 | 0.6 | 2.7 | 60 | 11 | 115 | 163 | 9 | 287 | 40 | 57 | 3 |
| 1995 | 511 | 574 | | 62 | 159 | 7 | 227 | 50.1 | 0.5 | 2.4 | 53 | 12 | 112 | 171 | 9 | 292 | 38 | 59 | 3 |
| 1996 | 532 | 564 | | 57 | 169 | 7 | 233 | 56.7 | 0.6 | 2.7 | 59 | 13 | 114 | 183 | 10 | 307 | 37 | 60 | 3 |
| 1997 | 554 | 552 | | 61 | 178 | 7 | 247 | 55.2 | 0.6 | 2.6 | 58 | 13 | 116 | 192 | 10 | 318 | 37 | 60 | 3 |
| 1998 | 577 | 544 | | 62 | 181 | 8 | 250 | 57.3 | 0.6 | 2.7 | 60 | 12 | 119 | 193 | 10 | 322 | 37 | 60 | 3 |
| 1999 | 600 | 532 | | 62 | 170 | 6 | 239 | 58.5 | 0.6 | 2.8 | 61 | 14 | 121 | 185 | 9 | 315 | 38 | 59 | 3 |
| 2000 | 625 | 556 | | 53 | 160 | 6 | 219 | 77.6 | 0.8 | 3.7 | 81 | 15 | 130 | 175 | 10 | 315 | 41 | 56 | 3 |
| 2001 | 651 | 570 | | 52 | 137 | 5 | 195 | 86.0 | 0.9 | 4.1 | 90 | 15 | 138 | 154 | 9 | 301 | 46 | 51 | 3 |
| 2002 | 677 | 559 | | 54 | 142 | 5 | 201 | 87.3 | 0.9 | 4.1 | 91 | 16 | 141 | 158 | 9 | 309 | 46 | 51 | 3 |
| 2003 | 705 | 567 | | 54 | 136 | 5 | 195 | 94.1 | 1.0 | 4.4 | 99 | 19 | 149 | 156 | 9 | 314 | 47 | 50 | 3 |
| 2004 | 734 | 575 | | 55 | 130 | 5 | 190 | 100.9 | 1.1 | 4.8 | 106 | 19 | 156 | 156 | 10 | 322 | 49 | 48 | 3 |
| 2005 | 764 | 572 | | 57 | 128 | 5 | 190 | 104.6 | 1.1 | 4.9 | 110 | 21 | 161 | 158 | 10 | 329 | 49 | 48 | 3 |

Source: Bahrain Country Paper. Ministry of Electricity and Water. 2008.

Table IV.5 الجدول
Pilot SEEAW Physical Use, Bahrain, 2005 (Mcm)
() 2005

| | Industries by ISIC categories | | | | | | | | Households | Rest of the world | Total | | | |
|----------------------------------|--|------------------|----------|------------|----------|----------|-------------------|------------|------------|-------------------|------------|--------------|-----------|--------|
| | ISIC 1-3 | ISIC 5-33, 41-43 | ISIC 35 | ISIC 36 | ISIC 37 | ISIC 55 | ISIC 38,39, 45-99 | Total | | | | | | |
| From the environment | i. Total abstraction (i.a+i.b) | 128 | 5 | 0 | 160 | 0 | 0 | 0 | 293 | 7 | | 300 | (-1+ -1) | -1 |
| | i.a Abstraction for own use | 128 | 5 | | 1 | | | | 134 | 7 | | 141 | | -1 |
| | i.b Abstraction for distribution | 0 | | | 159 | | | | 159 | | | 159 | | -1 |
| | i.b.1 From water resources: | 128 | 5 | 0 | 50 | 0 | 0 | 0 | 183 | 7 | 0 | 190 | : | 1- -1 |
| | i.b.1.I Surface water | | | | | | | | 0 | | | 0 | | -1- -1 |
| | i.b.1.II Groundwater | 128 | 5 | | 50 | 0 | | | 183 | 7 | | 190 | | -1- -1 |
| | i.b.1.III Soil water | | | | | | | | 0 | | | 0 | | -1- -1 |
| | i.b.2 From other sources | 0 | 0 | 0 | 110 | 0 | 0 | 0 | 110 | 0 | 0 | 110 | | 2- -1 |
| | i.b.2.I Collection of precipitation | | | | | | | | 0 | | | 0 | | -2- -1 |
| | i.b.2.II Abstraction from the sea | | | | 110 | | | | 110 | | | 110 | | -2- -1 |
| Within the economy | ii. Use of water received from other economic units (ii.a+ii.b+ii.c) | 21 | 4 | 0 | 0 | 0 | 0 | 0 | 25 | 126 | | 151 | | -2 |
| | of which: | | | | | | | | | | | | | |
| | ii.a Reused water | 21 | | | | | | | 21 | | | 21 | | -2 |
| | ii.b Wastewater to sewerage | | | | | | | | | | | | | -2 |
| ii.c Distributed water | 0 | 4 | | | | | | 4 | 126 | | 130 | | -2 | |
| Total use of water (i+ii) | 149 | 9 | 0 | 160 | 0 | 0 | 0 | 318 | 133 | 0 | 451 | (2+1) | | |

Source: Bahrain Country Paper. Ministry of Electricity and Water. 2008.

Table IV.6
Egypt Water Balance 2002-2007 (Billion cubic metres)
() 2007-2002

| | 2002/2003 | 2003/2004 | 2004/2005 | 2005/2006 | 2006/2007 |
|--|--------------|--------------|--------------|--------------|--------------|
| Water Resources | | | | | |
| Share of Nile Water | 55.5 | 55.5 | 55.5 | 55.5 | 55.5 |
| Groundwater on Valley and Delta | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 |
| Recycling of agricultural water | 4.4 | 4.8 | 5.1 | 5.4 | 5.7 |
| Recycling of sewage water | 0.9 | 1 | 1.1 | 1.2 | 1.3 |
| Rains and Floods | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 |
| Desalination of sea water | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| Total | 68.26 | 68.76 | 69.16 | 69.56 | 69.96 |
| Uses of Water | | | | | |
| Agriculture | 57.8 | 58.1 | 58.5 | 59 | 59.3 |
| Waste evaporation from Nile and Canals | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 |
| Provincial | 5.4 | 5.6 | 5.8 | 6.1 | 6.5 |
| Industry | 1.1 | 1.1 | 1.15 | 1.15 | 1.15 |
| River Navigation | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Total | 66.6 | 67.1 | 67.8 | 68.6 | 69.3 |

Source: Annual Statistical Yearbook 2008, Ministry of Water Resources and Irrigation, Egypt.

Overview of Environmental Expenditure in the ESCWA Region

Environmental expenditure is part of the public expenditure of any country. The constant struggle to protect the environment has been the boost for monitoring and managing environmental expenditure in every country so as to halt environmental degradation.

In the European Union, along the main lines of action for the development of a green national accounting framework, 20 EU countries plus Switzerland and Norway have a programme of environmental accounting, six of which have a legal basis for the accounts. Efforts by the EU were focused, in the short term, on the compilation of environmental protection expenditures and air emission modules of the accounts.²²

Despite the importance of environmental expenditure, its accountability has not been introduced yet into the ESCWA countries' governments' yearly public expenditure plan. In ESCWA countries, reports as well as the actual expenditure on environmental issues are scarce. Only two out of the 14 ESCWA countries account for the environmental expenditure in the public environmental plan.

Public Environmental Expenditure in Jordan

Public environmental expenditures in Jordan, based on UNSEEA 2003 (particularly the Environmental Protection Expenditure Account, EPEA) and compatible with the Classification of Environmental Protection Activities and Expenditure CEPA, were presented as a research thesis in 2008.²³

The results of the study showed that, in aggregate terms, public environmental expenditures have increased from about JD 220 million in 2000 to about JD 306 million in 2007 in constant prices (2000=100). Total public expenditure on the environment (PEE) as a percentage of GDP was 3.7 per cent in 2007 (table IV.7). Expressed as a percentage of total governmental expenditures, the public environmental expenditures amounted to 8.1 per cent.

| | |
|---------|------------|
| | 20 |
| | (13) |
| | 2008 |
| | () 2003 |
| | (14) |
| 2000 | 220 |
| 2007 | 306 |
| 3.7 | (100=2000) |
| (IV.7) | 8.1 |

²² Eurostat 2008. Revised European Strategy for Environmental Accounting. CPS 2008/68/7/EN – 18/09/2008.

²³ K. Alshatarat. 2008. Comparing Public Environmental Expenditures with Environmental Priorities-Jordan. UNESCO-IHE Institute for Water Education.

Most of the public environmental expenditure stems from budgetary sources (treasury), typically at a 70 per cent average of total PEE over the period (2000-2007) and at a 30 per cent average of total PEE over the same period from off-budgetary sources like foreign loans, grants and other sources.

()
70
.2007 2000

Environmental expenditure programmes were reflected in 3 out of 6 activities linked to the progress indicators of Goal 7. The largest percentage of money was spent on the water sector (65 per cent) in 2007 including 51 per cent on providing improved drinking water sources to the population and 8 per cent on improved sanitation facilities, which indicates that this is the upmost priority of the Jordanian government (table IV.8). Expenditures on waste management reached 7 per cent and on pollution abatement 9 per cent in 2007. The environmental expenditures in other domains such as biodiversity, forests and research and development did not exceed 2 per cent each (table IV.8).

6 3
7
51 2007 65
8
)
7 .(IV.8
.2007 9
2
. (IV.8)

Public Environmental Expenditure in Lebanon

Lebanon has been monitoring public environmental expenditures since 2001. In its publications,²⁴ Lebanon has also accounted for the cost of environmental degradation of several important environmental problems. Table IV.9 shows the environmental expenditure of the Lebanese government from 2001 till 2005, as well as the cost of environmental degradation of water for the years 2000 and 2005.

(15) .2001
IV.9
2005 2001
.2005 2000

²⁴ Council for Development and Reconstruction (CDR) progress report 2004 to 2007.

Table IV.7
Environmental Expenditure at Constant Prices in Jordan
(2000=100), (2000-2007)

| Economic indicators of environmental expenditure | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|--|----------|---------|---------|---------|---------|---------|---------|---------|
| GDP at Constant Prices (Million JD) | 5,989.10 | 6,181.3 | 6587.1 | 6,841.3 | 7,522.8 | 7,845.2 | 8,083.8 | 8,230.7 |
| Total Governmental Expenditure (MJD) | 2,529.00 | 2,636.6 | 2,695.7 | 3,075 | 3,352.4 | 3,497.2 | 3,698.7 | 3,794.7 |
| Environmental Expenditure (MJD) | 219.9 | 249 | 230.4 | 226.8 | 232.8 | 245.9 | 283.4 | 306.1 |
| % of GDP | 3.7 | 4 | 3.5 | 3.3 | 3.1 | 3.1 | 3.5 | 3.7 |
| % of Total Governmental Expenditure | 8.7 | 9.4 | 8.5 | 7.4 | 6.9 | 7 | 7.7 | 8.1 |

Source: Data for GDP and General government expenditure by Department of Statistics. PEERs data obtained from the current MSc thesis research.

Table IV.8
Environmental Expenditure by Sector in Jordan

| Environmental expenditure (000 JD) | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | () |
|--|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------|
| i. Waste management | 6,333.9 | 7,462.8 | 8,426.8 | 9,618.4 | 15,646.3 | 17,838.3 | 17,644.2 | 17,539.3 | -1 |
| % of Total Expenditure | 4 | 4 | 5 | 6 | 9 | 10 | 8 | 7 | |
| 2. Expenditures on Protection of biodiversity and landscapes | 2,454.7 | 2,830.9 | 3,281.4 | 4,201.3 | 4,850.3 | 4,639.7 | 4,068.6 | 3,585.5 | -2 |
| % of Total Expenditure | 1.6 | 1.6 | 2 | 2.7 | 2.9 | 2.6 | 1.9 | 1.4 | |
| 3. PAC Expenditure | 8,073.4 | 6,636.7 | 6,626.9 | 8,380.3 | 7,604.9 | 6,937.8 | 17,850.1 | 23,362.7 | -3 |
| % of Total Expenditure | 5 | 4 | 4 | 5 | 5 | 4 | 8 | 9 | |
| 4. Water Sector | 91,617.6 | 86,227.3 | 106,391.9 | 106,176.1 | 91,429.5 | 119,486.8 | 142,213.4 | 165,516 | -4 |
| % of Total Expenditure | 59 | 48 | 66 | 67 | 55 | 67 | 67 | 65 | |
| 4.1. Water supply | 94,650.3 | 93,613.7 | 73,733.6 | 104,994.5 | 112,264.1 | 91,663.7 | 73,001.7 | 78,554 | 1-4 |
| % of Total Expenditure | 59 | 59 | 44 | 59 | 53 | 36 | 41 | 51 | |
| 4.2. Wastewater management | 11,741.6 | 12,562.4 | 17,695.8 | 14,852.3 | 29,949.3 | 73,852.3 | 13,225.6 | 13,063.6 | 2-4 |
| % of Total Expenditure | 7 | 8 | 11 | 8 | 14 | 29 | 7 | 8 | |
| 5. Expenditures on Housing & Urban Development | 12,538 | 15,979 | 14,348 | 10,974 | 11,504 | 13,335 | 19,061 | 29,820 | 5 |
| % of Total Expenditure | 8 | 9 | 9 | 7 | 7 | 7 | 9 | 12 | () |
| 6. Research and development | 2,273.5 | 2,634.4 | 3,629.9 | 2,257.9 | 3,260.6 | 2,275 | 2,430.5 | 4,563 | -6 |
| % of Total Expenditure | 1.5 | 1.5 | 2.3 | 1.4 | 2 | 1.3 | 1.1 | 1.8 | |
| 7. Environmental Protection n.e.c. | 29,638.3 | 56,323.3 | 16,666.3 | 15,374.3 | 30,206.5 | 11,903.7 | 5,648.9 | 5,179 | -7 |
| % of Total Expenditure | 19.2 | 31.4 | 10.4 | 9.7 | 18.2 | 6.7 | 2.7 | 2 | |
| 8. Forestry Expenditure (000 JD) | 1,414.6 | 1,452.1 | 1,459.2 | 1,414.3 | 1,459.7 | 1,480.2 | 2,605.5 | 3,473.2 | -8 |
| % of Total Expenditure | 0.9 | 0.8 | 0.9 | 0.9 | 0.9 | 0.8 | 1.2 | 1.4 | () |
| Total expenditure by sector (000 JD) | 154,344.0 | 179,546.5 | 160,830.4 | 158,396.6 | 165,961.8 | 178,256.5 | 211,522.2 | 253,038.7 | () |
| (Mn JD) | 154.3 | 179.5 | 160.8 | 158.4 | 166.0 | 178.3 | 211.5 | 253.0 | () |
| | 65.6 | 69.4 | 69.6 | 68.4 | 66.8 | 67.6 | 71.9 | 53.1 | () |
| Total expenditure (Mn JD) | 219.9 | 249.0 | 230.4 | 226.8 | 232.8 | 245.9 | 283.4 | 306.1 | () |

Sources: Physical data obtained from forest & Range lands Directorate, Public Environmental Expenditures (PEE) data obtained from the current MSc thesis research, Physical data obtained from RSCN. PEER data obtained from the current MSc thesis research, Housing and Urban Development Corporation (HUDC), data obtained from analyzing the annual reports, Data for GDP and General government expenditure by Department of Statistics.

Table IV.9
Selected Indicators For Lebanon

| | 2000 | 2001 | 2002 ^{a/} | 2003 | 2004 | 2005 | 2006 | 2007 |
|--|-----------------------|----------------------|----------------------|----------------------|----------------------|---------|----------------------|------|
| Cost of Environmental Degradation (thousand US Dollars) | 565,000 ^{a/} | ... | ... | ... | ... | ... | ... | ... |
| Cost of Environmental Degradation of Air (thousand US Dollars) | 170,000 ^{a/} | ... | ... | ... | ... | ... | ... | ... |
| Cost of Environmental Degradation of Water (thousand US Dollars) | 175,000 ^{a/} | ... | ... | ... | ... | 175,000 | ... | ... |
| Cost of Environmental Degradation of Soil and Wildlife (thousand US Dollars) | 100,000 ^{a/} | ... | ... | ... | ... | ... | ... | ... |
| Cost of Environmental Degradation of Coastal Areas and Cultural Heritage (thousand US Dollars) | 110,000 ^{a/} | ... | ... | ... | ... | ... | ... | ... |
| Cost of Environmental Degradation from waste (thousand US Dollars) | 10,000 ^{a/} | ... | ... | ... | ... | ... | ... | ... |
| Environmental expenditure on water management (thousand US Dollars) ¹ | ... | 48,592 ^{b/} | 27,509 ^{c/} | 35,336 ^{d/} | 10,287 ^{e/} | ... | 40,262 ^{f/} | ... |
| Environmental expenditure on wastewater management (thousand US Dollars) ¹ | ... | 29,955 ^{b/} | 85,163 ^{c/} | 16,483 ^{d/} | 9,758 ^{e/} | ... | 27,447 ^{f/} | ... |
| Environmental expenditure on waste management (thousand US Dollars) ¹ | ... | 2,580 ^{b/} | 30,257 ^{c/} | 1,761 ^{d/} | 367 ^{e/} | ... | 196 ^{f/} | ... |

Sources: ^{a/} Cost of Environmental Degradation, The case of Lebanon and Tunisia. World Bank Environmental Department, 2004.

^{b/} Council for Development and Reconstruction (CDR) Progress Report 2002.

^{c/} Council for Development and Reconstruction (CDR) Progress Report 2003.

^{d/} Council for Development and Reconstruction (CDR) Progress Report 2004.

^{e/} Council for Development and Reconstruction (CDR) Progress Report 2005.

^{f/} Council for Development and Reconstruction (CDR) Progress Report 2007.

Notes: 1. These figures include the Council for Development and Reconstruction (CDR) approved contracts only, other public and/or private contracts are not accounted for in these figures for lack of information.

2. The high figures for 2002 in comparison with other years are related to international funding in these sectors during this specific year.

Overview of Lebanon Oil Spill

In July 2006, Israel targeted oil reservoirs at the Jiyeh storage tanks as part of the on-going war at that time on Lebanon.

2006 /

| Box IV.1 Summary of the Oil Spill, Lebanon* | |
|---|---------------------------------------|
| Date of the spilling | 13-15 July 2006 |
| Storage tank capacity (tons) | 44,000 |
| Amount of oil spilled (tons) | 12,000-15,000 |
| First clean-up operation | August 06 |
| Type of oil spilled | Heavy crude oil and residual products |
| Estimated affected area (sq. km) | 1.5 |
| Medical Waste (tons) | 200-250 |
| Water quality and water facilities (million US\$) | 131.4 |

* World Bank, Republic of Lebanon Economic Assessment of Environmental Degradation due to July 2006 Hostilities, 2007.

| * -IV.1 | |
|---------------|-----|
| 2006 / 15-13 | () |
| 44.000 | () |
| 15 000-12 000 | () |
| 2006 / | () |
| 1.5 | () |
| 250-200 | () |
| 131.4 | () |

The oil spill impacted the Lebanese seawater, marine life and biodiversity, palm islands reserve and the economic status of the near-to-shore population. Since Lebanon is not equipped with emergency plans for such cases, the help of the international organizations as well as the community was a must. The World Bank estimated the economic assessment of the environmental degradation related directly to the oil spill, as summarized in table IV.10.

.IV.10

Table IV.10
Economic Impact of the July 2006 Hostilities on the Environment in Lebanon
2006 /

| | Amount | |
|---|----------|-----|
| Impact on the Palm Island (million US Dollars) | 1.7- 2.2 | () |
| Impact on Fishing (million US Dollars) | 3.2-6.5 | () |
| Rubble and Demolition waste (Mcm) | 5.75 | () |
| Medical Waste Generated (tons) | 200-250 | () |
| Water quality and water facilities (million US Dollars) | 131.4 | () |
| Forest Fire impact (million US Dollars) | 6.4-10.2 | |
| Impact on Protected Areas (thousand US Dollars) | 150 | () |
| Impact on the National Reforestation Plan (thousand US Dollars) | 401 | () |
| Agriculture loss (million US Dollars) | 268.02 | () |

Source: World Bank, Republic of Lebanon, Economic Assessment of Environmental Degradation due to July 2006 Hostilities, 2007.

CHAPTER V. WASTE MANAGEMENT

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Statistical Highlights

- Major data gaps exist as to waste generation, collection and treatment in ESCWA countries. Waste statistics are only collected regularly in Kuwait, Palestine and Yemen
- Municipal waste quantity in Kuwait increased from 853 thousand tons in 2000 to 1,001 thousand tons in 2007
- Hazardous waste generation was 71 thousand tons in Jordan in 2005, 29.7 thousand tons in Palestine in 2006 and 30.1 thousand tons in Saudi Arabia in 2004
- The majority of solid waste is landfilled in ESCWA countries
- In 2005, Iraq had 237 landfills, Jordan 21 landfills, Palestine 164 landfills and Yemen 19 landfills

| | | | | | | | | |
|------|------|-------|------|-----|------|------|--|----|
| | | | | | | | | -1 |
| | 2007 | 1 001 | 2000 | 853 | | | | -2 |
| 2006 | | 29.7 | 2005 | 71 | | | | -3 |
| | | | 2004 | | | 30.1 | | -4 |
| | 164 | 21 | 237 | | 2005 | | | -5 |
| | | | | | 19 | | | |

Overview of Waste Management in the ESCWA Region

Waste generation and management form an environmental issue. In view of the population growth and the increase in waste generation, waste management programmes in ESCWA countries are still under-developed.

The majority of ESCWA countries uses landfills or open dumps for waste disposal. Recycling, composting and reuse of solid waste are very scarce in the region. However, recycling could be a very important solution to control the amount of waste disposal. Not only waste volumes in landfills will be minimized, but also the economic benefit of reusing solid waste is important in creating an incentive for developing such projects, if not on the national level, on the personal and communal levels.

Data collection on waste is very limited in the ESCWA countries, unlike the European Union where a data center on waste was established and countries are mandated to provide information (box V.1). Not until recently, ESCWA member countries began to collect data for municipal waste. Since not all the population within the country is covered by the waste collection system, available data is limited to large and urban cities and does not cover but few sectors (municipal, industrial, construction...) instead of all the waste generating sectors. The classification of waste data in the ESCWA countries is very random, which hinders the comparison and analysis among all countries.

Most of the municipal solid waste is disposed of in open dumps. Municipal waste data is available in several countries (table V.1); however data for 2007 is only available for Kuwait and Yemen.

Total solid waste data is available for Kuwait for instance, where it covers the construction, municipal and agriculture, forestry and fishing sectors for the years of 2000 till 2007 (table V.2).

Hazardous waste is monitored in Jordan and Palestine. In Egypt, about seven hundred thousand tons of hazardous waste were

(V.1)

(...)

2007 (V.1)

(V.2) 2007 2000

7 000
.2007

generated in 2007. In Palestine for example, hazardous waste quantity varied greatly throughout the years, from 11 thousand tons in 2005, to 30 thousand tons in 2006 and 4.5 thousand tons in 2007 (table V.3).

| | | | |
|-------|--------|-------|--------|
| 2006 | 30 000 | 2005 | 11 000 |
| .(V.3 |) 2007 | 4 500 | |

Landfill sites are reported in Egypt, Iraq, Jordan, Lebanon, Palestine and Yemen, throughout the years depending on the country (table V.4). However, the types of the waste disposed of in these landfills are not defined.

.(V.4)

It is worth mentioning that Lebanese landfill sites comprise sea dumping sites, which enclose a significant amount of solid waste and cause an environmental catastrophe with each raining season.

Box V.1 Eurostat and the Data Centre on Waste*

Eurostat is the lead organization for three environmental data centers: on natural resources, on products (supporting the integrated product policy) and on waste.

The main objectives of the Data Centre on Waste are to:

- Provide robust data, indicators and other relevant information for the assessment of policy effectiveness;
- Manage data, perform quality assurance, and coordinate data and information managed by other bodies (Directorate General for the Environment, Eurostat, Joint Research Centre, European Environment Agency, other EU institutions and international organizations such as OECD and UN);
- Be the central entry point for data reporting under the Community legislation on waste;
- Be the reference point for answering specific policy questions related to (statistical) information on waste and the associated environmental impacts;
- Develop and coordinate the necessary methodologies to produce statistical data, information and indicators on the environmental impacts of waste generation and management taking a life cycle perspective, in cooperation with Go4 partners.

* <http://epp.eurostat.ec.europa.eu/portal/page/portal/waste/introduction>, accessed on September 2009.

-V.1

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Municipal waste composition is only reported in Palestine through the UNSD/UNEP Questionnaire on Environment for 2008. In 2006, organic material waste was 86.4 per cent, inorganic material waste 10.9 per cent and paper and paperboard 2.7 per cent (table V.5). As for Qatar, some of the waste indicators were reported for the year of 2004 (table V.6).

| | | |
|-------|---|------------|
| 2008 | | |
| 86.4 | | 2006 |
| 10.9 | | |
| (V.5) |) | 2.7 |
| | | (V.6) 2004 |

Changing the public behavior towards the environment is considered an essential component in the regional environmental strategies. A good example on the engagement of civil society is presented in box V.2. Moreover, an important mechanism consists in using economic instruments in order to achieve the desired changes, including pricing, charges, taxes and financial incentives.²⁵

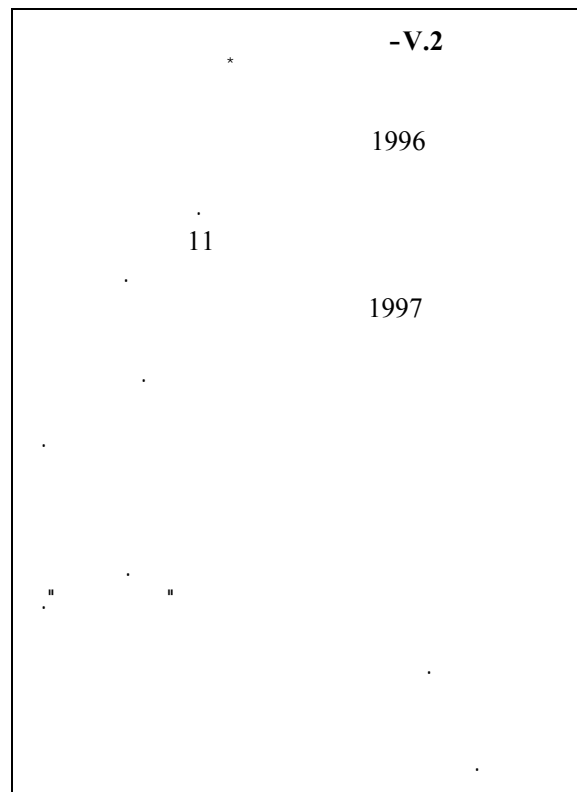
V.2

(16)

Box V.2. Communal Solidarity for Waste Management in South Lebanon *

In 1996, a lady from the village of Arabsalim, South Lebanon, decided to find a solution for the solid waste problem that invaded her town due to the lack of waste collection. With personal and communal efforts, she was able, along with 11 ladies from the same town, to teach citizens about waste sorting. These ladies managed in 1997 to get financial aid from the UNDP to improve their idea and make waste collection and management a sustainable solution for the village. They sorted the solid waste from the village and sold it to glass, metal and plastic manufactures for recycling. Due to their impressive efforts, the Italian embassy in Lebanon decided to offer them a storing building for the waste collection and sorting, and help them create a collection system consisting of a private driver that picks up the waste directly to the storing building for processing. They formed an NGO called "Nida' El-Ared" (Call of the Earth). Nowadays, this practice has spread to other areas lacking a waste collection programme, in order to improve the community's life. Working on a communal level for better waste management programmes can improve the lifestyle of the communities, despite the lack of incentives from the government.

* '101 Stories to tell', UNDP Lebanon, 2009.



²⁵ M.M. Sakkar, "Potential use of economic instruments in waste management in the Arab countries", vol. 39, No. 2 (2004), pp. 445-454.

Table V.1
Municipal Waste Generated (Thousand tons)
()

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|----------------------|------------------------|-----------------------|------------------------|------------------------|-------------------------|------------------------|------------------------|------------------------|
| Bahrain | 232 ^{a/ 1} | ... | ... | ... | ... | ... | ... | ... |
| Egypt | 14,500 ^{b/} | 14,500 ^{c/2} | ... | ... | ... | 15,500 ^{b/} | ... | ... |
| Iraq | ... | ... | ... | ... | ... | 5,446 ^{d/, 3} | ... | ... |
| Jordan | ... | 1,460 ^{e/} | ... | ... | ... | 1,875 ^{e/} | 1,839 ^{e/} | ... |
| Kuwait | 853 ^{g/} | 1,036 ^{g/} | 1,060 ^{g/} | 976 ^{h/} | 840 ^{h/} | 837 ^{h/} | 987 ^{h/} | 1,001 ^{i/} |
| Lebanon | ... | 1,440 | ... | ... | ... | ... | ... | ... |
| Oman | ... | ... | ... | ... | ... | ... | ... | ... |
| Palestine | ... | ... | ... | 860 ^{i/} | 984 ^{i/} | 996 ^{i/} | 1,039 ^{i/} | ... |
| Qatar | 266 ^{a/, 1} | ... | ... | ... | 370 ^{k/, 4} | ... | ... | ... |
| Saudi Arabia | ... | ... | ... | ... | 10,400 ^{l/, 5} | ... | ... | ... |
| Sudan | ... | ... | ... | ... | ... | ... | ... | ... |
| Syrian Arab Republic | ... | 5,480 ^{e/} | ... | ... | ... | ... | ... | ... |
| United Arab Emirates | 1,531 ^{a/, 6} | ... | ... | ... | ... | ... | ... | ... |
| Yemen | 1,267 ^{l/, 7} | 822 ^{l/, 7} | 1,310 ^{l/, 7} | 1,105 ^{l/, 7} | 1,167 ^{l/, 7} | 1,273 ^{l/, 7} | 1,382 ^{l/, 7} | 1,447 ^{l/, 7} |

Sources: a/ GCC countries and their role in environment protection and preserving natural resources, 2004.

b/ Environment Statistical Report 2007, CAPMAS, August 2009.

c/ Capmas Egypt Environment Questionnaire 2005.

d/ Iraq Central Organization for Statistics and Information Technology (COSIT) Environment Questionnaire 2006.

e/ Mediterranean Environmental Technical Assistance Program (METAP), from <http://www.metap-solidwaste.org/>, accessed on 20 June 2009.

f/ Results of the Study Liquid and Solid Wastes - Hazardous Wastes Department of Statistics Jordan.

g/ Kuwait Annual Statistical Abstract 2007.

h/ Kuwait Ministry of Planning.

i/ Kuwait Monthly Bulletin December 2008.

j/ UNSD/UNEP questionnaire on environment statistics 2008.

k/ Annual Statistical Abstract 25th Issue September 2005 (State of Qatar).

l/ The Eighth Development Plan, Ministry of Economy and Planning, 2005-2009.

Notes: 1. Municipal waste is only domestic waste.

2. range given in Egypt Environment Questionnaire is: 14-15 million tons. Activity: Purification discharges.

3. Data include waste, demolitions and scrab collected by Municipalities except in governorates of Irbil and Dhook.

4. The period 16/3/2004 to 15/3/2005. From Umm Al-Afai Landfill.

5. Estimate by Source.

6. Municipal waste is only domestic waste. Except Al-Ain Municipality, Umm al-Qaiwain Municipality and Fujaira Municipality.

7. Waste generated from big cities and not rural areas and includes Household, commercial and other activities.

Table V.2
Total Waste Generation (Thousand tons)
()

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|----------------------|-----------------------|---------------------|---------------------|---------------------|-------------------------|-----------------------|----------------------|---------------------|
| Bahrain | 372 ¹ | ... | ... | ... | ... | ... | 2,036 ² | ... |
| Egypt | 177,250 ^{a/} | 67,250 ³ | ... | ... | ... | 183,000 ^{a/} | ... | ... |
| Iraq | ... | ... | ... | ... | ... | 5,446 ⁴ | ... | ... |
| Jordan | ... | 3,324 ⁵ | 2,067 ⁶ | 414 ⁷ | 1,545 ⁸ | ... | 2,310 ⁹ | ... |
| Kuwait | 4,897 ¹⁰ | 5,297 ¹⁰ | 6,080 ¹⁰ | 5,043 ¹⁰ | 5,417 ¹⁰ | 5,771 ¹⁰ | 5,478 ¹⁰ | 5,486 ¹⁰ |
| Lebanon | ... | 1,600 ^{a/} | ... | ... | ... | ... | ... | ... |
| Oman | ... | ... | ... | ... | ... | ... | ... | ... |
| Palestine | 5 ¹¹ | 1,366 ¹² | ... | 1,881 ¹ | 3,052 ¹ | 1,007 ¹² | 20,230 ^{b/} | 5 ¹¹ |
| Qatar | 1,113 ^{c/} | ... | ... | ... | 4,370 ^{d/, 13} | ... | ... | ... |
| Saudi Arabia | 6,475 ^{d/} | ... | ... | ... | 13,100 ¹ | ... | ... | ... |
| Sudan | ... | ... | ... | ... | ... | ... | ... | ... |
| Syrian Arab Republic | ... | 5,480 ⁴ | ... | ... | ... | ... | ... | ... |
| United Arab Emirates | 5,311 ¹⁴ | ... | ... | ... | ... | ... | ... | ... |
| Yemen | 1,267 ⁴ | 822 ⁴ | 1,310 ⁴ | 1,105 ⁴ | 1,167 ⁴ | 1,273 ⁴ | 1,382 ⁴ | 1,447 ⁴ |

Sources: a/ Environment Statistical Report 2007, CAPMAS, August 2009.

b/ UNSD/UNEP questionnaire on environment statistics 2008.

c/ GCC countries and their role in environment protection and preserving natural resources, 2004.

d/ Annual Statistical Abstract 25th Issue September 2005 (State of Qatar).

Notes: 1. Waste generated from Industrial Activities and Municipal Waste only. Calculated by ESCWA.

2. Waste generated from Agriculture, Forestry and Fishing, Manufacturing Industries and Construction only. Calculated by ESCWA.

3. Waste generated from Agriculture, Forestry and Fishing, Mining and Quarrying, Construction, Industrial Activities, Other Activities and Municipal Waste only. Calculated by ESCWA.

4. Waste generated from Municipal Waste only. Calculated by ESCWA.

5. Waste Generated from Mining and Quarrying, Manufacturing Industries, Construction and Municipal waste only. Calculated by ESCWA.

6. Waste generated from Mining and Quarrying, Manufacturing Industries and Construction only. Calculated by ESCWA.

7. Waste generated from Construction, Industrial Activities and other Activities only. Calculated by ESCWA.

8. Waste generated from Construction and Other Activities only. Calculated by ESCWA.

9. Waste generated from Manufacturing Industries, Industrial Activities and Municipal waste only. Calculated by ESCWA.

10. Waste generated from Agriculture, Forestry and Fishing, Construction and Municipal waste only. Calculated by ESCWA.

11. Waste generated from Other Activities only. Calculated by ESCWA.

12. Waste generated from Other Activities and Municipal waste only. Calculated by ESCWA.

13. Covers the period from 16/3/2004 to 15/3/2005. From Umm Al-Afai Landfill.

14. Waste generated from Agriculture, Forestry and Fishing, Construction, Industrial Activities, Other Activities and Municipal Waste only.

Table V.3
Hazardous Waste

| | Hazardous Waste Generated (tons) | | | Hazardous Waste Managed (tons) | | |
|----------------------|----------------------------------|----------------------|-----------------------|--------------------------------|----------------------|---------------------|
| | () | () | () | () | () | () |
| | 2005 | 2006 | 2007 | 2005 | 2006 | 2007 |
| Bahrain | 38,202 ^{a/} | 38,740 ^{a/} | 35,008 ^{a/} | ... | ... | ... |
| Egypt | ... | ... | 692,000 ^{b/} | ... | ... | ... |
| Iraq | ... | ... | ... | ... | ... | ... |
| Jordan | 71,404 ^{a/} | ... | ... | 48,624 ^{a/} | ... | ... |
| Kuwait | ... | ... | ... | ... | ... | ... |
| Lebanon | ... | ... | ... | ... | ... | ... |
| Oman | ... | ... | ... | ... | ... | ... |
| Palestine | 10,997 ^{a/} | 29,687 ^{a/} | 4,548 ^{a/} | 10,997 ^{a/} | 29,687 ^{a/} | 4,548 ^{a/} |
| Qatar | ... | ... | ... | ... | ... | ... |
| Saudi Arabia | 30,100 ^{a/,*} | ... | ... | ... | ... | ... |
| Sudan | ... | ... | ... | ... | ... | ... |
| Syrian Arab Republic | ... | ... | ... | ... | ... | ... |
| United Arab Emirates | ... | ... | ... | ... | ... | ... |
| Yemen | ... | ... | ... | ... | ... | ... |

Sources: ^{a/} UNSD/UNEP questionnaire on environment statistics 2008.

^{b/} Egypt State of the Environment Report 2008, June 2009.

^{c/} The Eighth Development Plan, Ministry of Economy and Planning, 2005-2009.

Note: * Estimated by Source. Data refer to the year of 2004.

Table V.4
Landfills

| | Number of Landfill sites | Annual inputs to Landfill sites (Thousand tons) | Number of Landfill sites | Annual inputs to Landfill sites (Thousand tons) | Number of Landfill sites | Annual inputs to Landfill sites (Thousand tons) | Number of Landfill sites | Annual inputs to Landfill sites (Thousand tons) |
|----------------------|--------------------------|---|--------------------------|---|--------------------------|---|--------------------------|---|
| | () | () | () | () | () | () | () | () |
| | 2001 | 2001 | 2003 | 2003 | 2005 | 2005 | 2006 | 2006 |
| Bahrain | ... | ... | ... | ... | ... | ... | ... | ... |
| Egypt | ... | ... | ... | ... | ... | ... | 55 ^{a/} | 88,770 ^{a/, 1} |
| Iraq | ... | ... | ... | ... | 237 ^{b/, 2} | ... | ... | ... |
| Jordan | 26 ^{c/} | 1,643 ^{c/} | 22 ^{c/} | 1,686 ^{c/} | 21 ^c | 1,788 ^{c/} | ... | ... |
| Kuwait | ... | ... | ... | ... | ... | ... | ... | ... |
| Lebanon | 2 ^{d/} | 600 ^{d/} | ... | ... | ... | ... | ... | ... |
| Oman | ... | ... | ... | ... | ... | ... | ... | ... |
| Palestine | 137 ^{c/} | 1,350 ^{c/} | 194 ^{c/} | ... | 164 ^{c/} | ... | ... | ... |
| Qatar | ... | ... | ... | ... | ... | ... | ... | ... |
| Saudi Arabia | ... | ... | ... | ... | ... | ... | ... | ... |
| Sudan | ... | ... | ... | ... | ... | ... | ... | ... |
| Syrian Arab Republic | ... | ... | ... | ... | ... | ... | ... | ... |
| United Arab Emirates | ... | ... | ... | ... | ... | ... | ... | ... |
| Yemen | 14 ^{e/} | 822 ^{e/} | 19 ^{f/} | 1,105 ^{e/} | 19 ^{f/} | 1,273 ^{f/} | 19 ^{f/} | 1,382 ^{f/} |

Sources: a/ Egypt Correspondence with ESCWA, 2008.

b/ Iraq Central Organization for Statistics and Information Technology (COSIT) Environment Questionnaire 2006.

c/ UNSD/UNEP questionnaire on environment statistics 2008.

d/ Lebanon Central Administration of Statistics Environment Questionnaire 2006.

e/ Yemen CSO Environment Questionnaire 2005.

f/ UNSD Millennium Development Goals, database, 2008.

Notes: 1. ESCWA calculation.

2. Data include landfill sites compliant and non-compliant to environmental standards in all governorates except Irbil and Dhook.

Table V.5
Selected Indicators for Palestine

| | 2003 | 2004 | 2005 | 2006 | |
|--|---------------------|---------------------|--------------------|----------------------|---------------------|
| Waste Generation by Mining and quarrying (ISIC 05-09) (Thousand tons) | 402 ^{a/} | 743 ^{a/} | ... | 6,575 ^{a/} | (ISIC 05-09) |
| Waste Generation by Construction (ISIC 41-43) (Thousand tons) | 61 ^{a/} | 101 ^{a/} | ... | 648 ^{a/} | (ISIC 41-43) |
| Waste Generation by Industrial activities (Thousand tons) | 504 ^{b/} | 1,026 ^{b/} | ... | ... | |
| Waste Generation by Other activities (ISIC 36-39, 45-99) (Thousand tons) | 54 ^{a/} | 198 ^{a/} | 11 ^{a/} | 262 ^{a/} | (ISIC 36-39, 45-99) |
| Total waste generation (Thousand tons) | 1,390 ^{a/} | 2,027 ^{a/} | ... | 20,230 ^{a/} | |
| Composition of Municipal Waste: Textiles (per cent) | 0 ^{a/} | 0 ^{b/} | 0 ^{a/} | ... | : |
| Composition of Municipal Waste: Plastics (per cent) | 0.4 ^{b/} | 0 ^{b/} | 0.4 ^{a/} | ... | : |
| Composition of Municipal Waste: Glass (per cent) | 0 ^{a/} | 0 ^{b/} | 0 ^{a/} | ... | : |
| Composition of Municipal Waste: Paper, paperboard (per cent) | 0.1 ^{a/} | 2.6 ^{b/} | 1.8 ^{a/} | 2.7 ^{a/} | : |
| Composition of Municipal Waste: Metals (per cent) | 0 ^{a/} | 0 ^{b/} | 0 ^{a/} | ... | : |
| Composition of Municipal Waste: Organic material (per cent) | 88 ^{a/} | 84.1 ^{b/} | 81.3 ^{a/} | 86.4 ^{a/} | : |
| Composition of Municipal Waste: Organic material of which food and garden waste (per cent) | 85.5 ^{a/} | 82.6 ^{a/} | 81.3 ^{a/} | ... | : |
| Composition of Municipal Waste: Other inorganic material (per cent) | 11.5 ^{a/} | 13.3 ^{b/} | 16.5 ^{a/} | 10.9 ^{a/} | : |

Sources: a/ UNSD/UNEP questionnaire on Environment Statistics 2008.
b/PCBS reply to questionnaire - July 2005.

Table V.6
Selected Indicators for Qatar

| | 2004 | |
|--|-----------------------|---------------------|
| Waste Generation by Construction (ISIC 41-43) (Thousand tons) | 3,544 ^{a/ 1} | (ISIC 41-43) |
| Waste Generation by Other activities (ISIC 36-39, 45-99) (Thousand tons) | 5 ^{a/ 1} | (ISIC 36-39, 45-99) |
| Total waste generation (Thousand tons) | 4,370 ^{a/ 1} | |
| Composition of Municipal Waste: Plastics (per cent) | 0.5 | : |
| Composition of Municipal Waste: Paper, paperboard (per cent) | 0.1 | : |
| Municipal waste generated (Thousand tons) | 370 ^{a/ 1} | |

Source: a/ Annual Statistical Abstract 25th Issue September 2005 (State of Qatar).

Note: 1. The period 16/3/2004 to 15/3/2005. From Umm Al-Afai Landfill.

CHAPTER VI. ENERGY CONSUMPTION

-

Statistical Highlights

1. Oil consumption in 2007 amounted to 250,519 thousand tons of oil equivalent (TOE) with an average of 1,063 TOE per capita and ranged between 111 kg of oil equivalent in the Sudan and 5,332 kg of oil equivalent in Qatar
2. Natural gas consumption in 2007 was estimated at 209,725 thousand TOE with an average of 8.9 TOE per capita and ranged between 150 kg of oil equivalent in Iraq and 79 TOE in Saudi Arabia
3. Electricity consumption per capita was 99 kWh in the Sudan, 17,057 kWh in the United Arab Emirates with an average of 2,058 kWh in the ESCWA region in 2007
4. Energy consumption per capita in 2007 varied between 120 kg of oil equivalent in the Sudan and 27,339 kg of oil equivalent in Qatar, with an average of 1,952 kg of oil equivalent in the ESCWA region
5. In 2007, the average energy intensity in ESCWA was 243 kg of oil equivalent per \$1,000 PPP with a decrease of 4 per cent from 2005

| | | | | |
|--------|-------|---------|-------|----|
| | 1 063 | 250 519 | 2007 | -1 |
| | | 5 332 | 111 | |
| | 8.9 | 209 725 | 2007 | -2 |
| | | 79 | 150 | |
| 17 057 | | 99 | | -3 |
| | 2007 | | 2 058 | |
| 27 339 | | 120 | 2007 | -4 |
| | | | 1 952 | |
| 1 000 | 243 | 2007 | | -5 |
| | 2005 | 4 | | |

Overview of the Energy Sector in the ESCWA Region

Energy production and consumption are very important in the ESCWA countries known to have ample oil and natural gas resources. On the other hand, the use of oil and natural gas around the globe is increasing, leading to severe problems affecting the climate change.

The ESCWA region is known to have the largest share of proven oil and natural gas reserves of the world (50 per cent)¹⁰. However, the sustainable production and consumption of oil and natural gas are required to ensure a longer lifespan of existing resources. Table VI.1 presents the oil and natural gas reserves in the different ESCWA countries in 2007, each country's production, as well as the estimate of the reserve life-time. The lifespan of oil reserves ranged between 4 years in Bahrain, and 74 years in Iraq taking into account that the yearly production quantity remains the same as in 2007.

As for natural gas, the lifespan of the reserves varied between 8 years in Bahrain, 428 and 567 years in Qatar and Iraq respectively (table VI.1). However, the Iraqi production was halted by the war on Iraq in 2003 and has not reached its 1989 levels (box VI.1).

In 2007, oil consumption in the ESCWA countries varied between 1,793 thousand TOE in Bahrain and 102,289 thousand TOE in Saudi Arabia. As for the ESCWA region, oil consumption was estimated at 250,519 thousand TOE in 2007 compared to 236,449 thousand TOE in 2006.

The highest per capita oil consumption in the ESCWA region was reported in Qatar, the United Arab Emirates and Kuwait at 5,332, 4,832 and 4,699 kg of oil equivalent in 2007. On the other hand, the lowest per capita oil consumption was in the Sudan, Yemen and Egypt at 111, 314 and 429 kg of oil equivalent respectively. As for the ESCWA region, the average consumption per capita was 1,063 kg of oil equivalent in 2007 compared to 1,026 kg of oil equivalent in 2006 (table VI.2).

| Country | Oil Reserves (2007) | Natural Gas Reserves (2007) | Oil Production (2007) | Natural Gas Production (2007) | Oil Reserve Life-Time (2007) | Natural Gas Reserve Life-Time (2007) |
|--------------|---------------------|-----------------------------|-----------------------|-------------------------------|------------------------------|--------------------------------------|
| Bahrain | 4 | 8 | 1,793 | 1,793 | 4 | 8 |
| Qatar | 567 | 428 | 428 | 428 | 567 | 428 |
| Iraq | 50 | 567 | 567 | 567 | 50 | 567 |
| ESCWA Region | 250,519 | 236,449 | 236,449 | 236,449 | 250,519 | 236,449 |
| ESCWA Region | 4,699 | 4,832 | 5,332 | 5,332 | 4,699 | 4,832 |
| Sudan | 111 | 314 | 314 | 314 | 111 | 314 |
| Yemen | 111 | 314 | 314 | 314 | 111 | 314 |
| Egypt | 111 | 314 | 314 | 314 | 111 | 314 |
| ESCWA Region | 1,063 | 1,026 | 1,026 | 1,026 | 1,063 | 1,026 |

¹⁰ UNESCWA, Statistical Abstract of the ESCWA Region 2009.

Natural gas consumption in the ESCWA region in 2007, ranged between 2,398 and 67,000 thousand TOE in Jordan and Saudi Arabia respectively, while the total consumption in the ESCWA region was 209,725 thousand TOE.

2 398 2007
67 000
209 725

The highest per capita natural gas consumption in 2007 was 79,702 kg of oil equivalent in Saudi Arabia while the lowest consumption was 150 kg of oil equivalent in Iraq. The ESCWA region average increased from 9,169 kg of oil equivalent in 2006 to 9,367 kg of oil equivalent in 2007 (table VI.3).

79 702 2007
150
2006 9 169
(VI.3) 2007 9 367

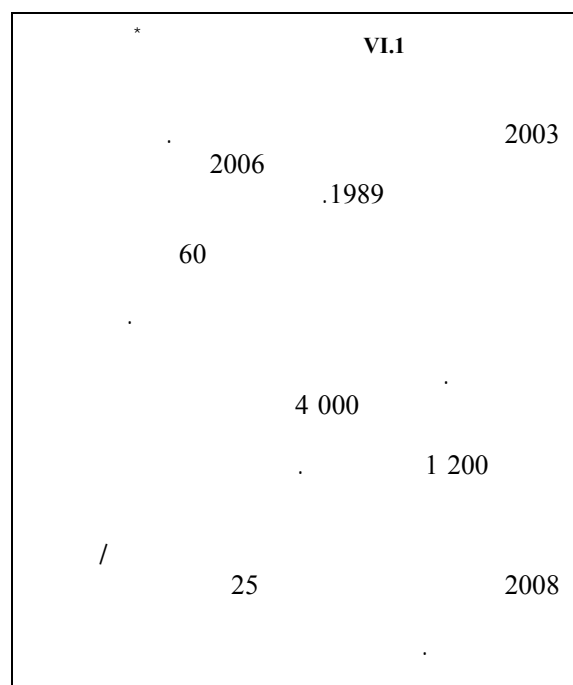
Box VI.1. Iraq and Energy Reserves*

Iraqi natural gas production has risen since 2003, and returned to levels reached during the mid-1990's. However, its 2006 dry natural gas production is still far below its peak level reached in 1989.

The Ministry of Oil reported that approximately 60 per cent of associated natural gas production is flared due to a lack of sufficient infrastructure to utilize it for consumption and export. Significant volumes of gas are also re-injected to enhance oil recovery efforts. In addition, flaring of natural gas has meant lost Liquefied petroleum gas (LPG) output of an estimated 4,000 tons per day, while at the same time LPG shortages require imports of 1,200 tons per day.

To reduce flaring, the state-owned South Gas Company signed an agreement with Shell in September 2008 to implement a 25-year project to capture flared gas and provide it for domestic use, with any surplus sent to an LNG project for export.

* www.eia.doe.gov/cabs/Iraq/NaturalGas.html, accessed on September 2009.



Electricity consumption increased in the ESCWA region from 437,431 Gwh in 2006 to 484,695 Gwh in 2007. The highest consumption was found in Saudi Arabia at 169,373 Gwh while the lowest consumption was in Palestine at 3,836 Gwh in 2007. The per capita electricity consumption somehow increased between 2006 and 2007 in the ESCWA region from 1,967 kWh to 2,058 kWh with the lowest consumption being reported in the Sudan at 99 kWh per capita in 2007 (table VI.4).

484 695 2006 437 431
.2007
169 373
3 836
.2007
1 967 2 058 2006
99 2007
(VI.4) 2007

Energy consumption includes all the abovementioned indicators with the addition of some environment-friendly energy sources, namely hydro power and wind power that exist yet scarcely in the ESCWA region.

Energy consumption in the ESCWA region is following an increasing trend, such is the world. Total energy consumption in the ESCWA region increased from 435.5 million TOE in 2005 to 455.1 million TOE in 2007. As well, the average per capita consumption in the ESCWA region increased from 1.89 TOE in 2005 to 1.95 TOE in 2007. The lowest energy consumption was observed at 120 kg of oil equivalent in the Sudan in 2007 (table VI.5).

| | |
|------|-------|
| 2005 | 435.5 |
| 2007 | 455.1 |
| 1.89 | |
| 1.95 | |
| 2005 | |
| 2007 | |
| 120 | |

Primary energy consumption in the countries of the GCC was estimated in million TOE at 290 for the year of 2006 and 311.7 in 2007. Similarly, commercial energy used per \$1,000 of GDP¹¹ was relatively high in those countries, reaching 400 kg of oil equivalent per \$1,000 PPP in 2005 in Bahrain. In 2006, the region's overall average energy efficiency amounted to 243 kg of oil equivalent per \$1,000 PPP, with a decrease of 4 per cent since 2005. The rise in energy efficiency was mainly observed in Kuwait and Lebanon (table VI.6).

| | |
|-------|------|
| 290 | 2006 |
| 311.7 | 2007 |
| 1 000 | (18) |
| 1 000 | 400 |
| 2005 | |
| 2006 | |
| 1 000 | 243 |
| 4 | |
| 2005 | |

¹¹ Energy use (kg oil equivalent) per \$1,000 GDP (PPP) is commercial energy use measured in units of oil equivalent per \$1,000 of GDP converted from national currencies using purchasing power parity (PPP) conversion factors.

Table VI.1
Oil and Natural Gas Proven Reserve, Production and Lifespan, 2007
2007

| | Oil | | | Natural Gas | | |
|-------------------------|---------------------------------|-------------------------|-----------------------------------|--|--|-----------------------------------|
| | Reserve (million barrels) | Production (000 b/d) | Reserve/ Production (years) | Reserve (Billion cubic metre) | Production (Billion cubic metre) | Reserve/ Production (years) |
| | () | (/) | (/) | () | () | (/) |
| Bahrain | 125 ^{a/} | 83 ^{a/} | 4 | 90 ^{b/} | 11.50 ^{b/} | 8 |
| Egypt | 4,100 ^{b/} | 1,162 ^{a/} | 10 | 2,060 ^{b/} | 46.50 ^{b/} | 44 |
| Iraq | 115,000 ^{b/} | 4,234 | 74 | 3,170 ^{b/} | 1.46 ^{f/} | 567 |
| Kuwait | 101,500 ^{b/} | 5,090 ^{e/} | 55 | 1,780 ^{b/} | 12.60 ^{b/} | 141 |
| Oman | 5,600 ^{b/} | 1,364 ^{d/} | 11 | 690 ^{b/} | 24.10 ^{b/} | 29 |
| Qatar | 27,400 ^{b/} | 2,004 ^{e/} | 37 | 25,600 ^{b/} | 59.80 ^{b/} | 428 |
| Saudi Arabia | 264,200 ^{b/} | 19,067 ^{e/} | 38 | 7,170 ^{b/} | 75.90 ^{b/} | 94 |
| Sudan | 6,600 ^{b/} | 931 | 19 | 84 ^{a/} | ... | ... |
| Syrian Arab Republic | 2,500 ^{b/} | 759 ^{d/} | 9 | 290 ^{b/} | 5.30 ^{b/} | 55 |
| United Arab Emirates | 97,800 ^{b/} | 5,419 ^{e/} | 49 | 6,090 ^{b/} | 49.20 ^{b/} | 124 |
| Yemen | 2,800 ^{b/} | 656 ^{d/} | 12 | 490 ^{b/} | ... | ... |
| ESCWA | 627,625 | 40,769 | | 47,514 | 286.36 | |

Sources: a/ Energy Information Administration, 2007.

b/ BP Statistical Review 2008.

c/ BP Statistical Review 2008 and OPEC Monthly Oil Market Report August 2008.

d/ BP Statistical Review 2008 and Annual statistical bulletin 2007 OPEC.

e/ Energy Information Administration, 2007 and Oil and Gas Journal.

f/ Annual statistical bulletin 2007 OPEC. For life span, 5year average production was used (5.6).

g/ OAPPEC Annual Statistical Report 2008.

Note: Reserve life is calculated by dividing the reserve over production.

Table VI.2
Total Oil Consumption and Per Capita Consumption in the ESCWA Region

| | Oil Consumption (000 TOE) | | Oil Consumption Per Capita (kg of oil equivalent) | |
|----------------------|---------------------------|----------------|---|--------------|
| | () | () | () | () |
| | 2006 | 2007 | 2006 | 2007 |
| Bahrain | 1,643 | 1,793 | 2,224 | 2,382 |
| Egypt | 30,378 | 32,370 | 410 | 429 |
| Iraq | 28,386 | 29,058 | 996 | 1,002 |
| Jordan | 4,953 | 5,279 | 865 | 891 |
| Kuwait | 13,297 | 13,396 | 4,785 | 4,699 |
| Lebanon | 4,880 | 4,681 | 1,203 | 1,142 |
| Oman | 3,441 | 3,785 | 1,351 | 1,458 |
| Qatar | 3,735 | 4,482 | 4,548 | 5,332 |
| Saudi Arabia | 91,682 | 102,289 | 3,792 | 4,135 |
| Sudan | 4,681 | 4,268 | 124 | 111 |
| Syrian Arab Republic | 12,998 | 13,396 | 670 | 672 |
| United Arab Emirates | 20,020 | 21,165 | 4,712 | 4,832 |
| Yemen | 6,743 | 7,022 | 310 | 314 |
| ESCWA | 236,449 | 250,519 | 1,026 | 1,063 |

Source: ESCWA calculation.

Table VI.3
Total Natural Gas Consumption and Per Capita Consumption in the ESCWA Region

| | Natural Gas Consumption (000 TOE) | | Natural Gas Consumption Per Capita (kg of oil equivalent) | |
|----------------------|-----------------------------------|----------------------|--|--------------------|
| | 2006 | 2007 | 2006 ^{f/} | 2007 ^{f/} |
| Bahrain | 12,060 | 12,264 ^{b/} | 16,321 | 16,294 |
| Egypt | 32,900 ^{a/} | 34,500 ^{a/} | 444 | 457 |
| Iraq | 4,344 | 4,344 ^{b/} | 152 | 150 |
| Jordan | 2,106 ^{c/} | 2,398 ^{b/} | 368 | 405 |
| Kuwait | 11,300 ^{a/} | 10,900 ^{a/} | 4,067 | 3,823 |
| Oman | 9,880 ^{d/} | 10,088 ^{d/} | 3,880 | 3,887 |
| Qatar | 17,600 ^{a/} | 17,700 ^{a/} | 21,429 | 21,056 |
| Saudi Arabia | 66,200 ^{a/} | 67,000 ^{a/} | 80,603 | 79,702 |
| Sudan ^{d/} | - | - | | |
| Syrian Arab Republic | 3,881 ^{e/} | 6,132 ^{b/} | 103 | 159 |
| United Arab Emirates | 39,000 ^{a/} | 44,400 ^{a/} | 2,010 | 2,228 |
| ESCWA | 199,270 | 209,725 | 9,169 | 9,367 |

Sources: ^{a/} BP Statistical Review 2009.

^{b/} OAPEC Annual Statistical Report 2008.

^{c/} Ministry of Energy and Mineral resources. Energy 2006 facts and figures, Jordan.

^{d/} Energy Information Administration, 2007.

^{e/} Central Bureau of Statistics, Statistical Abstract 2005, Syria.

^{f/} ESCWA calculation.

Table VI.4
Total Electricity Consumption and Per Capita Consumption in the ESCWA Region

| | Electricity Consumption (Gwh) | | Electricity Consumption Per Capita (kWh) | |
|----------------------|-------------------------------|-----------------------|--|--------------------|
| | (. . .) | (. . .) | (. . .) | (. . .) |
| | 2006 | 2007 | 2006 ^{f/} | 2007 ^{f/} |
| Bahrain | 9,102 ^{a/} | 10,689 ^{a/} | 12,558 | 14,202 |
| Egypt | 92,828 ^{a/} | 98,812 ^{a/} | 1,252 | 1,309 |
| Iraq | 15,743 ^{a/} | 15,895 ^{a/} | 552 | 548 |
| Jordan | 9,593 ^{b/} | 10,840 ^{a/} | 1,674 | 1,830 |
| Kuwait | 41,602 ^{a/} | 42,585 ^{a/} | 14,972 | 14,936 |
| Lebanon | 8,125 ^{a/} | 10,590 ^{e/} | 2,004 | 2,583 |
| Oman | 10,469 ^{d/} | 11,189 ^{a/} | 4,112 | 4,312 |
| Palestine | 938 ^{a/} | 3,590 ^{a/} | 241 | 894 |
| Qatar | 11,340 | 12,145 | 13,807 | 14,447 |
| Saudi Arabia | 163,151 ^{a/} | 169,373 ^{a/} | 6,749 | 6,848 |
| Sudan | 3,458 ^{e/} | 3,836 ^{a/} | 92 | 99 |
| Syrian Arab Republic | 25,051 ^{a/} | 26,204 ^{a/} | 1,291 | 1,315 |
| United Arab Emirates | 58,821 ^{a/} | 74,717 ^{a/} | 13,845 | 17,057 |
| Yemen | 3,210 | 4,094 ^{a/} | 148 | 183 |
| ESCWA | 453,431 | 484,695 | 1,967 | 2,058 |

Sources: ^{a/} Arab Union of Producers, Transporters and Distributor of Electricity, Statistical Bulletin 2007, Issue 16.

^{b/} Jordan Statistical Abstract 2006.

^{c/} CAS Statistical Yearbook 2007.

^{d/} Oman Statistical Yearbook 2007.

^{e/} Sudan Statistical Yearbook 2006.

^{f/} ESCWA calculation.

Table VI.5
Total Energy Consumption and Per Capita Consumption in the ESCWA Region

| | Energy Consumption (000 TOE) | | Energy Consumption Per Capita (kg of oil equivalent) | |
|----------------------|------------------------------|----------------|--|--------------|
| | () | () | () | () |
| | 2006 | 2007 | 2006 | 2007 |
| Bahrain | 13,703 | 14,007 | 18,545 | 18,610 |
| Egypt | 67,285 | 70,946 | 907 | 940 |
| Iraq | 34 227 | 34 811 | 1,201 | 1,201 |
| Jordan | 7,072 | 5,549 | 1,234 | 937 |
| Kuwait | 24,897 | 24,696 | 8,960 | 8,662 |
| Lebanon | 5,054 | 4,828 | 1,246 | 1,178 |
| Oman | 13,321 | 13,873 | 5,231 | 5,346 |
| Qatar | | | 25,977 | 27,339 |
| Saudi Arabia | 21,335 | 22,982 | 6,535 | 6,897 |
| Sudan | 157,982 | 170,589 | 133 | 120 |
| Syrian Arab Republic | 5,017 | 4,626 | 1,018 | 1,023 |
| United Arab Emirates | 19,753 | 20,395 | 13,892 | 14,968 |
| Yemen | 59,020 | 65,565 | 310 | 314 |
| ESCWA | 435,517 | 455,115 | 1,889 | 1,952 |

Source: ESCWA calculation.

Table VI.6
Energy Use (Kg oil equivalent) Per \$1,000 GDP (Constant 2005 PPP)¹
¹() ()

| | % of Change | | |
|----------------------|-------------|------------|--------------------------|
| | 2005 | 2006 | 2005-2006 |
| Bahrain | 400 | ... | - |
| Egypt | 184 | 176 | -4.3 |
| Jordan | 298 | 287 | -3.7 |
| Kuwait | 255 | 215 | -15.7 |
| Lebanon | 145 | 124 | -14.5 |
| Oman | 274 | 281 | 2.6 |
| Qatar | 285 | ... | ... |
| Saudi Arabia | 286 | 289 | 1 |
| Sudan | 280 | 257 | -8.2 |
| Syrian Arab Republic | 243 | 238 | -2.1 |
| United Arab Emirates | 228 | 214 | -6.1 |
| Yemen | 150 | 149 | -0.7 |
| ESCWA Total | 252 | 223 | -26.4² |

Source: MDG Database 2009

Notes: 1. Energy Use is the 28th indicator, of target 7A of Goal 7 of the Millennium Development on Ensuring Environmental Sustainability.

2. The percentage of change excludes Bahrain, Iraq, Palestine and Qatar.

CHAPTER VII. AIR POLLUTION

-

Statistical Highlights

1. Carbon dioxide emissions amounted to 1,030 million tons in 2005 in the ESCWA region with an increase of 14 per cent since 2000
2. ESCWA average per capita CO₂ emissions reached 4.5 tons in 2004, compared to a worldwide average of 4 tons per capita
3. The consumption of Ozone depleting substances (ODS) in the ESCWA region decreased by 58 per cent from 2002 to 2006

| | | | | |
|------|-----|-------|-----------|----|
| 2005 | | 1 030 | | -1 |
| | | 2000 | 14 | |
| 2004 | 4.5 | | 4 | -2 |
| | | 58 | | -3 |
| | | | 2006 2002 | |

Overview of Air Pollution in the ESCWA Region

The ESCWA region is endowed with energy resources, representing approximately 50 per cent of the world's oil resources and 27 per cent of natural gas resources in 2007. In some areas, however, the population still has no access to electricity, and relies on non-commercial fuels to meet energy needs.¹²

Energy consumption is driven mainly by accelerated economic growth and extreme climatic conditions (high temperatures and aridity), which requires intensive use of air conditioning and energy-rich processes for desalination. As a result, and mainly in the Gulf region, the highest per capita commercial energy consumption in the world is observed accompanied by a rise in greenhouse gas (GHG) emissions.

Climate Change: Carbon Dioxide (CO₂) and Greenhouse Gas (GHG) Emissions

According to the IPCC Fourth Assessment Report, "Climate Change 2007", the effect of climate change in Asia will have tremendous effects on the lifestyle of its inhabitants over the 21st century. West Asia, known for its arid and semi-arid climate, will experience expansion in the deserts' area and severe water stress settings. The aridity of the region will increase over the next 100 years, driving the bareness of the ground surface to increase and causing the soil moisture to evaporate. On the other hand, temperatures in West Asia, will increase of about 1.06 to 1.55 degrees Celsius in 2020,¹³ between 2 and 3.7 degrees Celsius in 2050 and between 2.7 and 6.3 degrees Celsius in 2080.¹⁴ Moreover, an increase in heavy rainfall days and annual precipitation as well as a decrease in summer precipitation will be recorded.

¹² ESCWA, *Statistical abstract of the ESCWA region*, Issue 26 (2007), which is available at: www.escwa.org.lb/divisions/scu/statabs26/index.asp.

¹³ The numbers presented are based on projections. The lowest values are estimated to be the lowest future emissions trajectory while the highest values are based on the highest future emission trajectory.

¹⁴ The Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2007 – Impacts, Adaptation and Vulnerability*, Contribution of the Working Group II to the Fourth Assessment Report, United Kingdom, 2007.

The climate change conditions will affect natural ecosystems (i.e. natural ecosystems and biodiversity), water resources (shortage in renewable water resources and increase in water demand), agricultural production and food security (due to an increase in the temperature), human health (diseases' expansion) and human dimensions (i.e. population growth, migration and urban development).¹⁵

Greenhouse gases' emissions play a very important role in climate change. CO₂ emissions and Ozone depleting substances (ODS) such as Chlorofluorocarbons (CFC) and Hydrochlorofluorocarbons (HCFC), are known to deteriorate the ozone layer with a direct effect on climate change. Since the Montreal Protocol, the phase out of CFCs has been almost completed while the use of HCFCs is being reduced.¹⁶ On the other hand, CO₂ emissions account for more than half of the GHG emissions. The highest emissions are observed in developed countries, and have led to an increase of 30 per cent of CO₂ emissions worldwide in 2005 compared to the 1990 average.¹⁷

On the ESCWA region level, CO₂ emissions have been increasing in comparison with the 1990 data. As shown in table VII.1 and figure VII.1, the 14 ESCWA countries have witnessed an increase in the CO₂ emissions from 1990 till 2006. CO₂ emissions vary greatly between ESCWA members due to the differences as to the area, population and economy of each country. Therefore, three categories can be distinguished¹⁸, The first one includes countries with CO₂ emissions varying between zero and 50,000 thousand tons per year; the second one comprises countries with CO₂ emissions ranging between 50,000 thousand and 100,000 thousand tons per year; and the third category covers countries with CO₂ emissions exceeding 100,000 thousand tons per year. Figure VII.2 shows the CO₂ emissions in the ESCWA region compared to the CO₂ emissions in the world throughout the years.

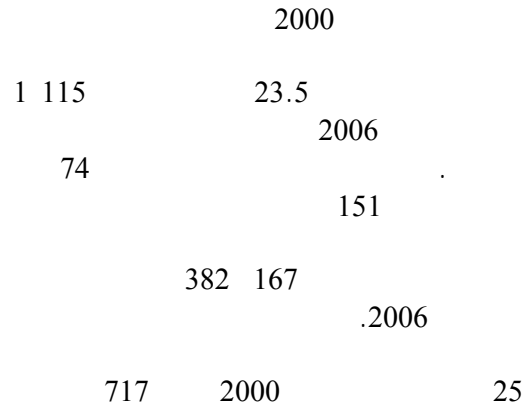
¹⁵ The Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2007 – Impacts, Adaptation and Vulnerability, Contribution of the Working Group II to the Fourth Assessment Report*, United Kingdom, 2007.

¹⁶ The United Nations, *The Millennium Development Goals Report 2008*, New York, 2008.

¹⁷ The United Nations, *The Millennium Development Goals Report 2008*, New York, 2008.

¹⁸ This category division is only created by ESCWA to simplify the figures due to the large range in values. It can not in any way be considered as a classification from the IPCC or the UNFCCC.

Emissions of carbon dioxide, which represents the main greenhouse gas, have increased in the ESCWA region since 2000 by 23.5 per cent to reach 1,115 million tons in 2006, as shown by the latest available data. The national average of 74 million tons per year increases to 151 million tons when weighted by surface area given that the two largest countries in ESCWA, namely, Egypt and Saudi Arabia, emitted 167 and 382 million tons respectively in 2006. At the subregional level, CO₂ emissions in the GCC have increased by 25 per cent since 2000 to reach 717 million tons per year.

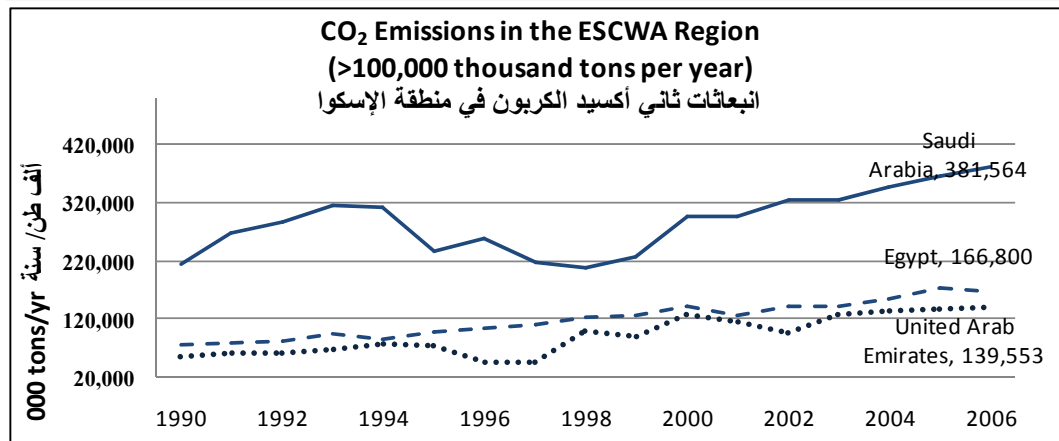
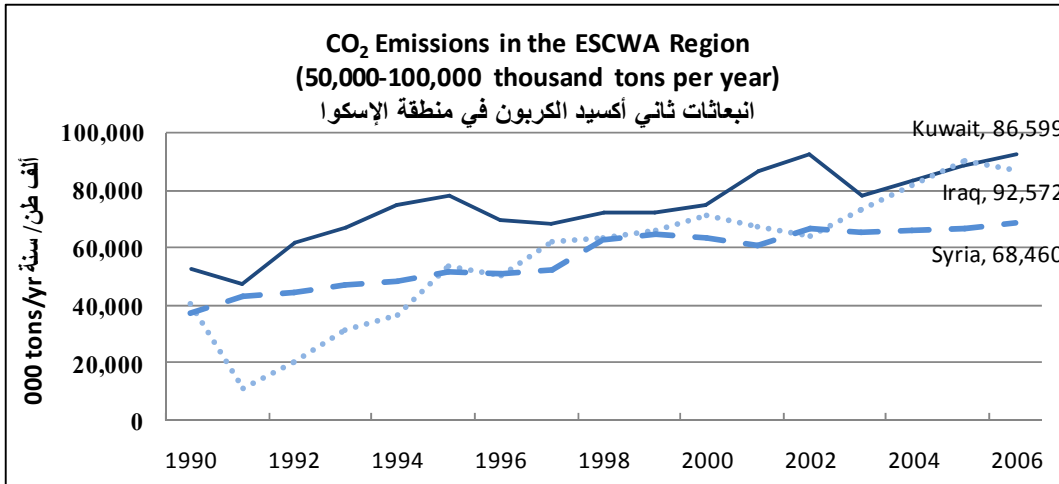
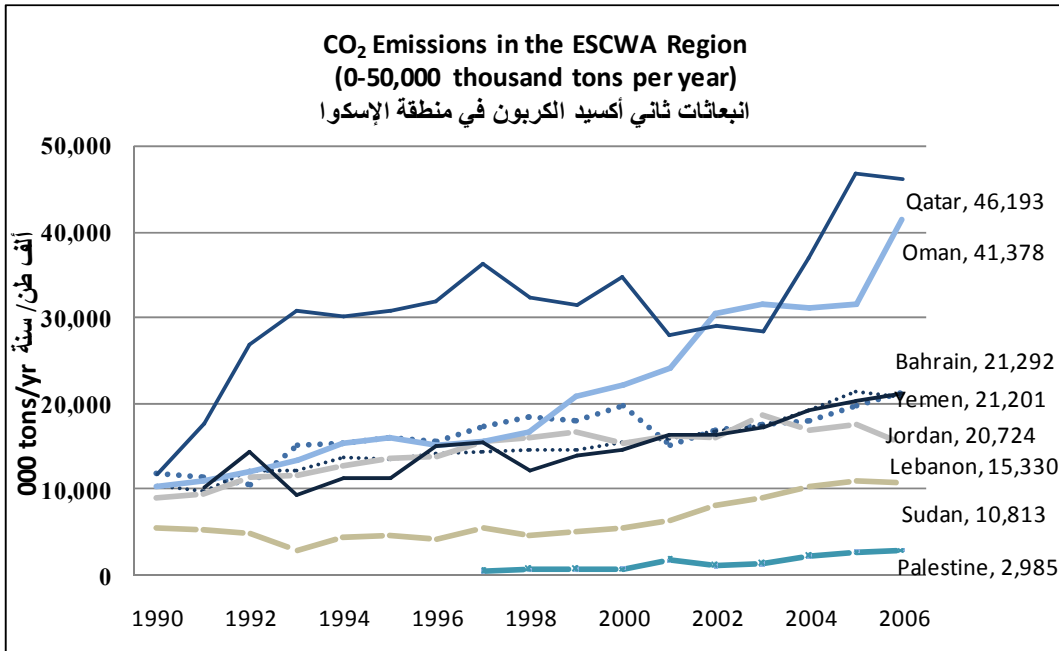


It is also worth mentioning that the Nitrous Oxide (N₂O) is playing an important role in depleting the ozone layer. Before the phase-out of CFCs, N₂O used to bond with CFC to produce ClONO₂, which has a neutral effect on the ozone layer. Although Nitrous Oxide has an impact on climate change and the depletion of the ozone layer, only Kyoto Protocol regulates and monitors its consumption quantities, knowing that the annual emission of N₂O reached 10.5 million metric tons during the 1990's.¹⁹

10.5 (26)

¹⁹ Nitrous Oxide (N₂O): The Dominant Ozone-Depleting Substance Emitted in the 21st Century. A.R. Ravinshankara, J. S. Daniel and R. W. Portmann. Science Magazine, Volume 326, 27 August 2009.

Figure VII. 1



Per capita CO₂ emissions in the ESCWA region reached 4.7 tons per year in 2006, representing an increase of about 11 per cent since 2002, compared to the world average of 4.3 tons²⁰ (table VII.2; figure VII.3). The average of CO₂ emissions per capita in the GCC was 17 tons per capita when weighted by surface area and 20 tons per capita when weighted by total population of the GCC. Bahrain, Kuwait, Qatar and the United Arab Emirates are among the top ten countries worldwide with CO₂ emissions exceeding 15 tons per capita. These rates could decline as efforts are being made to upgrade energy production and consumption efficiencies in the region and more oil companies are adopting zero emission flaming technologies and using natural gas in power and desalination plants.

| | | |
|-------|-------------------|---------|
| 2006 | | 4.7 |
| 2002 | | 11 |
| VII.2 |) ⁽²⁷⁾ | 4.3 |
| 17 | | .(VII.3 |
| 20 | | |
| | | 15 |

Such cities as Sana'a, Damascus, Baghdad and Manama, among other major cities in the ESCWA region, suffer from air pollution levels that sometimes exceed WHO guidelines.²¹ While few ESCWA member countries monitor air pollution levels systematically, available data and reports indicate that the main causes include industrial processes, inappropriate disposal of solid and hazardous waste, vehicle emissions and the burning of oil in electric power production.

(28)

The air quality in the different main cities of Egypt, Jordan, Kuwait and Saudi Arabia differs between countries. However, the one common factor between these countries is the high concentrations of Nitrogen Oxide, carbon dioxide emissions, sulfur dioxide and so on (tables VII.3, VII.4, VII.5, VII.6), when compared to WHO air quality guidelines (annex 2).

| | | |
|-------|---|--------------------|
| VII.3 |) | (VII.6 VII.5 VII.4 |
| | | .(2) |

Ozone Depleting Substances (ODS)

Since the Montreal Protocol, concerted efforts led to reductions in the consumption of Ozone depleting substances (ODS) throughout the world. From 2003 till 2007, the consumption of ODS decreased in the ESCWA region by 21 per cent (table VII.7; figures VII.4 and VII.5). In the

| | | | | |
|-------|---|---------|-------|------|
| VII.7 |) | 21 | 2007 | 2003 |
| | | .(VII.5 | VII.4 | |

²⁰ World Development Indicator, World Bank, 2008.

²¹ Y. Meslmani, "Some trends related to air pollution in Damascus", *Management of Environmental Quality*, vol. 15, No. 4 (2004), pp. 353-363; and United Nations Environment Programme (UNEP), "State of environment in the Arab region: A progress report" (UNEP/Regional Office for West Asia, 2003).

GCC subregion, consumption declined by 9 per cent, namely, from 2,932 to 2,666 metric tons.

Moreover, CFC consumption in the ESCWA region decreased by 55 per cent between 2004 and 2008 while the HCFC consumption was reduced by only 11 per cent for the same period (tables VII-8 and VII-9).

Disaggregated data on selected indicators, including halons, CFCs and ozone, is only provided by Lebanon, Qatar and Yemen (tables VII.10, VII.11 and VII.12).

Challenges in the region require tremendous efforts to decrease CO₂ emissions and phase out CFCs and HCFCs. However, a very important worldwide challenge will be raised in the Copenhagen meeting, where the future plan for the fight against climate change will be sketched.

Table VII.1
Emissions of Carbon Dioxide (CO₂) (Thousand tons per year)^{a/}
^{a/}()

| | 2000 | 2002 | 2003 | 2004 | 2005 | 2006 | 2000/06 % change | |
|---------------------------|----------------|----------------|----------------|------------------|------------------|------------------|---------------------|---------------|
| Bahrain | 19,756 | 16,823 | 17,578 | 18,055 | 19,683 | 21,292 | 7.8 | |
| Egypt | 141,317 | 140,092 | 140,004 | 153,399 | 173,481 | 166,800 | 18.0 | |
| Iraq | 74,532 | 92,484 | 77,832 | 83,178 | 88,631 | 92,572 | 24.2 | |
| Jordan | 15,506 | 16,885 | 17,490 | 19,235 | 21,333 | 20,724 | 33.7 | |
| Kuwait | 71,100 | 63,976 | 73,256 | 81,330 | 89,870 | 86,599 | 21.8 | |
| Lebanon | 15,352 | 16,038 | 18,729 | 16,889 | 17,494 | 15,330 | -0.1 | |
| Oman | 22,055 | 30,426 | 31,548 | 31,064 | 31,467 | 41,378 | 87.6 | |
| Palestine | 799 | 1,170 | 1,283 | 2,211 | 2,754 | 2,985 | 273.6 | |
| Qatar | 34,727 | 28,959 | 28,288 | 36,989 | 46,710 | 46,193 | 33.0 | |
| Saudi Arabia | 297,722 | 323,429 | 323,668 | 346,016 | 367,033 | 381,564 | 28.2 | |
| Sudan | 5,533 | 8,118 | 8,998 | 10,373 | 11,000 | 10,813 | 95.4 | |
| Syrian Arab Republic | 63,338 | 66,795 | 65,212 | 66,198 | 66,598 | 68,460 | 8.1 | |
| United Arab Emirates | 126,742 | 95,847 | 127,409 | 132,070 | 135,692 | 139,553 | 10.1 | |
| Yemen | 14,626 | 16,284 | 17,138 | 19,140 | 20,174 | 21,201 | 45.0 | |
| ESCWA^{b/} | 903,105 | 917,326 | 948,433 | 1,016,147 | 1,091,920 | 1,115,464 | 23.5 | ^{b/} |
| GCCs^{b/} | 572,102 | 559,460 | 601,747 | 645,524 | 690,455 | 716,579 | 25.3 | ^{b/} |

Sources: ^{a/} MDG Database, taken from the Carbon Dioxide Information Analysis Center (CDIAC), accessed on November 2009.

^{b/} ESCWA Calculation.

Note: Emission of Carbon Dioxide is the 28th indicator, of target 7A of Goal 7 of the Millennium Development on Ensuring Environmental Sustainability.

Table VII.2
Emissions of Carbon Dioxide Per Capita (Ton/capita)
 ()

| | 2000 | 2002 | 2003 | 2004 | 2005 | 2006 | 2000/06 % change |
|----------------------|------------|------------|------------|------------|------------|-------------|---------------------|
| Bahrain | 30.4 | 24.7 | 25.3 | 25.4 | 27.2 | 28.8 | -5.2 |
| Egypt | 2.1 | 2.0 | 2.0 | 2.1 | 2.4 | 2.2 | 5.9 |
| Iraq | 3.0 | 3.5 | 2.9 | 3.0 | 3.2 | 3.2 | 9.2 |
| Jordan | 3.2 | 3.3 | 3.4 | 3.6 | 3.8 | 3.6 | 11.9 |
| Kuwait | 31.9 | 26.2 | 28.9 | 31.1 | 33.3 | 31.2 | -2.3 |
| Lebanon | 4.1 | 4.1 | 4.8 | 4.3 | 4.4 | 3.8 | -7.1 |
| Oman | 9.2 | 12.4 | 12.8 | 12.5 | 12.6 | 16.3 | 77.0 |
| Palestine | 0.3 | 0.3 | 0.4 | 0.6 | 0.7 | 0.8 | 202.4 |
| Qatar | 56.3 | 42.2 | 38.9 | 48.4 | 58.7 | 56.2 | -0.1 |
| Saudi Arabia | 14.3 | 14.8 | 14.4 | 15.0 | 15.5 | 15.8 | 10.3 |
| Sudan | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 72.9 |
| Syrian Arab Republic | 3.8 | 3.8 | 3.6 | 3.6 | 3.5 | 3.5 | -8.0 |
| United Arab Emirates | 39.0 | 26.6 | 33.7 | 33.5 | 33.1 | 32.8 | -15.8 |
| Yemen | 0.8 | 0.8 | 0.9 | 0.9 | 1.0 | 1.0 | 21.3 |
| ESCWA average | 4.4 | 4.2 | 4.3 | 4.5 | 4.7 | 4.7 | 6.8 |
| GCCs average | | | | | | 20.1 | |

Source: ESCWA calculations, Population based on the United Nations: World Population Prospects: The 2008 Revision and the CO₂ Emissions are based on the CO₂ emissions figures from the MDG database.

Note: Emission of Carbon Dioxide Per Capita is the 28th indicator, of target 7A of Goal 7 of the Millennium Development on Ensuring Environmental Sustainability.

Table VII.3
Selected Indicators for Air Quality in Egypt

| | 1999 | 2005 | 2006 | |
|--|---------------|--------|--------|--------------------|
| Name of Site | Alexandria | | | |
| Annual Mean Concentration of Carbon Monoxide (CO) in Ambient Air in Urban City (ug/m3) | 4,000 | 2,000 | 2,000 | (CO) |
| Annual Mean Concentrations of Sulfur Dioxide (SO ₂) in Ambient Air in Urban City (ug/m3) | 7,000 | 12,000 | 17,000 | (SO ₂) |
| Annual Mean Concentrations of Nitrogen Dioxide (NO ₂) in Ambient Air in Urban City (ug/m3) | 58,000 | 53,000 | 54,000 | (NO ₂) |
| Name of Site | Greater Cairo | | | |
| Annual Mean Concentration of Carbon Monoxide (CO) in Ambient Air in Urban City (ug/m3) | 8,000 | 5,000 | 4,000 | (SO ₂) |
| Annual Mean Concentrations of Sulfur Dioxide (SO ₂) in Ambient Air in Urban City (ug/m3) | 65,000 | 46,000 | 44,000 | (SO ₂) |
| Annual Mean Concentrations of Nitrogen Dioxide (NO ₂) in Ambient Air in Urban City (ug/m3) | 58,000 | 51,000 | 56,000 | (NO ₂) |

Source: Egypt Annual Guide for Environmental Data and Indicators 2008.

Table VII.4
Selected Indicators for Air Quality in Jordan

| | 2003 | 2004 | 2005 | 2006 | |
|--|-----------------------|-----------------------|-----------------------|-----------------------|--------------------|
| Emissions of Carbon Dioxide (CO ₂) (Million tons per year) | 18.6 ^{a/} | 19.43 ^{a/} | 20.11 ^{a/} | 20.77 ^{a/} | |
| Emissions of Non-Methane Organic Compounds (NM-VOCs) (Thousand tons per year) | 46.2 ^{b/} | 48.5 ^{b/} | 50.9 ^{a/} | 53.3 ^{a/} | (NM-VOCs) |
| Emissions of Methane (CH ₄) (Thousand tons per year) | 2.3 ^{b/} | 2.4 ^{b/} | 2.5 ^{a/} | 2.7 ^{a/} | (CH ₄) |
| Emissions of Nitrous Oxide (N ₂ O) (Thousand tons per year) | 0.3 ^{b/} | 0.4 ^{b/} | 0.3 ^{a/} | 0.3 ^{a/} | (N ₂ O) |
| Emissions of Carbon Dioxide per capita (tons/capita) | 3.2 | 3.11 ^{c/} | ... | ... | 28 : |
| Emissions of Carbon Monoxide (CO) (tons per year) | 457,700 ^{a/} | 483,300 ^{a/} | 509,500 ^{a/} | 537,400 ^{a/} | |
| Emissions of Nitrogen Oxides (NO _x) (Thousand tons per year) | 113.7 ^{b/} | 118 ^{b/} | 122.2 ^{a/} | 127 ^{a/} | (NO _x) |
| Annual Mean Concentrations of Suspended Particulate Matter (< 10 µm) (SPM ₁₀) in Ambient Air in Urban City (ug/m3) | 283 ^{b/,*} | ... | ... | ... | (10) |

Sources: a/ Jordan Annual Environmental Statistics for 2006.

b/ Department of Statistics (DOS) Jordan Reply to ESCWA Questionnaire on Environment 2006.

c/ World Development Indicator, World Bank, 2008.

Note: * Urban City is Amman, Station name is Marka.

Table VII.5
Selected Indicators for Air Quality in Kuwait

| | 2005 | 2006 | |
|--|--------------|-------|--------------------|
| Name of Site | Al-Mansouria | | |
| Emissions of Nitrogen Oxides (NO _x) (ppb) | 2.374 | 0.077 | |
| Annual Mean Concentrations of Sulfur Dioxide (SO ₂) in Ambient Air in Urban City (ppb) | 2.481 | 0.02 | (SO ₂) |
| Annual Mean Concentrations of Nitrogen Dioxide (NO ₂) in Ambient Air in Urban City (ppb) | 2.28 | 0.066 | (NO ₂) |
| Emissions of Methane (CH ₄) (ppm) | 9.899 | 1.831 | (CH ₄) |
| Emissions of Non-Methane Organic Compounds (NM-VOCs) (ppb) | 8.888 | 0.658 | (NM-VOCs) |

Source: Annual Statistical Abstract 2007, Edition 44, State of Kuwait, 2008.

Table VII.6
Selected Indicators for Air Quality in Saudi Arabia

| | 1997 | 2003 | | |
|--|--------|-------|--------------------|------|
| Name of Site | Riyadh | | | |
| Annual Mean Concentration of Carbon Monoxide (CO) in Ambient Air in Urban City (PPM) | 0.75 | 0.64 | (CO) | |
| Annual Mean Concentrations of Sulfur Dioxide (SO ₂) in Ambient Air in Urban City (PPM) | 0.012 | 0.011 | (SO ₂) | |
| Annual Mean Concentrations of Suspended Particulate Matter (< 10 µm) (SPM ₁₀) in Ambient Air in Urban City (ug/m3) | 85 | 157 |) | (10 |
| Name of Site | Jeddah | | | |
| Annual Mean Concentration of Carbon Monoxide (CO) in Ambient Air in Urban City (PPM) | 0.62 | 0.51 | (CO) | |
| Annual Mean Concentrations of Sulfur Dioxide (SO ₂) in Ambient Air in Urban City (PPM) | 0.08 | 0.021 | (SO ₂) | |
| Annual Mean Concentrations of Suspended Particulate Matter (< 10 µm) (SPM ₁₀) in Ambient Air in Urban City (ug/m3) | 100 | 129 |) | (10 |

Source: The Eighth Development Plan, Ministry of Economy and Planning, Kingdom of Saudi Arabia, 2005-2009.

Table VII.7
Ozone-Depleting Substances Consumption in ODP metric tons^{1,2}
^{1,2}()

| | 2003 | 2004 | 2005 | 2006 | 2007 |
|----------------------|--------------|--------------|--------------|--------------|--------------|
| Bahrain | 125.8 | 85.3 | 85.7 | 61.1 | 43.4 |
| Egypt | 1,662.7 | 1,644.2 | 1,348.6 | 1,091.6 | 860.8 |
| Iraq | ... | ... | ... | 1,580.6 | 1,836.3 |
| Jordan | 228.6 | 196.9 | 201.2 | 150.3 | 119.5 |
| Kuwait | 450.6 | 485.8 | 373.9 | 393.1 | 427.9 |
| Lebanon | 685.0 | 432.0 | 354.6 | 290.0 | 112.4 |
| Oman | 152.2 | 118.7 | 74.1 | 58.0 | 29.6 |
| Qatar | 115.9 | 76.4 | 52.0 | 46.4 | 36.5 |
| Saudi Arabia | 1,476.0 | 1,604.4 | 1,145.4 | 1,612.6 | 1,615.8 |
| Sudan | 218.9 | 205.5 | 187.1 | 121.8 | 71.4 |
| Syrian Arab Republic | 1,654.1 | 1,302.2 | 1,100.3 | 710.8 | 372.3 |
| United Arab Emirates | 612.0 | 645.3 | 659.8 | 541.1 | 512.8 |
| Yemen | 873.6 | 856.8 | 818.3 | 535.3 | 427.5 |
| ESCWA | 8,130 | 7,568 | 6,315 | 7,132 | 6,423 |
| ESCWA average | 688.0 | 637.8 | 533.4 | 553.3 | 497.4 |

Source: MDG Database 2009, accessed 6 November 2009.

Notes: 1. Ozone-Depleting CFCs Consumption is the 28th indicator, of target 9 of Goal 7 of the Millennium Development on Ensuring Environmental Sustainability.

2. Country Data.

Table VII.8
CFC Consumption (ODP metric tons) in the ESCWA region
 ()

| | 2004 | 2005 | 2006 | 2007 | 2008 | Share of | Share of | % change |
|------------------------------------|---------------|---------------|---------------|---------------|--------------|-----------------|----------------|------------|
| | | | | | | ESCWA Total (%) | World total(%) | |
| | | | | | | 2007 | 2007 | 2007/2008 |
| Bahrain | 65 | 59 | 32 | 15 | 12 | 0.4 | 0.1 | -20 |
| Egypt | 1,048 | 821 | 594 | 242 | 188 | 6.9 | 1.6 | -22 |
| Iraq | ... | ... | 1,414 | 1,686 | 1,597 | 48.4 | 11.0 | -5 |
| Jordan | 58 | 60 | 22 | 24 | 6 | 0.7 | - | -75 |
| Kuwait | 233 | 153 | 107 | 68 | 33 | 2.0 | 0.4 | -51 |
| Lebanon | 347 | 287 | 224 | 75 | 34 | 2.1 | 0.5 | -55 |
| Oman | 99 | 54 | 26 | 10 | 9 | 0.3 | 0.1 | -16 |
| Qatar | 64 | 37 | 31 | 13 | ... | 0.4 | 0.1 | ... |
| Saudi Arabia | 1,150 | 879 | 850 | 658 | ... | 18.9 | 4.3 | ... |
| Sudan | 203 | 185 | 120 | 61 | 45 | 1.8 | 0.4 | -27 |
| Syrian Arab Republic | 928 | 870 | 541 | 282 | 166 | 8.1 | 1.8 | -41 |
| United Arab Emirates | 291 | 265 | 132 | 79 | ... | 2.3 | 0.5 | ... |
| Yemen | 746 | 711 | 395 | 269 | 248 | 7.7 | 1.8 | -8 |
| ESCWA* | 5,232 | 4,379 | 4,489 | 3,481 | 2,336 | 100 | 22.7 | -33 |
| World* | 65,795 | 44,174 | 37,156 | 15,346 | ... | - | 100 | ... |
| Share of ESCWA out of World | 8 | 10 | 12 | 23 | ... | | | |

Source: Ozone Secretariat website, the Data Access Center, accessed on 09 November 2009.

Note: * ESCWA calculation.

Table VII.9 الجدول
HCFC Consumption (ODP metric tons) in the ESCWA region

| | 2004 | 2005 | 2006 | 2007 | 2008 | Share of ESCWA Total | Share of World total (%) | % change 2007/2008 |
|--|---------------|---------------|---------------|---------------|---------------|----------------------------|--------------------------------|--------------------------|
| Bahrain | 20 | 27 | 29 | 29 | 39 | 1.13 | 0.1 | 35.2 |
| Egypt | 155 | 174 | 256 | 433 | 352 | 17.0 | 1.2 | -18.7 |
| Iraq | ... | ... | 96 | 109 | 107 | 4.3 | 0.3 | -2.6 |
| Jordan | 18 | 28 | 47 | 56 | 59 | 2.2 | - | 5.9 |
| Kuwait | 253 | 221 | 286 | 360 | 376 | 14.1 | 1.0 | 4.3 |
| Lebanon | 19 | 19 | 21 | 20 | 24 | 0.8 | 0.1 | 23.2 |
| Oman | 20 | 20 | 32 | 20 | 25 | 0.8 | 0.1 | 26.7 |
| Qatar | 13 | 15 | 15 | 24 | ... | 0.9 | 0.1 | ... |
| Saudi Arabia | 213 | 239 | 736 | 897 | ... | 35.2 | 2.4 | ... |
| Sudan | ... | ... | ... | 9 | 45 | 0.3 | 0.0 | 426.7 |
| Syrian Arab Republic | 45 | 60 | 49 | 45 | 97 | 1.8 | 0.1 | 113.7 |
| United Arab Emirates | 327 | 370 | 397 | 426 | ... | 16.7 | 1.1 | ... |
| Yemen | 63 | 70 | 103 | 122 | 153 | 4.8 | 0.3 | 24.9 |
| ESCWA* | 1,145 | 1,242 | 2,065 | 2,549 | 1,276 | 100 | 6.8 | -49.9 |
| World* | 30,692 | 30,758 | 31,898 | 37,217 | 42,204 | - | 100 | 13.4 |
| Share of ESCWA out of World | 3.7 | 4.0 | 6.5 | 6.8 | 3.0 | | | |

Source: Ozone Secretariat website, the Data Access Center, accessed on 09 November 2009.

Notes: * ESCWA Calculation.

Table VII.10
Selected Indicators for Air Quality in Lebanon

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | |
|--|---------------------|----------------------|----------------------|---------------------|--------------------|---------------------|---------------------|---------------------|---------|
| Consumption of ozone-depleting CFC-11 (ODP tons) (tons per year) | ... | ... | ... | ... | ... | 1.9 ^{a/} | 1.17 ^{a/} | 0.83 ^{a/} | 11- |
| Consumption of ozone-depleting CFC-12 (ODP tons) (tons per year) | ... | ... | ... | ... | ... | 216.8 ^{a/} | 71.5 ^{a/} | 32.34 ^{a/} | 12- |
| Consumption of ozone-depleting Halon-1211 (ODP tons) (tons per year) | ... | ... | ... | ... | ... | - | - | - | 1211- |
| Consumption of ozone-depleting Halon-1301(ODP tons) (tons per year) | ... | ... | ... | ... | ... | - | - | - | 1301- |
| Consumption of ozone-depleting HCFC-22 (ODP tons) (tons per year) | ... | ... | ... | ... | ... | 17.44 ^{a/} | 18.76 ^{a/} | 23.7 ^{a/} | 22- |
| Consumption of Methyl Bromide (ODP tons) (tons per year) | 212.4 ^{b/} | 205.02 ^{b/} | 154.29 ^{b/} | 77.16 ^{b/} | 43.2 ^{b/} | 42.12 ^{a/} | 19.5 ^{a/} | - | |
| Emissions of Carbon Dioxide (CO ₂) (million tons per year) | 16.54 ^{c/} | 16.39 ^{c/} | ... | ... | ... | ... | ... | ... | |
| Emissions of Carbon Dioxide per capita (tons/capita) | 4.8 ^{c/} | 4.7 ^{c/} | 5.4 | 4.1 ^{d/} | ... | ... | ... | ... | : 28 |

Sources: a/ Progress of Implementation of CPs, National Ozone Unit, Lebanon.
b/ Statistical Yearbook, 2007, Lebanon.
c/ UNSD Millennium Development Goals.
d/ World Development Indicator, World Bank, 2008.

Table VII.11
Selected Indicators for Air Quality in Qatar

| | 2004 | 2005 | 2006 | |
|--|----------------------|----------------------|----------------------|--------------|
| Consumption of Ozone-Depleting CFC-11 (ODP tons) (Tons per year) | 18.9 ^{a/} | 6.09 ^{a/} | 4.35 ^{a/} | 11- () |
| Consumption of Ozone-Depleting CFC-12 (ODP tons) (Tons per year) | 44.84 ^{a/} | 30.91 ^{a/} | 27.08 ^{a/} | 12- () |
| Consumption of Ozone-Depleting Halon-1211 (ODP tons) (tons per year) | 0 ^{a/} | 0 ^{a/} | 0 ^{a/} | 1211- () |
| Consumption of Ozone-Depleting Halon-1301(ODP tons) (tons per year) | 0 ^{a/} | 0 ^{a/} | 0 ^{a/} | 1301- () |
| Consumption of Ozone-Depleting HCFC-22 (ODP tons) (tons per year) | 230.63 ^{a/} | 272.22 ^{a/} | 325.85 ^{a/} | 22- () |
| Emissions of Carbon Dioxide per capita (tons/capita) | 69 ^{b/} | ... | ... | 28 : |

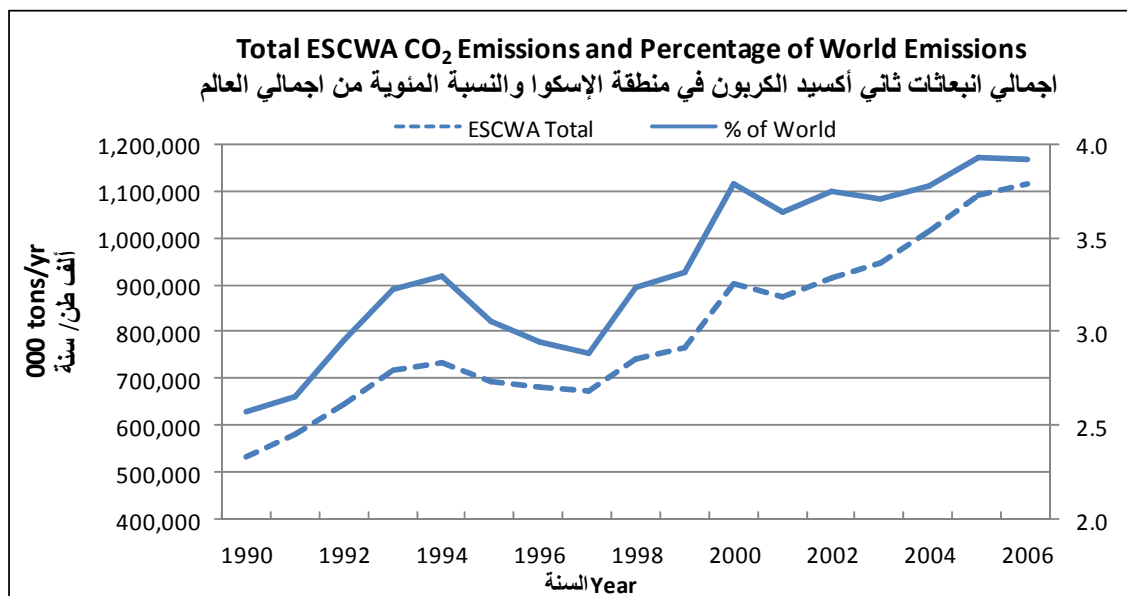
Sources: a/ Qatar Annual Abstract 2007.
b/ World Development Indicator, World Bank, 2008.

Table VII.12
Selected Indicators for Air Quality in Yemen

| | 2004 | 2005 | 2006 | 2007 | |
|--|---------------------|---------------------|---------------------|-----------------------|-------|
| Consumption of ozone-depleting CFC-11 (ODP tons) (tons per year) | 57.9 ^{a/} | 58 ^{a/} | 51.8 ^{a/} | 50.9 ^{a/} | 11- |
| Consumption of ozone-depleting CFC-12 (ODP tons) (tons per year) | 672.8 ^{a/} | 643.3 ^{a/} | 330.4 ^{a/} | 215.2 ^{a/} | 12- |
| Consumption of ozone-depleting Halon-1211 (ODP tons) (tons per year) | 0.2 ^{a/} | 0.1 ^{a/} | 0.06 ^{a/} | 0.09 ^{a/} | 1211- |
| Consumption of ozone-depleting Halon-1301(ODP tons) (tons per year) | 0.4 ^{a/} | 0 ^{a/} | 0.1 ^{a/} | 0.04 ^{a/} | 1301- |
| Consumption of ozone-depleting HCFC-22 (ODP tons) (tons per year) | 1,140 ^{a/} | 1,264 ^{a/} | 1,853 ^{a/} | 2,211.8 ^{a/} | 22- |
| Emissions of Carbon Dioxide per capita (tons/capita) | 1.03 ^{b/} | ... | ... | ... | : |

Sources: a/ Yemen Statistical Yearbook 2007.
b/ World Development Indicator, World Bank, 2008.

Figure VII.2



Note: Left axis represents the ESCWA CO₂ Emissions and the right axis represents ESCWA's percentage of CO₂ emissions out of the world.

Figure VII.3
 Emission of Carbon Dioxide per Capita in the ESCWA Region

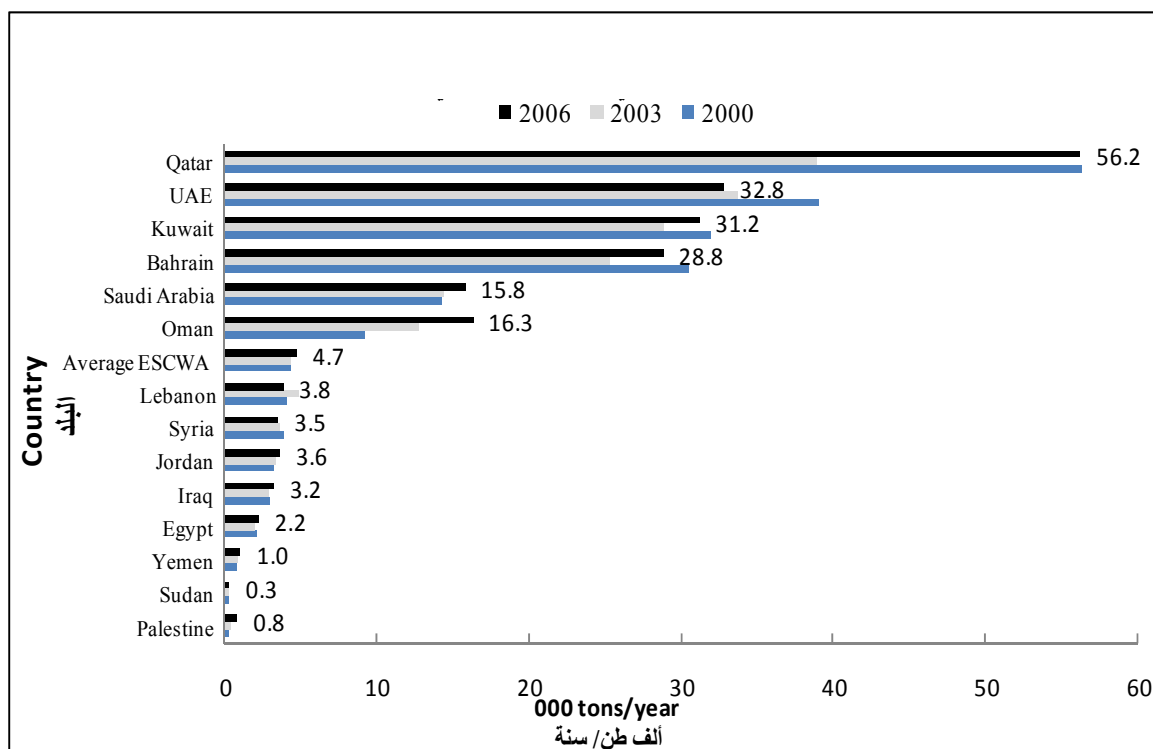


Figure VII.4
ODS Consumption in ODP Metric Tons in the ESCWA Region
 ()

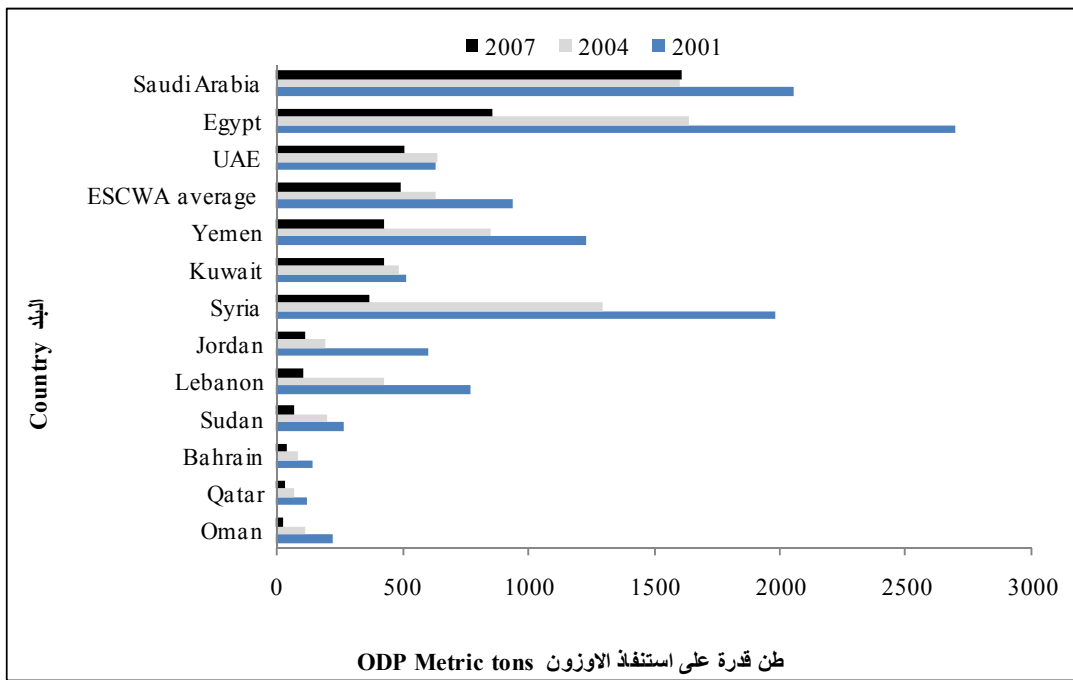
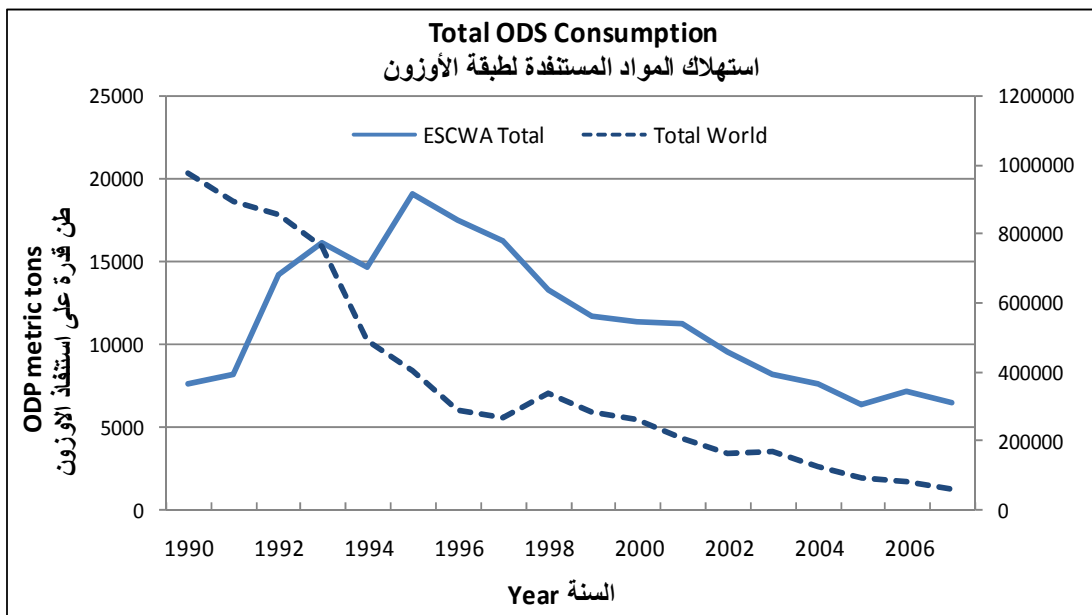


Figure VII.5 الشكل



Note: The left axis represents the ESCWA ODS Consumption and the right axis represents the total world ODS consumption.

CHAPTER VIII. MDG 7: ENSURING ENVIRONMENTAL SUSTAINABILITY

: 7 -

Statistical Highlights

- 91 per cent of the population in the ESCWA region in 2004 and 87 per cent in 2006 had access to safe water
- 96 per cent of the population in the GCC in 2004 and 95 per cent in 2006 had access to safe water
- Urban access to safe drinking water in ESCWA was estimated at 96 per cent in 2004 and 93 per cent in 2006
- Rural access to safe drinking water in ESCWA was estimated at 84 and 85 per cent in 2004 and 2006 respectively
- 86 per cent of the population in the ESCWA region in 2004 and 78 per cent in 2006 had access to improved sanitation
- 97 per cent of the population in the GCC had access to improved sanitation in 2004
- 66 per cent of the rural population in the ESCWA region had access to improved sanitation in 2006 compared to 90 per cent of the urban population
- Over 70 per cent of the rural population in the Sudan and Yemen and more than 50 per cent of the rural population in Egypt lacked access to improved sanitation in 2006

| | | | | | |
|------|------|------|------|------|------|
| | 2006 | 87 | 2004 | 91 | -1 |
| 2006 | 95 | 2004 | | 96 | -2 |
| | 96 | | | | -3 |
| 85 | 2004 | 84 | | 93 | 2004 |
| | | | | 2006 | -4 |
| | 2006 | 78 | 2004 | 86 | -5 |
| 2004 | | | | 97 | -6 |
| | | | | 66 | 2006 |
| | | | | 90 | -7 |
| | 50 | | 70 | 2006 | -8 |

Overview of Goal 7 of the MDGs

7

The Millennium Development Goals (MDGs) were launched in September 2000 with the approval of 189 countries from around the world. Several socio-economic issues are to be assessed over the period of 1990 to 2015 in order to attain the set goals. The MDGs are divided into 8 main goals, namely to eradicate extreme poverty and hunger, achieve universal primary education, promote gender equality and empower women, reduce child mortality, improve maternal health, combat HIV/AIDS, malaria and other diseases, ensure environmental sustainability and develop a global partnership for development.

/

189 2000

1990

.2015

Goal 7 of the MDGs addresses the issue of ensuring environmental sustainability and sets several targets. This chapter addresses some of the Goal 7 indicators related to the access to safe drinking water, sanitation and urban population living in the slums in the ESCWA region.

7

7

Access to Safe Drinking Water

Between 2000 and 2006, the proportion of the population in the ESCWA region with access to safe water increased from 84 to 91 per cent. When weighted by population, the regional average reached 91 per cent in 2004 and 90 per cent in 2006. This could indicate the need for more significant efforts to improve the infrastructure services that offer access to safe drinking water.

91 84

.2006 2000

91

.2006 90 2004

Moreover, the effort to improve access to safe drinking water varies between urban and rural areas. In Saudi Arabia for instance, the access to safe drinking water in urban areas in 2006 was estimated at 97 per cent while merely 64 per cent of the rural population had such access in 2004. Moreover, the Syrian Arab Republic urban access was estimated at 98 and 95 per cent in 2004 and 2006 respectively, while the rural population's access was estimated at 87 and 83 per cent respectively (tables VIII.1, VIII.2 and VIII.3). As for the entire ESCWA region, urban access to safe drinking water was estimated at 96 per cent in 2004 and 93 per cent in 2006, when, on the other hand, rural access was estimated at 84 and 85 per cent in 2004 and 2006 respectively.

2006 97

.2004 64

95 98

2006 2004

83 87

.(VIII.3

VIII.2 VIII.1)

93 2004 96

2006

2006 2004 85 84

Access to Sanitation

Access to sanitation remains lower than access to safe drinking water, particularly in rural areas where considerable efforts are still needed. Between 2000 and 2006, the proportion of the population in the ESCWA region with access to improved sanitation decreased from 74 to 64 per cent mainly because only one third of the Sudanese population has improved access to sanitation (table III.4). In the countries of the GCC, access to improved sanitation reached 97 per cent in 2004.

64 2000 74
 .2006
 .(III.4)
 97
 .2004

Access to improved sanitation in urban areas increased significantly from 86 per cent in 2000 (89 per cent without the Sudan), to 90 per cent in 2006 which indicates that efforts to improve access to sanitation were constantly deployed over those years. In rural areas, however, the access to sanitation is very limited. It was estimated at 66 per cent in 2006 compared to 79 per cent in 2004. The low level of access to sanitation in rural areas was still at 24 per cent in the Sudan and 30 per cent in Yemen in 2006 (tables VIII.4, VIII.5 and VIII.6).

86
 90 (89) 2000
 2006
 79 2006 66
 .2004
 24
 30
 .(VIII.6 VIII.5 VIII.4) 2006

Urban Population in the Slums

Urban population living in the slums is reported in 9 out of the 14 ESCWA countries. Although it varies between countries, the total urban population living in the slums was estimated at 40.3 millions in 2005. The highest urban population living in the slums was found in the Sudan at 13.9 millions in 2005 (table VIII.7).

2005 40.3
 13.9
 .(VIII.7) 2005

Table VIII.1
Access to Improved Drinking Water Sources (total) (%)
 ()

| | 2000 | 2002 | 2003 | 2004 | 2006 ^{a/, 1} | |
|--|---------------------|-------------------|-------------------|-------------------|-----------------------|----|
| Bahrain | ... | ... | 100 ^{b/} | 100 | 100 | |
| Egypt | 94 | 98 ^{c/} | 98 | 98 ^{d/} | 98 | |
| Iraq | ... | 81 ^{c/} | 81 | 81 ^{d/} | 77 | |
| Jordan | ... | 98 ^{b/} | 97 | 97 ^{d/} | 98 | |
| Kuwait | 100 | 100 | 100 | 100 ^{e/} | 100 | |
| Lebanon | 100 | 100 ^{c/} | 100 | 100 ^{d/} | 100 | |
| Oman | 38 ^{e/} | 79 ^{e/} | ... | ... | ... | |
| Palestine | 96 | 83 ^{b/} | 81 | 81 ^{e/} | 89 | |
| Qatar | 91 | 100 ^{c/} | 100 | 100 ^{d/} | 100 | |
| Saudi Arabia | 95 ^{e/} | ... | 95 | 95 ^{f/} | 94 | |
| Sudan | 69 ^{a/, 1} | ... | ... | ... | 70 | |
| Syrian Arab Republic | 82 ^{g/} | 79 ^{c/} | 93 | 93 ^{d/} | 89 | |
| United Arab Emirates | 85 | ... | 100 | 100 ^{b/} | 100 | |
| Yemen | 69 | 69 ^{c/} | 67 | 67 ^{d/} | 66 | |
| ESCWA ^{i/} | 84 | 89 | 93 | 93 ² | 91 ³ | i/ |
| GCC^{i/} | 82 | 93 | 99 | 99 | 99 | i/ |
| ESCWA adjusted average by population^{i/} | 85 | 89 | 74 | 91 | 87 | i/ |
| GCC adjusted average by population | 90 | 91 | 100 | 96 | 95 | |

Sources: a/ MDG Database 2009.

b/ ESCWA questionnaire to water authorities.

c/ Joint Arab Economic Report September 2005.

d/ UNSD-MDG Indicators 2006.

e/ ESCWA questionnaire to Central Statistics Office.

f/ Ministry of Water and Electricity Kingdom of Saudi Arabia (Documents) water affairs 2004 AD.

g/ Statistics Office of Syria.

h/ Ministry of Electricity and Water. United Arab Emirates.

i/ ESCWA Calculation.

Notes: 1. Estimation by source.

2. Excluding Oman and Sudan.

3. Excluding Oman.

Table VIII.2
Access to Improved Drinking Water Sources (urban) (%)
()

| | 2000 | 2002 | 2003 | 2004 | 2006 ^{a/ 1} |
|----------------------|-----------------------|------------------------|--------------------|------------------------|------------------------|
| Bahrain | 100 ² | 100 ^{b/} | 100 ^{c/} | 100 ^{d/} | 100 |
| Egypt | 99 ^{e/ 3} | 100 ^{b/} | 97 ^{f/ 4} | 99 ^{d/} | 99 |
| Iraq | 96 ^{g/} | 97 ^{b/} | ... | 97 ^{d/} | 88 |
| Jordan | ... | 98.3 ^{b/ 5} | ... | 99 ^{d/} | 99 |
| Kuwait | 100 ^{i/} | ... | 100 ^{c/} | 100 ^{d/} | 100 |
| Lebanon | 100 ^{i/ 6} | 100 ^{b/} | 65 ^{c/} | 100 ^{d/} | 100 |
| Oman | 41 ^{k/ 6} | 81 ^{b/} | ... | ... | ... |
| Palestine | 98.3 ^{l/ 7} | 95 ^{c/} | 98.8 | 82 ^{b/} | 90 |
| Qatar | 100 ^{i/} | 100 ^{b/} | 100 ^{c/} | 100 ^{d/} | 100 |
| Saudi Arabia | 100 ^{m/ 8} | 97 ^{g/} | ... | 100 ^{n/} | 97 |
| Sudan | 79 ^{a/ 1} | ... | ... | ... | 78 |
| Syrian Arab Republic | 98 ^{g/} | 94 ^{b/} | 94 ^{c/} | 98 ^{d/} | 95 |
| United Arab Emirates | 100 ^{i/} | ... | 100 ^{c/} | 100 ^{n/} | 100 |
| Yemen | 74 | 74 ^{b/} | ... | 71 ^{d/} | 68 |
| ESCWA | 92⁹ | 94¹⁰ | ... | 96¹¹ | 93¹² |
| GCC | 90 | 95 | | 100 | 99 |

Sources: ^{a/} MDG Database 2009.

^{b/} Joint Arab Economic Report September 2005.

^{c/} National data from water team.

^{d/} UNSD-MDG Indicators 2006.

^{e/} Number is estimated.

^{f/} CSO Egypt questionnaire.

^{g/} WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation. Coverage estimates 1980-2000. September, 2001. Web address: http://www.wssinfo.org/en/25_wat_dev_en.html.

^{h/} Department of Statistics. The Hashemite Kingdom of Jordan.

^{i/} Joint Arab Economic Report. September 2002 and 2003.

^{j/} The number is estimated.

^{k/} CSO Oman water questionnaire.

^{l/} Palestinian Central Bureau of Statistics, 2000. Health Survey. Ramallah. Palestine.

^{m/} MDG questionnaire ESCWA.

^{n/} Ministry of Water and Electricity Kingdom of Saudi Arabia (Documents) water affairs 2004 AD.

^{o/} Syria CBS March 2005.

^{p/} Ministry of Electricity and Water. United Arab Emirates.

^{q/} UNICEF 2005.

Notes: 1. Estimation by source.

2. Joint Arab Economic Report. September 2002, 2003.

3. WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation. Coverage estimates 1980-2000. September, 2001. Web address: http://www.wssinfo.org/en/25_wat_dev_en.html.

4. National data from ESCWA water team.

5. Data validated by DOS, Jordan.

6. WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation. Coverage estimates 1980-2000. September, 2001. Web address: http://www.wssinfo.org/en/25_wat_dev_en.html.

7. National data from ESCWA water team.

8. National data from ESCWA water team.

9. Excluding Jordan.

10. Excluding Kuwait, Sudan, United Arab Emirates.

11. Excluding Sudan and Oman.

12. Excluding Oman.

Table VIII.3
Access to Improved Drinking Water Sources (rural) (%)
()

| | 2000 | 2002 | 2003 | 2004 | 2006 ^{a/, 1} |
|----------------------|-----------------------|-----------------------|-------------------|-----------------------|------------------------|
| Bahrain | 100 ² | ... | 100 ^{b/} | ... | ... |
| Egypt | 96 ^{d/} | 97 ^{d/} | 71 ^{e/} | 97 ^{f/} | 98 |
| Iraq | 48 ^{g/, 3} | 50 ^{d/} | ... | 50 ^{f/} | 56 |
| Jordan | ... | 93.1 ^{b/, 4} | ... | 91 ^{f/} | 91 |
| Kuwait ¹ | ... | ... | ... | ... | ... |
| Lebanon | 100 ^{g/, 3} | 100 ^{d/} | ... | 100 ^{f/} | 100 |
| Oman | 30 ^{i/, 3} | 72 ^{d/} | ... | ... | ... |
| Palestine | 91.4 ^{i/, 5} | 76 ^{b/} | 92.9 | 81 ^{d/} | 88 |
| Qatar | ... | 100 ^{d/} | ... | 100 ^{f/} | 100 |
| Saudi Arabia | 64 ^{k/, 6} | ... | ... | 64 ¹ | ... |
| Sudan | 63 ^{g/, 1} | ... | ... | ... | 64 |
| Syrian Arab Republic | 85 ^{m/} | 64 ^{d/} | 64 ^{b/} | 87 ^{f/} | 83 |
| United Arab Emirates | ... | ... | 100 ^{b/} | 100 ^{b/} | 100 |
| Yemen | 68 | 68 ^{d/} | ... | 65 ^{f/} | 65 |
| ESCWA | 75⁷ | 80⁸ | ... | 84⁹ | 85¹⁰ |
| GCC | 65 | 86 | ... | 88 | ... |

Sources: a/ MDG Database 2009.

b/ National data from water team.

c/ WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation. Coverage estimates 1980-2000. September, 2001 Web address: http://www.wssinfo.org/en/25_wat_dev_en.html.

d/ Joint Arab Economic Report Sep. 2005.

e/ CSO Water Questionnaire.

f/ UNSD-MDG Indicators 2006.

g/ The number is estimated.

h/ Department of Statistics. The Hashemite Kingdom of Jordan.

i/ CSO Oman water questionnaire.

j/ Palestinian Central Bureau of Statistics, 2000. Health Survey. Ramallah. Palestine.

k/ ESCWA MDG questionnaire.

l/ Ministry of Water and Electricity Kingdom of Saudi Arabia (Documents) water affairs 2004 AD.

m/ Syria CBS March 2005.

n/ Ministry of Electricity and Water. United Arab Emirates.

Notes: 1. Estimation by source.

2. Joint Arab Economic Report. September 2002 and 2003.

3. WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation. Coverage estimates 1980-2000. September, 2001. Web address: http://www.wssinfo.org/en/25_wat_dev_en.html.

4. tables containing data were sent to DOS for validation. They validated some, corrected others and added new data.

5. SDPD received this data on 16 October 2004 after validation of the previously available national data.

6. Old Value: 70, old source: from national data from water team.

7. Excluding Jordan, Kuwait, Qatar, United Arab Emirates.

8. Excluding Bahrain, Kuwait, Saudi, Sudan, United Arab Emirates.

9. Excluding Bahrain, Kuwait, Oman and Sudan.

10. Excluding Bahrain, Kuwait, Oman and Saudi Arabia.

Table VIII.4
Access to Improved Sanitation (total) (%)
()

| | 2000 | 2002 | 2003 | 2004 | 2006 ^{a/, 1} |
|---|---------------------|---------------------|-------------------|-----------------------|-----------------------|
| Bahrain | 63 | ... | 73 ^{b/} | ... | ... |
| Egypt | 54 ^c | 68 ^{c/} | 68 ^{b/} | 70 ^{d/} | 66 |
| Iraq | 73 | 80 ^{c/} | ... | 79 ^{d/} | 76 |
| Jordan | ... | 93 ^{e/, 2} | ... | 97 ^{d/} | 85 |
| Kuwait | 96 | 97 | 100 ^{b/} | 100 ^{c/} | 100 |
| Lebanon | 98 | 98 ^{c/} | 98 ^{f/} | 98 ^{d/} | ... |
| Oman | 89 ^{g/} | 89 ^{c/} | ... | ... | ... |
| Palestine | 52 ^{b/, 2} | 30 ^{b/} | ... | 99 ^{c/} | 80 |
| Qatar | ... | 100 ^{c/} | ... | 100 ^{d/} | 100 |
| Saudi Arabia | 98 | ... | ... | 89 ^{i/} | ... |
| Sudan | 34 ^{a/, 1} | ... | ... | ... | 35 |
| Syrian Arab Republic | 70 ^{j/} | 77 ^{c/} | 90 ^{k/} | 90 ^{d/} | 92 |
| United Arab Emirates | ... | 100 ^{m/} | 100 ^{b/} | 100 ^{n/} | 97 |
| Yemen | 38 | 30 ^{c/} | ... | 28 ^{d/} | 46 |
| ESCWA | 70 | 78 | ... | 86⁴ | 78⁵ |
| GCC | 87 | 97 | ... | 97 | ... |
| ESCWA weighted average by population¹ | 59 | 67 | ... | 74 | 64 |
| GCC weighted average by population¹ | 86 | 96 | ... | 92 | ... |

Sources: a/ MDG Database 2009.

b/ National data from water team.

c/ WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation. Egypt 2006.

d/ UNSD-MDG Indicators 2006.

e/ UNICEF Statistics 56 from Water team.

f/ World Development Indicators 2006.

g/ CSO Oman water questionnaire.

h/ Palestinian Central Bureau of Statistics, 2000. Health Survey. Ramallah. Palestine.

i/ Ministry of Water and Electricity Kingdom of Saudi Arabia (Documents) water affairs 2004 AD.

j/ Syria CBS March 2005.

k/ MDG: 72 from national data from water team.

l/ Office of the Prime Minister. Central Bureau of Statistics, Syria.

m/ UNICEF 2005.

n/ Ministry of Electricity and Water. United Arab Emirates.

Notes: 1. Estimation by source.

2. National data from water team.

3. SDPD received this data on 16 October 2004 after validation of the previously available national data.

4. Excluding Bahrain, Oman and Sudan.

5. Excluding Bahrain, Saudi Arabia, Oman and Lebanon.

Table VIII.5
Access to Improved Sanitation (urban) (%)

| | 2000 | 2002 | 2003 | 2004 | 2006 ^{a/, 1} |
|----------------------|-----------------------|-----------------------|------------------------|-----------------------|-----------------------|
| Bahrain | 70 ² | 100 ^{b/} | 100 | 100 ^{e/} | 100 |
| Egypt | 81 ^{d/} | 84 ^{b/} | 77 ^{e/, 3} | 86 ^{e/} | 85 |
| Iraq | 93 ^{f/, 4} | 95 ^{b/} | ... | 95 ^{e/} | 80 |
| Jordan | ... | 95 ^{b/, 5} | 94 ^{i/} | 99 ^{e/} | 88 |
| Kuwait | 100 ^{j/} | 100 | 100 ^{b/} | 100 ^{b/} | 100 |
| Lebanon | 100 ^{f/, 4} | 100 ^{b/} | 100 ^{j/} | 100 ^{e/} | 100 |
| Oman | 98 ^{d/, 6} | 97 ^{b/} | 97 ^{i/} | 97 ^{e/} | 97 |
| Palestine | 56.4 ^{k/, 7} | 99.6 ^{e/} | 100 | 99 ^{b/} | 84 |
| Qatar | 100 ^{j/} | 100 ^{b/} | ... | 100 ^{e/} | 100 |
| Saudi Arabia | 100 | 100 ^{b/} | 100 ^{j/} | 100 ^{j/} | 100 |
| Sudan | 51 ^{a/, 1} | ... | ... | ... | 50 |
| Syrian Arab Republic | 85 ^{m/} | 97 ^{b/} | 98 ^{e/} | 99 ^{e/} | 96 |
| United Arab Emirates | 100 ^{j/} | 100 ^{b/} | 100 ^{b/} | 100 ^{b/} | 98 |
| Yemen | 89 | 76 ^{b/} | 76 ^{i/} | 43 ^{e/} | 88 |
| ESCWA | 86⁸ | 96⁹ | 95¹⁰ | 94⁹ | 90 |
| GCC | 95 | 100 | 100 | 100 | 99 |

Sources: a/ MDG Database 2009.

b/ Joint Arab Economic Report September 2005.

c/ UNSD-MDG Indicators 2006.

d/ WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation. Coverage estimates 1980-2000. September, 2001 Web address: http://www.wssinfo.org/en/25_wat_dev_en.html.

e/ CSO Egypt water questionnaire.

f/ The number is an estimate.

g/ National data from water team.

h/ 74 from Department of Statistics. The Hashemite Kingdom of Jordan. Maybe reported Sewerage connection.

i/ World Development Indicators 2006.

j/ Joint Arab Economic Report. September 2002 and 2003.

k/ Palestinian Central Bureau of Statistics, 2000. Health Survey. Ramallah. Palestine.

l/ Figure reported as 2003.

m/ Syria CBS March 2005.

n/ Ministry of Electricity and Water. United Arab Emirates.

o/ UNICEF 2005.

Notes: 1. Estimation by source.

2. Joint Arab Economic Report. September 2002 and 2003.

3. National data from ESCWA water team.

4. WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation. Coverage estimates 1980-2000. September, 2001. Web address: http://www.wssinfo.org/en/25_wat_dev_en.html.

5. Data validated by DOS, Jordan.

6. CSO Oman.

7. Source: National data from ESCWA water team on 16 October 2004 after validation of the previously available national data.

8. Excluding Jordan.

9. Excluding Sudan.

10. Excluding Bahrain, Iraq, Qatar, Sudan.

Table VIII.6
Access to Improved Sanitation (rural) (%)
()

| | 2000 | 2002 | 2003 | 2004 | 2006 ^{a/, 1} |
|----------------------|----------------------|---------------------|-------------------|-----------------------|-----------------------|
| Bahrain | ... | ... | ... | ... | ... |
| Egypt | 53 ^{b/} | 56 ^{e/} | 68 ^{d/} | 58 ^{e/} | 52 |
| Iraq | 31 ^{f/, 1} | 48 ^{e/} | ... | 48 ^{e/} | 69 |
| Jordan | 78 ^{a/, 1} | 85 ^{g/, 2} | 85 ^{b/} | 91 ^{e/} | 71 |
| Kuwait | ... | ... | ... | ... | ... |
| Lebanon | 87 ^{i/, 1} | 87 ^{e/} | 87 ^{b/} | 87 ^{e/} | ... |
| Oman | 61 ^{i/, 1} | 61 ^{e/} | 61 ^{b/} | ... | ... |
| Palestine | 43 ^{k/, 3} | ... | ... | 99 ^{e/} | 69 |
| Qatar | 100 ^{a/, 1} | 100 ^{e/} | ... | 100 ^{e/} | 100 |
| Saudi Arabia | 40 | ... | ... | 40 ^{l/} | ... |
| Sudan | 24 ^{a/, 1} | ... | ... | ... | 24 |
| Syrian Arab Republic | 55 ^{m/} | 56 ^{e/} | 81 ^{b/} | 81 ^{e/} | 88 |
| United Arab Emirates | 95 ^{a/, 1} | 100 ^{e/} | 100 ^{d/} | 100 ^{b/} | 95 |
| Yemen | 24 ^{a/, 1} | 14 ^{e/} | 14 ^{b/} | ... | 30 |
| ESCWA | 35 | 67 | ... | 79⁵ | 66⁶ |

Sources: a/ MDG Database 2009.

b/ WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation. Egypt 2006.

c/ Joint Arab Economic Report Sep. 2005.

d/ National data from water team.

e/ UNSD-MDG Indicators 2006.

f/ The number is an estimate.

g/ Reported from wssinfo.org, Department of Statistics. Jordan. Maybe reported Sewerage Connection.

h/ World Development Indicators 2006.

i/ This number is an estimate.

j/ CSO Oman.

k/ Palestinian Central Bureau of Statistics, 2000. Health Survey. Ramallah. Palestine.

l/ Ministry of Water and Electricity Kingdom of Saudi Arabia (Documents) water affairs 2004 AD.

m/ Syria CBS March 2005.

n/ MDG 44 National data from water team.

o/ UNICEF 2005.

p/ Ministry of Electricity and Water. United Arab Emirates.

Notes: 1. Estimation by source.

2. WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation. Coverage estimates 1980-2000. September, 2001. Web address: http://www.wssinfo.org/en/25_wat_dev_en.html.

3. Data was validated by DOS, Jordan.

4. National data from ESCWA water team.

5. Excluding Bahrain, Kuwait, Oman, Sudan and Yemen.

6. Excluding Bahrain, Kuwait, Lebanon, Oman, Saudi Arabia.

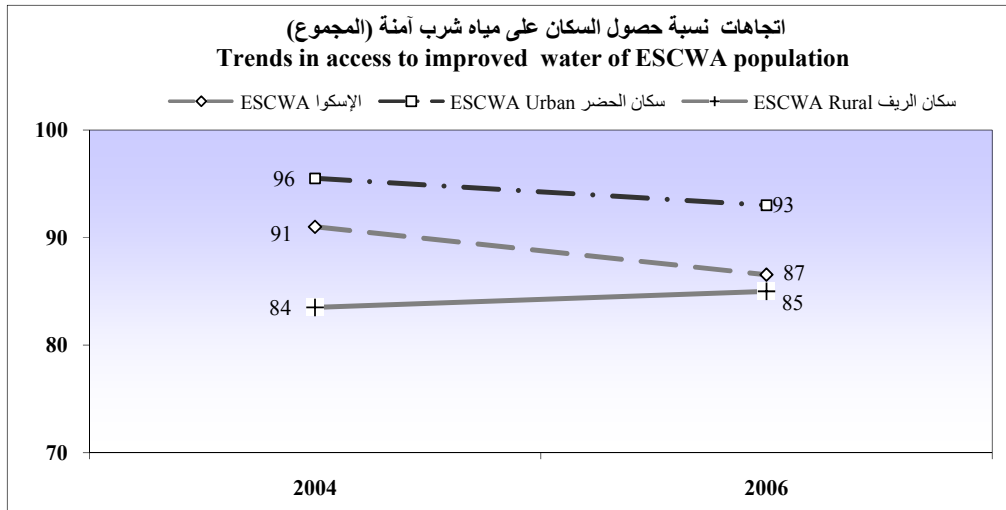
Table VIII.7
ESCWA Urban Population Living in Slums
 ()

| | Number of Households | | Proportion of households (%) | |
|----------------------|----------------------|------------|------------------------------|------|
| | 1990 | 2005 | 1990 | 2005 |
| Egypt | 14,086,925 | 5,405,326 | 57.5 | 17.1 |
| Iraq | 6,824,582 | 9,692,492 | 56.7 | 52.8 |
| Jordan | 387,750 | 718,812 | 16.5 | 15.8 |
| Lebanon | 1,142,000 | 1,756,720 | 50 | 53.1 |
| Oman | 671,134 | ... | 60.5 | ... |
| Saudi Arabia | 2,385,108 | 4,070,289 | 19.8 | 18 |
| Sudan | 5,707,584 | 13,913,793 | 86.4 | 94.2 |
| Syrian Arab Republic | 628,609 | 981,945 | 10.4 | 10.5 |
| Yemen | 1,787,400 | 3,802,848 | 67.5 | 67.2 |
| ESCWA | 33,621,092 | 40,342,225 | 46 | 41* |

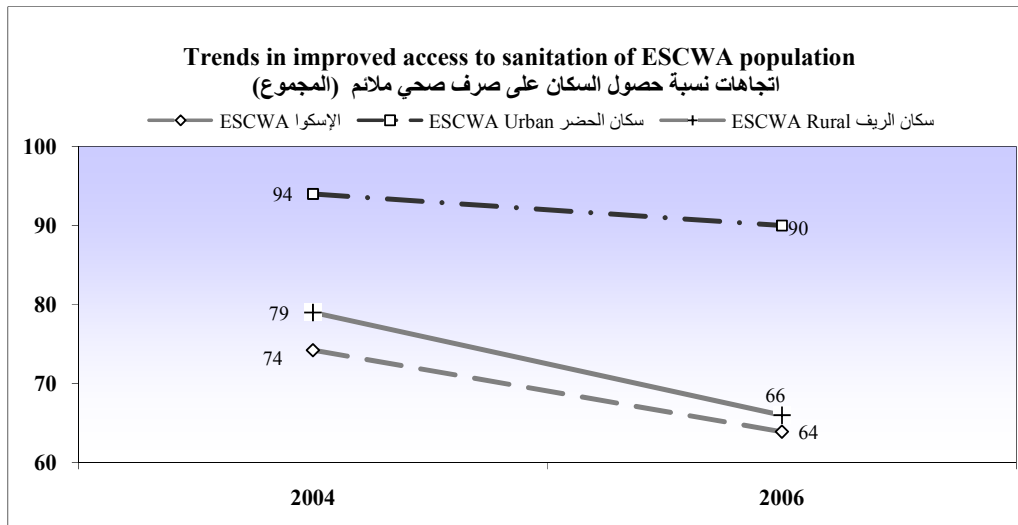
Source: MDG Database 2009.

Notes: * Excluding Oman.

Figure VIII.1
Trends of access to Improved Water and Sanitation of ESCWA Population



Note: Regional average for total population was calculated as weighted adjusted average by population size. Rural and urban averages were normal averages.



Annex 1

Definitions by Chapter

Water Resources and Use

DEFINITION

| | |
|--|--|
| Actual evapotranspiration: | Total actual volume of evaporation from the ground, wetlands and natural water bodies and transpiration of plants The 'actual evapotranspiration' is calculated using different types of mathematical models, ranging from very simple algorithms (Budyko, Turn Pyke, etc) to schemes that represent the hydrological cycle in detail |
| Actual external inflow of surface and ground waters: | Total volume of actual flow of rivers and groundwater, coming from neighboring countries |
| Advanced treatment: | Process capable of reducing specific constituents in waste water not normally achieved by other treatment options. For the purpose of this questionnaire, advanced treatment technology covers all unit operations which are not considered to be mechanical or biological. In waste water treatment this includes e.g. chemical coagulation, flocculation and precipitation, break-point chlorination, stripping, mixed media filtration, micro-screening, selective ion exchange, activated carbon adsorption, reverse osmosis, ultra-filtration, electro-flotation. Advanced treatment processes are also used in combination and/or in conjunction with mechanical and biological unit operations. To avoid double counting, water subjected to more than one treatment should be reported under the highest level of treatment only |
| Biochemical Oxygen Demand (BOD ₅). | Amount of dissolved oxygen required by organisms for the aerobic decomposition of organic matter present in water. This is measured at 20 degrees Celsius for a period of five days. The parameter yields information on the degree of water pollution with organic matter |
| Biological treatment: | Processes which employ aerobic or anaerobic micro-organisms and result in decanted effluents and separated sludge containing microbial mass together with pollutants |
| Chemical Oxygen Demand (COD): | Index of water pollution measuring the mass concentration of oxygen consumed by the chemical breakdown of organic and inorganic matter. This is a measure of potassium permanganate (KMnO ₄) consumed, calculated in terms of oxygen equivalent |
| Chlorophyll-a (Chl-a): | The photosynthetic green pigment present in most plants or algae. Chlorophyll-a is an indicator of the degree of eutrophication of water bodies |
| Desalinated water: | Total volume of water obtained from desalination processes (from seawater, brackish water etc) |
| Dissolved Oxygen (DO): | Amount of gaseous oxygen (O ₂) actually present in water expressed in terms of either of its presence in the volume of water (milligrams of O ₂ per litre) |
| Exports of water: | Total volume of bulk fresh water that is exported to other countries as a commodity through pipelines or on ships. Bottled water is excluded |
| Faecal Coliform: | Microorganisms found in the intestinal tract of human beings and animals. Their presence in water indicates faecal pollution rendering water unsuitable for drinking without prior treatment |

| | |
|---|---|
| Fresh ground water: | Water which is being held in, and can usually be recovered from, or via, an underground formation. All permanent and temporary deposits of water, both artificially charged and naturally occurring in the subsoil, of sufficient quality for at least seasonal |
| Fresh surface water: | Water which flows over, or rests on the surface of a land mass, natural watercourses such as rivers, streams, brooks, lakes, etc., as well as artificial watercourses such as irrigation, industrial and navigation canals, drainage systems and artificial reservoirs. Water abstracted through bank filtration is included under fresh surface water. Sea-water, and transitional waters, such as brackish swamps, lagoons and estuarine areas are considered non-fresh water and are not included here |
| Imports of water: | Total volume of bulk fresh water that is imported from other countries as a commodity through pipelines or on ships. Bottled water is excluded |
| Internal flow: | Total volume of river run-off and groundwater generated, in natural conditions, exclusively by precipitation into a territory. The internal flow is equal to precipitation less actual evapotranspiration and can be calculated or measured. If the river run-off and groundwater generation are measured separately, transfers between surface and groundwater should be netted out to avoid double counting |
| Irrigation water: | Water which is applied to soils in order to increase their moisture content and to provide for normal plant growth |
| Long-term annual average: | Arithmetic average over at least 20 consecutive years |
| Mechanical treatment: | Processes of a physical and mechanical nature which result in decanted effluents and separate sludge. Mechanical processes are also used in combination and/or in conjunction with biological and advanced unit operations. Mechanical treatment is understood to include at least such processes as sedimentation, flotation, etc. To avoid double counting, water subjected to more than one treatment should be reported under the highest level of treatment only |
| Non treated waste water: | Waste water discharged into ambient media without treatment |
| Non-fresh water abstraction: | Includes sea water and transitional water, such as brackish swamps, lagoons and estuarine areas |
| Other supply: | Any supply of water not specified elsewhere. In particular, supplies from commercial and industrial establishments, whether marketed or not. Also included is supply of reusable water |
| Outflow of surface and ground waters: | Actual outflow of rivers and groundwater into neighboring countries and/or into the sea |
| Population connected to independent treatment (septic tanks): | The percentage of resident population whose waste water is treated in individual, often private facilities such as septic tanks |
| Population connected to waste water collecting system: | The percentage of the resident population connected to the public waste water collecting systems (sewerage). Public waste water collecting systems may deliver waste water to treatment plants or may discharge it without treatment to the environment |
| Population connected to waste water treatment: | The percentage of the resident population whose waste water is treated at public waste water treatment plants |

| | |
|---|---|
| Precipitation: | Total volume of atmospheric wet precipitation (rain, snow, hail, dew...) falling on the territory of the country over one year, in millions of cubic meters (mio m ³) |
| Regular freshwater resources 95% of the time: | Portion of the total freshwater resource that can be depended on for annual water development during 19 out of 20 consecutive years, or at least 95 per cent of the years included in longer consecutive periods. This item yields information about the average annual long-term availability of fresh water for use in human activities |
| Renewable groundwater available for annual abstraction: | Recharge less the long term annual average rate of flow required to achieve ecological quality objectives for associated surface water. It takes account of the ecological restrictions imposed to groundwater exploitability; other restrictions based on economic and technical criteria could also be taken into account in terms of accessibility, productivity and maximum production cost deemed acceptable by developers. The theoretical maximum of groundwater available is the recharge |
| Self-supply: | Abstraction of water for own final use. Includes water drawn from village wells |
| Stratification: | The arrangement of a body of a lake into two or more horizontal layers of differing characteristics, such as temperature, density, etc |
| Total Dissolved Solids (TDS): | Total weight of dissolved mineral constituents in water. Excessive amounts make water unsuitable for drinking or for use in industrial processes |
| Total fresh water available for use: | = Total gross fresh water abstraction - Water returned without use + Imports of water - Exports of water + Desalinated water + Total reuse of fresh water |
| Total gross fresh water abstraction: | Total of fresh surface water and fresh groundwater abstractions over one year within the national territory |
| Total Nitrogen: | Sum of inorganic and organic nitrogen compounds (excluding N ₂) in water measured in terms of nitrogen. Nitrogen - together with phosphorus - contributes to eutrophication of water bodies |
| Total Phosphorus: | Sum of phosphorus compounds in water measured in terms of phosphorus. Phosphorus is an element that, while being essential to life as a key limiting nutrient factor, nevertheless contributes - together with nitrogen - to the eutrophication of lakes and other bodies of water |
| Total public water supply: | Water supplied by economic units engaged in collection, purification and distribution of water (including desalting of sea water to produce water as the principal product of interest, and excluding system operation for agricultural purposes and treatment of waste water solely in order to prevent pollution.) It corresponds to ISIC division 41. Deliveries of water from one public supply undertaking to another are excluded |
| Total renewable fresh water resources: | = Internal flow + Actual external inflow of surface and groundwaters |
| Total reuse of fresh water: | Fresh water that has undergone waste water treatment and is deliverable to a user as reclaimed waste water. This means the direct supply of treated effluent to the user. Excluded is waste water discharged into a watercourse and used again downstream |
| Total sewage sludge production: | The accumulated settled solids, either moist or mixed, with a liquid component as a result of natural or artificial processes, that have been separated from various types of waste water during treatment (Please provide the data as dry weight. If data is only available for wet weight, please fill in the data for wet weight and specify this in a footnote) |

| | |
|---|---|
| Total waste water generated: | The quantity of water in cubic meters (m ³) that is discharged due to being of no further immediate value to the purpose for which it was used or in the pursuit of which it was produced because of its quality, quantity or time of occurrence |
| Total waste water treatment: | Process to render waste water fit to meet applicable environmental standards or other quality norms for recycling or reuse. Three broad types of treatment are distinguished in the questionnaire: mechanical, biological and advanced. For the purpose of calculating the total amount of treated waste water, volumes reported should be shown only under the highest type of treatment to which it was subjected. Thus, waste water treated mechanically as well as biologically should be shown under biological treatment, and waste water treated in accordance with all three types should be reported under advanced treatment. Waste water treatment does not include the collection of waste water or storm water, even when no treatment will be possible without collection |
| TOTAL water abstraction: | Water removed from any source, either permanently or temporarily, during a specified period of time. Mine water and drainage water are included |
| Total water supply: | Delivery of water to users and abstraction for own final use. Total water supply excludes water used in hydropower generation. (Total public water supply + Self-supply + Other supply) |
| Treated in independent treatment facilities: | Individual private treatment facilities to treat domestic and other waste water in cases where a public waste water network is not available or not justified either because it would produce no environmental benefit or it would involve excessive cost. Examples of such systems are treatment in septic tanks |
| Treated in other treatment plants: | Treatment of waste water in any non-public treatment plants, i.e. industrial waste water plants. Excluded from 'Other waste water treatment' is treatment in facilities covered under independent treatment facilities such as septic tanks |
| Waste water treated in public treatment plants: | All treatment of waste water in municipal treatment plants by official authorities, or by private companies for local authorities, whose main purpose is waste water treatment |
| Water losses during transport: | Volume of water lost during transport between a point of abstraction and a point of use, and between points of use and reuse |
| Water returned without use: | Water abstracted from any fresh water source and discharged into fresh waters without use, or before use. Occurs primarily during mining and construction activities. Discharges to the sea are excluded |

AIR

| | |
|-----------------------------|--|
| Annual mean concentration: | Arithmetic mean over all valid measurements for the respective year |
| Background site: | A monitoring station remote from any industrial and densely populated area. Please indicate the name and location of the site |
| Emission sources: | The classification of emission sources used in this questionnaire is based on the Revised IPCC 1996 Guidelines for National Greenhouse Gas Inventories |
| Emissions from Agriculture: | Emissions from the breeding of livestock, rice cultivation, field burning of agricultural residues, prescribed burning of savannas and other agricultural activities. This variable corresponds to IPCC category 4 |

| | |
|---|---|
| Emissions form Energy activities [Production and Use]: | This category comprises all emissions related to the production and use of energy in any sectors of the economy and households. It includes emissions from fuel combustion as well as fugitive fuels. This variable corresponds to IPCC category 1 |
| Emissions form Fuel combustion: | Emissions caused by the burning of fossil fuels in any process. It comprises the combustion of fuels in the energy industries, all other industries and transport; it includes small combustion activities such as in commercial, institutional or residential buildings, fuel combustion in agriculture and in all other activities. CO ₂ emission from the combustion of biomass is excluded. This variable corresponds to IPCC category 1A |
| Emissions form Manufacturing Industries and construction: | Emissions from fuel combustion in manufacturing industries (except coke ovens that are allocated under Energy industries) and construction. If more disaggregated data by industrial activities according to International Standard Industrial Classification |
| Energy industries: | Emissions from fuel combustion in public electricity and heat production, in petroleum refining, manufacturing of solid fuels and other energy industries. For the purposes of this questionnaire, fugitive emissions from fuels (coal mining, oil and gas fields) |
| Fugitive emissions from fuels: | Intentional or unintentional releases of gases from anthropogenic activities. In particular, they may arise from the production, processing, transmission, storage and use of fuels, and include emissions from combustion only where it does not support a productive activity (e.g., flaring of natural gases at oil and gas production facilities. The variable corresponds to the sum of the IPCC categories 1B1 and 1B2 |
| Industrial city: | Industrial city in which a significant number of inhabitants are exposed to the highest level of industrial pollution. Please indicate the name of the city and the air quality monitoring stations |
| Industrial processes: | Emissions from processes such as chemical industry, metal industry, production and use of mineral products and other industries |
| Non-methane volatile organic compounds (NM-VOCs): | A group of solvent-like organic compounds that easily evaporate at normal temperatures. They are produced mainly in fuel combustion and in processes that use solvents or solvent-based products such as painting, metal degreasing etc. Several of these chemicals are harmful to human health if inhaled, ingested, drunk or get in contact with skin. NM-VOCs are significant precursors to ground level ozone formation. NM-VOCs are the sum of all hydrocarbon air pollutants except methane |
| Other fuel combustion: | Emissions from fuel combustion in commercial, institutional and residential buildings, agriculture, forestry, fishing and other non-specified fuel combustion (e.g. military). The fishing sector includes domestic inland, coastal and deep-sea fishing |
| Other sources of Emissions: | Emissions from waste water treatment, waste disposal on land, waste incineration, land-use changes, forestry and other activities which have not been covered above. This variable corresponds to the sum of the IPCC categories 5, 6 and 7 |
| Solvent use: | Emissions from paint application, degreasing and dry cleaning, manufacturing and processing of chemical products, and other processes using solvents and other solvent based products. This variable corresponds to IPCC category 3 |

| | |
|--|---|
| Suspended Particulate Matter (SPM ₁₀): | Finely divided solids or liquids, less than 10 µm (micrometers), that may be dispersed through the air from combustion processes, industrial activities or natural sources |
| Total emissions: | Emissions from human activities in the country. Please note that emissions from international aviation and maritime transport are excluded |
| Transport: | Emissions from fuel combustion in transport activities such as domestic air transport, road transport, railways, navigation and other transport. Evaporative emissions from vehicles are also included in this category. Please note that emissions from international aviation and marine transport are excluded. This variable corresponds to IPCC category 1A3 |
| Urban (largest) city: | City of large(st) population. Indicate the name of the city and air quality monitoring stations and provide data for each station |

Waste Management

| | |
|---|---|
| Composted (waste): | Composting is a biological process that submits biodegradable waste to anaerobic or aerobic decomposition, and that results in a product that is recovered |
| Hazardous waste: | Wastes that, owing to their toxic, infectious, radioactive or flammable properties pose a substantial actual or potential hazard to the health of humans and other living organisms and the environment |
| Incinerated (waste): | The controlled combustion of waste with or without energy recovery |
| Incineration plant: | Facilities for burning wastes under controlled conditions, with or without energy recovery |
| Industrial waste: | For the purposes of this questionnaire, industrial waste comprises waste from mining and quarrying, manufacturing industries, energy production and construction |
| Landfill site: | Sites that manage the final placement of waste in or on the land in a controlled or uncontrolled way |
| Landfilled (waste): | It includes all amounts going to landfill, either directly, or after sorting and/or treatment, as well as residues from recovery and disposal operations going to landfill. Landfill is the final placement of waste into or onto the land in a controlled or uncontrolled way. The definition covers both landfill in internal sites (i.e. where a generator of waste is carrying out its own waste disposal at the place of generation) and in external sites |
| Municipal waste collected: | Municipal waste collected by or on behalf of municipalities, as well as municipal waste collected by the private sector. It includes mixed household waste, and fractions collected separately for recovery operations (through door-to-door collection and/or through voluntary deposits) |
| Municipal waste generated: | This amount is the sum of the amount of municipal waste collected plus the estimated amount of municipal waste from areas not served by a municipal waste collection service |
| Municipal waste managed in the country: | The amount of municipal waste collected in the country - amount exported before treatment or disposal + amount imported for treatment or disposal |
| Municipal waste: | Municipal waste includes household waste and similar waste. The definition also includes bulky waste (e.g. white goods, old furniture, mattresses) and yard waste, leaves, grass clippings, street sweepings, the content of litter |

| | |
|---|--|
| | containers, and market cleansing waste, if managed as waste. It includes waste originating from: households, commerce and trade, small businesses, office buildings and institutions (schools, hospitals, government buildings). It also includes waste from selected municipal services, e.g. waste from park and garden maintenance, waste from street cleaning services (street sweepings, the content of litter containers, market cleansing waste), if managed as waste. The definition excludes waste from municipal sewage network and treatment, municipal construction and demolition waste |
| Other (waste treatment/disposal): | Any other final treatment or disposal different from recycling (composting), incineration and landfill. Permanent storage of waste is included here |
| Other activities: | For the purpose of this questionnaire, the category 'other activities' refers to all other economic activities not specified before |
| Other, please specify: | Plants for waste treatment/disposal not elsewhere specified. It includes permanent storage |
| Recycled (waste): | Recycling is defined as any reintroduction of waste material in a production process that diverts it from the waste stream, except reuse as fuel. Both reprocessing as the same type of product, and for different purposes should be included. Recycling within industrial plants i.e. at the place of generation should be excluded |
| Share of population served by municipal waste management services (in %): | The percentage of the total, urban and rural population covered by regular municipal waste removal service in relation to the total, urban and rural population, respectively, of the country |
| Treatment plant: | Facilities for the physical, thermal, chemical, or biological processing of waste, that change the characteristics of the waste in order to reduce its volume, or hazardous nature, facilitate its handling, or enhance recycling. Composting plants are included here |
| Waste: | Waste refers here to materials that are not prime products (i.e. products produced for the market) for which the generator has no further use for his own purpose of production, transformation or consumption, and which he discards, or intends or is required to discard. It excludes residuals directly recycled or reused at the place of generation (i.e. establishment) and waste materials that are directly discharged into ambient water or air |
| (Waste from) Agriculture and forestry: | All waste from agricultural and forestry activities. Manure used as fertilizer should not be included; only 'surplus'(or excess) manure should be included. This category refers to ISIC divisions 01 and 02 |
| (Waste from) Construction: | All waste from construction activities. This category refers to waste generated in ISIC division 45 |
| (Waste from) Energy production: | All waste from electricity, gas, steam and hot water supply. This category refers to ISIC division 40 |
| (Waste from) Manufacturing industries: | All waste from manufacturing industries. This category refers to ISIC divisions 15 to 37 |
| (Waste from) Mining and quarrying: | All waste from mining and quarrying activities. This category refers to ISIC divisions 10 to 14 |

Health and Environment

| | |
|--|--|
| Mortality rate in children under 5 years of age of total population of children under 5 years age: | The under-five mortality rate is the probability (expressed as a rate per 1,000 live births) of a child born in a specified year dying before reaching the age of five if subject to current age-specific mortality rates |
| Number of deaths from Water borne-diseases: | Death rate for persons of all ages attributed to waterborn diseases which arise from the contamination of water by human or animal faeces or urine infected by pathogenic viruses, bacteria or protozoa, or from the contamination of water by chemical substances, and which are directly transmitted when the water is drunk or used in the preparation of food, or for recreational purposes |
| Population connected to independent treatment (septic tanks): | The percentage of the total population connected to independent treatment (septic tanks) |
| Population connected to waste water collecting system: | The percentage of the total population connected to waste water collecting system |
| Population connected to waste water treatment: | The percentage of the total population connected to waste water treatment |
| Population with access to safe drinking water (rural): | “Improved” water supply technologies are: household connection, public standpipe, borehole, protected dug well, protected spring, rainwater collection. “Not improved” are: unprotected well, unprotected spring, vendor-provided water, bottled water (based on concerns about the quantity of supplied water, not concerns over the water quality), tanker truck-provided water. It is assumed that if the user has access to an “improved source” then such source would be likely to provide 20 litres per capita per day at a distance no longer than 1000 metres |
| Population with access to sanitation services (rural): | Rural Population with access to sanitation services (connection to a public sewer, connection to septic system, simple pit latrine) |
| Population with access to sanitation services (urban): | Urban Population with access to sanitation services (connection to a public sewer, connection to septic system, simple pit latrine) |
| Proportion of population with sustainable access to an improved water source, urban: | “Improved” water supply technologies are: household connection, public standpipe, borehole, protected dug well, protected spring, rainwater collection. “Not improved” are: unprotected well, unprotected spring, vendor-provided water, bottled water (based on concerns about the quantity of supplied water, not concerns over the water quality), tanker truck-provided water. It is assumed that if the user has access to an “improved source” then such source would be likely to provide 20 litres per capita per day at a distance no longer than 1000 metres |

Definitions of MDG Goal 7: Ensure Environmental Sustainability

| | |
|--|--|
| Carbon dioxide emissions (per capita) : | Carbon dioxide emissions per capita is the total amount of carbon dioxide emitted by a country as a consequence of human (production and consumption) activities, divided by the population of the country. In the global carbon dioxide emission estimates of the Carbon Dioxide Information Analysis Center of Oak Ridge National Laboratory in the United States, the calculated country emissions of carbon dioxide include emissions from consumption of solid, liquid and gas fuels; cement production; and gas flaring. National reporting to the United Nations Framework Convention on Climate Change, which follows the Intergovernmental Panel on Climate Change guidelines, is based on national emission inventories and covers all sources of anthropogenic carbon dioxide emissions as well as carbon sinks (such as forests). Carbon dioxide emissions per capita are calculated by dividing carbon dioxide emissions by the number of people in the national population. Carbon dioxide emission estimates from 1950 to the present are derived primarily from energy statistics published by the United Nations, using the methods outlined in “Carbon dioxide emissions from fossil fuels: a procedure for estimation and results for 1950–82”. National reporting to the United Nations Framework Convention on Climate Change is based on the Intergovernmental |
| Consumption of ozone-depleting CFCs (ODP tons): | Consumption of ozone-depleting chlorofluorocarbons (CFCs) in ODP (ozone-depleting potential) tons is the sum of the consumption of the weighted tons of the individual substances in the group—metric tons of the individual substance (defined in the Montreal Protocol on Substances that Deplete the Ozone Layer) multiplied by its ozone-depleting potential. An ozone-depleting substance is any substance containing chlorine or bromine that destroys the stratospheric ozone layer. The stratospheric ozone layer absorbs most of the biologically damaging ultraviolet radiation. The consumption of CFCs is the national production plus imports, minus exports, minus destroyed quantities, minus feedstock uses of individual CFCs. National annual consumption of CFCs is the sum of the weighted tons (consumption in metric tons multiplied by the estimated ozone-depleting potential) of the individual CFCs |
| Energy use (kg oil equivalent) per \$1,000 GDP (Constant 2005 PPP \$): | Energy use per GDP (Constant 2005 PPP \$) is the kilogram of oil equivalent of energy use per gross domestic product converted to 2005 constant international dollars using purchasing power parity rates. Energy use refers to use of primary energy before transformation to other end-use fuels, which is equal to indigenous production plus imports and stock changes, minus exports and fuels supplied to ships and aircraft engaged in international transport. |
| | Gross Domestic Product (GDP) is the sum of gross value added by all resident producers in the economy plus any product taxes (less subsidies) not included in the valuation of output. Value added is the net output of an industry after adding up all outputs and subtracting intermediate inputs. The purchasing power parity (PPP) conversion factor is the number of units of a country's currency required to buy the same amounts of goods and services in the domestic market as the United States (U.S.) dollar would buy in the United States. An international dollar has the same purchasing power over GDP as a U.S. dollar has in the United States. |

Proportion of population using improved drinking water source:

The proportion of the population using an improved drinking water source, total, urban, and rural, is the percentage of the population who use any of the following types of water supply for drinking: piped water into dwelling, plot or yard; public tap/standpipe; borehole/tube well; protected dug well; protected spring; rainwater collection and bottled water (if a secondary available source is also improved). It does not include unprotected well, unprotected spring, water provided by carts with small tanks/drums, tanker truck-provided water and bottled water (if secondary source is not an improved source) or surface water taken directly from rivers, ponds, streams, lakes, dams, or irrigation channels.

Proportion of population using improved sanitation facilities:

The proportion of the population using an improved sanitation facility, total, urban, rural, is the percentage of the population with access to facilities that hygienically separate human excreta from human contact. Improved facilities include flush/pour flush toilets or latrines connected to a sewer, -septic tank, or -pit, ventilated improved pit latrines, pit latrines with a slab or platform of any material which covers the pit entirely, except for the drop hole and composting toilets/latrines. Unimproved facilities include public or shared facilities of an otherwise acceptable type, flush/pour-flush toilets or latrines which discharge directly into an open sewer or ditch, pit latrines without a slab, bucket latrines, hanging toilets or latrines which directly discharge in water bodies or in the open and the practice of open defecation in the bush, field or bodies or water.

Slum population in urban areas:

The Proportion of urban population living in slums is the proportion of urban population living in slum households. A slum household is defined as a group of individuals living under the same roof lacking *one or more* of the following conditions:

- Access to improved water
- Access to improved sanitation
- Sufficient-living area
- Durability of housing
- Security of tenure

However, since information on secure tenure is not available for most of the countries, only the first four indicators are used to define slum household, and then to estimate the proportion of urban population living in slums.

Annex 2

WHO Drinking Water Guidelines

| Chemical | Guideline value² (mg/litre) | Remarks |
|--|---|--|
| Acrylamide | 0.0005 ^b | |
| Alachlor | 0.02 ^b | |
| Aldicarb | 0.01 | Applies to aldicarb sulfoxide and aldicarb sulfone |
| Aldrin and dieldrin | 0.00003 | For combined aldrin plus dieldrin |
| Antimony | 0.02 | |
| Arsenic | 0.01 (P) | |
| Atrazine | 0.002 | |
| Barium | 0.7 | |
| Benzene | 0.01 ^b | |
| Benzo[<i>a</i>]pyrene | 0.0007 ^b | |
| Boron | 0.5 (T) | |
| Bromate | 0.01 ^b (A, T) | |
| Bromodichloromethane | 0.06 ^b | |
| Bromoform | 0.1 | |
| Cadmium | 0.003 | |
| Carbofuran | 0.007 | |
| Carbon tetrachloride | 0.004 | |
| Chlorate | 0.7 (D) | |
| Chlordane | 0.0002 | |
| Chlorine | 5 (C) | For effective disinfection, there should be a residual concentration of free chlorine of ≥ 0.5 mg/litre after at least 30 min contact time at pH <8.0 |
| Chlorite | 0.7 (D) | |
| Chloroform | 0.3 | |
| Chlorotoluron | 0.03 | |
| Chlorpyrifos | 0.03 | |
| Chromium | 0.05 (P) | For total chromium |
| Copper | 2 | Staining of laundry and sanitary ware may occur below guideline value |
| Cyanazine | 0.0006 | |
| Cyanide | 0.07 | |
| Cyanogen chloride | 0.07 | For cyanide as total cyanogenic compounds |
| 2,4-D (2,4-dichlorophenoxyacetic acid) | 0.03 | Applies to free acid |
| 2,4-DB | 0.09 | |
| DDT and metabolites | 0.001 | |
| Di(2-ethylhexyl)phthalate | 0.008 | |
| Dibromoacetonitrile | 0.07 | |
| Dibromochloromethane | 0.1 | |
| 1,2-Dibromo-3-chloropropane | 0.001 ^b | |
| 1,2-Dibromoethane | 0.0004 ^b (P) | |
| Dichloroacetate | 0.05 ^b (T, D) | |
| Dichloroacetonitrile | 0.02 (P) | |
| Dichlorobenzene, 1,2- | 1 (C) | |

Table A4.3 Continued

| Chemical | Guideline value (mg/litre) | Remarks |
|--|---------------------------------------|--|
| Dichlorobenzene, 1,4- | 0.3 (C) | |
| Dichloroethane, 1,2- | 0.03 ^b | |
| Dichloroethene, 1,2- | 0.05 | |
| Dichloromethane | 0.02 | |
| 1,2-Dichloropropane (1,2-DCP) | 0.04 (P) | |
| 1,3-Dichloropropene | 0.02 ^b | |
| Dichlorprop | 0.1 | |
| Dimethoate | 0.006 | |
| Dioxane, 1,4- | 0.05 ^b | |
| Edetic acid (EDTA) | 0.6 | Applies to the free acid |
| Endrin | 0.0006 | |
| Epichlorohydrin | 0.0004 (P) | |
| Ethylbenzene | 0.3 (C) | |
| Fenoprop | 0.009 | |
| Fluoride | 1.5 | Volume of water consumed and intake from other sources should be considered when setting national standards |
| Hexachlorobutadiene | 0.0006 | |
| Isoproturon | 0.009 | |
| Lead | 0.01 | |
| Lindane | 0.002 | |
| Manganese | 0.4 (C) | |
| MCPA | 0.002 | |
| Mecoprop | 0.01 | |
| Mercury | 0.006 | For inorganic mercury |
| Methoxychlor | 0.02 | |
| Metolachlor | 0.01 | |
| Microcystin-LR | 0.001 (P) | For total microcystin-LR (free plus cell-bound) |
| Molinate | 0.006 | |
| Molybdenum | 0.07 | |
| Monochloramine | 3 | |
| Monochloroacetate | 0.02 | |
| Nickel | 0.07 | |
| Nitrate (as NO ₃ ⁻) | 50 | Short-term exposure |
| Nitrilotriacetic acid (NTA) | 0.2 | |
| Nitrite (as NO ₂ ⁻) | 3 | Short-term exposure |
| | 0.2 (P) | Long-term exposure |
| <i>N</i> -Nitrosodimethylamine (NDMA) | 0.1 | |
| Pendimethalin | 0.02 | |
| Pentachlorophenol | 0.009 ^b (P) | |
| Permethrin | 0.3 | Only when used as a larvicide for public health purposes |
| Pyriproxyfen | 0.3 | |
| Pyriproxyfen | 0.3 | This is not to be used as a guideline value where pyriproxyfen is added to water for public health purposes. |
| Selenium | 0.01 | |
| Simazine | 0.002 | |
| Sodium dichloroisocyanurate | 50 | As sodium dichloroisocyanurate |
| | 40 | As cyanuric acid |
| Styrene | 0.02 (C) | |
| 2,4,5-T | 0.009 | |
| Terbutylazine | 0.007 | |
| Tetrachloroethene | 0.04 | |
| Toluene | 0.7 (C) | |

| Chemical | Guideline value (mg/litre) | Remarks |
|-------------------------|-------------------------------|---|
| Trichloroacetate | 0.2 | |
| Trichloroethene | 0.02 (P) | |
| Trichlorophenol, 2,4,6- | 0.2 ^b (C) | |
| Trifluralin | 0.02 | |
| Trihalomethanes | | The sum of the ratio of the concentration of each to its respective guideline value should not exceed 1 |
| Uranium | 0.015 (P,T) | Only chemical aspects of uranium addressed |
| Vinyl chloride | 0.0003 ^b | |
| Xylenes | 0.5 (C) | |

^a P = provisional guideline value, as there is evidence of a hazard, but the available information on health effects is limited; T = provisional guideline value because calculated guideline value is below the level that can be achieved through practical treatment methods, source protection, etc.; A = provisional guideline value because calculated guideline value is below the achievable quantification level; D = provisional guideline value because disinfection is likely to result in the guideline value being exceeded; C = concentrations of the substance at or below the health-based guideline value may affect the appearance, taste or odour of the water, leading to consumer complaints.

^b For substances that are considered to be carcinogenic the guideline value is the concentration in drinking-water associated with an upper-bound excess lifetime cancer risk of 10^{-5} (one additional cancer per 100 000 of the population ingesting drinking-water containing the substance at the guideline value for 70 years). Concentrations associated with upper-bound estimated excess lifetime cancer risks of 10^{-4} and 10^{-6} can be calculated by multiplying and dividing, respectively, the guideline value by 10.

Source: Guidelines for Drinking-water Quality, Third edition incorporating the first and second addenda, Volume 1 Recommendations. Geneva 2008.

Annex 3

WHO Air Quality Guidelines

| Parameter | Concentration | Unit | Time of exposure |
|-----------|---------------|--------------------------|------------------|
| PM2.5 | 10 | $\mu\text{g}/\text{m}^3$ | Annual mean |
| | 25 | $\mu\text{g}/\text{m}^3$ | 24-hour mean |
| PM10 | 20 | $\mu\text{g}/\text{m}^3$ | Annual mean |
| | 50 | $\mu\text{g}/\text{m}^3$ | 24-hour mean |
| O3 | 100 | $\mu\text{g}/\text{m}^3$ | 8-hour mean |
| | 40 | $\mu\text{g}/\text{m}^3$ | Annual mean |
| NO2 | 200 | $\mu\text{g}/\text{m}^3$ | 1-hour mean |
| | 20 | $\mu\text{g}/\text{m}^3$ | 24-hour mean |
| SO2 | 500 | $\mu\text{g}/\text{m}^3$ | 10-minute mean |

Source: WHO, WHO Air Quality Guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide, Global Update 2005, 2006.

Annex 4

UNSD/UNEP Questionnaire on Environment 2008

**United Nations Statistics Division (UNSD) and United Nations Environment Programme (UNEP)
Questionnaire 2008 on Environment Statistics**

Water Section

Table W1: Renewable Freshwater Resources

| Priority | Line | Category | Unit | Long term annual average | 1990 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|----------|------|--|-----------------------|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| ! | 1 | Precipitation | mio m ³ /y | | | | | | | | | | | | | | | |
| | 2 | Actual evapotranspiration | mio m ³ /y | | | | | | | | | | | | | | | |
| ! | 3 | Internal flow (=1-2) | mio m ³ /y | | | | | | | | | | | | | | | |
| | 4 | Inflow of surface and groundwaters | mio m ³ /y | | | | | | | | | | | | | | | |
| ! | 5 | Renewable freshwater resources (=3+4) | mio m ³ /y | | | | | | | | | | | | | | | |
| | 6 | Outflow of surface and groundwaters | mio m ³ /y | | | | | | | | | | | | | | | |
| | 7 | Regular freshwater resources 95% of the time | mio m ³ /y | | | | | | | | | | | | | | | |

Notes: Precipitation figures should be based on representative precipitation measurements from across the country and the country's climatic zones.

:1

| 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 | 1999 | 1998 | 1997 | 1996 | 1995 | 1990 | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|--|--|--------|---|---|
| | | | | | | | | | | | | | | | | | | 1 | ! |
| | | | | | | | | | | | | | | | | | | 2 | |
| | | | | | | | | | | | | | | | | | (=1-2) | 3 | ! |
| | | | | | | | | | | | | | | | | | | 4 | |
| | | | | | | | | | | | | | | | | | (=3+4) | 5 | ! |
| | | | | | | | | | | | | | | | | | | 6 | |
| | | | | | | | | | | | | | | | | | 95% | 7 | |

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Table W2: Water Use Balance

| Line | Category | Unit | 1990 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|------|---|-----------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | Gross freshwater abstracted (=W3,1) | mio m ³ /y | | | | | | | | | | | | | | |
| 2 | Water returned without use | mio m ³ /y | | | | | | | | | | | | | | |
| 3 | Net freshwater abstracted (=1-2) | mio m ³ /y | | | | | | | | | | | | | | |
| 4 | Desalinated water | mio m ³ /y | | | | | | | | | | | | | | |
| 5 | Reused water | mio m ³ /y | | | | | | | | | | | | | | |
| 6 | Imports of water | mio m ³ /y | | | | | | | | | | | | | | |
| 7 | Exports of water | mio m ³ /y | | | | | | | | | | | | | | |
| 8 | Total freshwater made available for use (=3+4+5+6-7) | mio m ³ /y | | | | | | | | | | | | | | |
| 9 | Leakage during transport (=W4,4) | mio m ³ /y | | | | | | | | | | | | | | |
| 10 | Wastewater generated (=11+12+13) | mio m ³ /y | | | | | | | | | | | | | | |
| 11 | <i>of which:</i> Discharged to inland water bodies | mio m ³ /y | | | | | | | | | | | | | | |
| 12 | Discharged to marine water bodies | mio m ³ /y | | | | | | | | | | | | | | |
| 13 | Reused water (=5) | mio m ³ /y | | | | | | | | | | | | | | |
| 14 | Consumptive water use (=8-9-10) | mio m ³ /y | | | | | | | | | | | | | | |
| 15 | Water consumption (=14+12) | mio m ³ /y | | | | | | | | | | | | | | |

Notes: Do not confuse freshwater consumption with freshwater use, as these terms are different concepts in water statistics. Please see the definitions for more information.

Gross freshwater abstracted is water removed from any source, either permanently or temporarily. Includes abstraction by the water supply industry (ISIC 36) and direct abstraction by other activities, and water abstracted but returned without use, such as mine water and drainage water.

Water returned without use is water discharged into freshwaters without use, or before use. Occurs primarily during mining and construction activities. Excludes discharges into the sea.

:2

| 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 | 1999 | 1998 | 1997 | 1996 | 1995 | 1990 | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|--|--------------|----|
| | | | | | | | | | | | | | | | | (=W3-1) | 1 |
| | | | | | | | | | | | | | | | | | 2 |
| | | | | | | | | | | | | | | | | (=1-2) | 3 |
| | | | | | | | | | | | | | | | | | 4 |
| | | | | | | | | | | | | | | | | | 5 |
| | | | | | | | | | | | | | | | | | 6 |
| | | | | | | | | | | | | | | | | | 7 |
| | | | | | | | | | | | | | | | | (=7-6+5+4+3) | 8 |
| | | | | | | | | | | | | | | | | (=W4-4) | 9 |
| | | | | | | | | | | | | | | | | (=11+12+13) | 10 |
| | | | | | | | | | | | | | | | | : | 11 |
| | | | | | | | | | | | | | | | | | 12 |
| | | | | | | | | | | | | | | | | (=5) | 13 |
| | | | | | | | | | | | | | | | | (=8-9-10) | 14 |
| | | | | | | | | | | | | | | | | (=12+14) | 15 |

(ISIC 36)

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Table W3: Freshwater Abstraction

| Priority | Line | Category | Unit | 1990 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|----------|------|--|-----------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | | <i>Water abstracted</i> | | | | | | | | | | | | | | | |
| ! | 1 | Gross <u>freshwater</u> abstracted (=11+21) (=2+3+4+5+6+7+8) | mio m ³ /y | | | | | | | | | | | | | | |
| | 2 | Water abstraction by water supply industry (ISIC 36) (=12+22) | mio m ³ /y | | | | | | | | | | | | | | |
| | | <i>Self abstraction for own use by:</i> | | | | | | | | | | | | | | | |
| | 3 | Households (=13+23) | mio m ³ /y | | | | | | | | | | | | | | |
| | 4 | Agriculture, forestry and fishing (ISIC 01-03) (=14+24) | mio m ³ /y | | | | | | | | | | | | | | |
| | 5 | Manufacturing (ISIC 10-33) (=15+25) | mio m ³ /y | | | | | | | | | | | | | | |
| | 6 | Electricity industry (ISIC 351) (=16+26) | mio m ³ /y | | | | | | | | | | | | | | |
| | 7 | Other economic activities (=17+27) | mio m ³ /y | | | | | | | | | | | | | | |
| | | <i>Surface water abstracted</i> | | | | | | | | | | | | | | | |
| ! | 11 | Gross <u>fresh surface water</u> abstracted (=12+13+14+15+16+17) | mio m ³ /y | | | | | | | | | | | | | | |
| | 12 | Surface water abstraction by water supply industry (ISIC 36) | mio m ³ /y | | | | | | | | | | | | | | |
| | | <i>Self abstraction for own use by:</i> | | | | | | | | | | | | | | | |
| | 13 | Households | mio m ³ /y | | | | | | | | | | | | | | |
| | 14 | Agriculture, forestry and fishing (ISIC 01-03) | mio m ³ /y | | | | | | | | | | | | | | |
| | 15 | Manufacturing (ISIC 10-33) | mio m ³ /y | | | | | | | | | | | | | | |
| | 16 | Electricity industry (ISIC 351) | mio m ³ /y | | | | | | | | | | | | | | |
| | 17 | Other economic activities | mio m ³ /y | | | | | | | | | | | | | | |
| | | <i>Groundwater abstracted</i> | | | | | | | | | | | | | | | |
| ! | 21 | Gross <u>fresh groundwater</u> abstracted (=22+23+24+25+26+27) | mio m ³ /y | | | | | | | | | | | | | | |
| | 22 | Groundwater abstraction by water supply industry (ISIC 36) | mio m ³ /y | | | | | | | | | | | | | | |
| | | <i>Self abstraction for own use by:</i> | | | | | | | | | | | | | | | |
| | 23 | Households | mio m ³ /y | | | | | | | | | | | | | | |
| | 24 | Agriculture, forestry and fishing (ISIC 01-03) | mio m ³ /y | | | | | | | | | | | | | | |
| | 25 | Manufacturing (ISIC 10-33) | mio m ³ /y | | | | | | | | | | | | | | |
| | 26 | Electricity industry (ISIC 351) | mio m ³ /y | | | | | | | | | | | | | | |
| | 27 | Other economic activities | mio m ³ /y | | | | | | | | | | | | | | |

Notes: This table covers water abstraction from water bodies (rivers, lakes, groundwater etc.) by the abstractor. Electricity industry excludes water for hydroelectricity generation purposes.

| 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 | 1999 | 1998 | 1997 | 1996 | 1995 | 1990 | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|--|--|----|----------------------|--------------|----|
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | 21 | ! | | |
| | | | | | | | | | | | | | | | | | | (=27+26+25+24+23+22) | | |
| | | | | | | | | | | | | | | | | | | (ISIC 36) | 22 | |
| | | | | | | | | | | | | | | | | | | : | | |
| | | | | | | | | | | | | | | | | | | | 23 | |
| | | | | | | | | | | | | | | | | | | | (ISIC 01-03) | 24 |
| | | | | | | | | | | | | | | | | | | | (ISIC 10-33) | 25 |
| | | | | | | | | | | | | | | | | | | | (ISIC 351) | 26 |
| | | | | | | | | | | | | | | | | | | | | 27 |

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Table W4: Water Supply Industry (ISIC 36)

| Priority | Line | Category | Unit | 1990 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|----------|------|---|----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| ! | 1 | Gross freshwater delivered by water supply industry (ISIC 36) | mio m³/y | | | | | | | | | | | | | | |
| | 2 | Freshwater losses during transport | mio m ³ /y | | | | | | | | | | | | | | |
| | 3 | <i>of which:</i> Losses by evaporation | mio m ³ /y | | | | | | | | | | | | | | |
| | 4 | Losses by leakage | mio m ³ /y | | | | | | | | | | | | | | |
| ! | 5 | Net freshwater delivered by water supply industry (ISIC 36) (=1-2) (=6+7+8+9+10) | mio m³/y | | | | | | | | | | | | | | |
| | | <i>of which delivered to:</i> | | | | | | | | | | | | | | | |
| ! | 6 | Households | mio m ³ /y | | | | | | | | | | | | | | |
| | 7 | Agriculture, forestry and fishing (ISIC 01-03) | mio m ³ /y | | | | | | | | | | | | | | |
| | 8 | Manufacturing (ISIC 10-33) | mio m ³ /y | | | | | | | | | | | | | | |
| | 9 | Electricity industry (ISIC 351) | mio m ³ /y | | | | | | | | | | | | | | |
| | 10 | Other economic activities | mio m ³ /y | | | | | | | | | | | | | | |
| | | <i>Population supplied by water supply industry (ISIC 36)</i> | | | | | | | | | | | | | | | |
| ! | 11 | Population supplied by water supply industry (ISIC 36) | % | | | | | | | | | | | | | | |

Notes: This table covers water supplied by water supply industries, whether under public or under private control. It corresponds to what was called public water supply in previous questionnaires.

(ISIC 36)

:4

| 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 | 1999 | 1998 | 1997 | 1996 | 1995 | 1990 | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|---|-------------------------------------|----|---|
| | | | | | | | | | | | | | | | | (ISIC 36) | 1 | ! |
| | | | | | | | | | | | | | | | | | 2 | |
| | | | | | | | | | | | | | | | | | 3 | |
| | | | | | | | | | | | | | | | | | 4 | |
| | | | | | | | | | | | | | | | | (2-1 =) (ISIC 36) (10+9+8+7+6=) | 5 | ! |
| | | | | | | | | | | | | | | | | : | | |
| | | | | | | | | | | | | | | | | | 6 | ! |
| | | | | | | | | | | | | | | | | (ISIC 01-03) | 7 | |
| | | | | | | | | | | | | | | | | (ISIC 10-33) | 8 | |
| | | | | | | | | | | | | | | | | (ISIC 351) | 9 | |
| | | | | | | | | | | | | | | | | | 10 | |
| | | | | | | | | | | | | | | | | (ISIC 36) | | |
| | | | | | | | | | | | | | | | % | (ISIC 36) | 11 | ! |

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Table W5: Total Water Use

| Line | Category | Unit | 1990 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|------|---|-----------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | Freshwater use, total (=2+3+5+6+7) (=W4,5+W3,(3+4+5+6+7)) | mio m ³ /y | | | | | | | | | | | | | | |
| | <i>of which used by:</i> | | | | | | | | | | | | | | | |
| 2 | Households (=W3,3+W4,6) | mio m ³ /y | | | | | | | | | | | | | | |
| 3 | Agriculture, forestry and fishing (ISIC 01-03) (=W3,4+W4,7) | mio m ³ /y | | | | | | | | | | | | | | |
| 4 | <i>of which for irrigation in agriculture</i> | mio m ³ /y | | | | | | | | | | | | | | |
| 5 | Manufacturing (ISIC 10-33) (=W3,5+W4,8) | mio m ³ /y | | | | | | | | | | | | | | |
| 6 | Electricity industry (ISIC 351) (=W3,6+W4,9) | mio m ³ /y | | | | | | | | | | | | | | |
| 7 | Other economic activities (=W3,7+W4,10) | mio m ³ /y | | | | | | | | | | | | | | |

Notes: This table covers all water uses, including self-abstracted water, water supplied by public or private water industries, and water received from other parties. Production of electricity excludes water used for hydroelectricity production.

:5

| 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 | 1999 | 1998 | 1997 | 1996 | 1995 | 1990 | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|--|--|--|--|---|
| | | | | | | | | | | | | | | | | | | (=2+3+5+6+7) (W3,(3+4+5+6+7)+W4,5=) | 1 |
| | | | | | | | | | | | | | | | | | | : | |
| | | | | | | | | | | | | | | | | | | (W3,3+W4,6=) | 2 |
| | | | | | | | | | | | | | | | | | | (W3,4+W4,7=) (ISIC 01-03=) | 3 |
| | | | | | | | | | | | | | | | | | | | 4 |
| | | | | | | | | | | | | | | | | | | (W3,5+W4,8=) (ISIC 10-33) | 5 |
| | | | | | | | | | | | | | | | | | | (W3,6+W4,9=) (ISIC 351) | 6 |
| | | | | | | | | | | | | | | | | | | (W3,7+W4,10=) | 7 |

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Table W6: Wastewater Treatment Facilities

| Priority | Line | Category | Unit | 1990 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|----------|------|---|---------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | | Primary urban wastewater treatment | | | | | | | | | | | | | | | |
| | 1 | Number of plants | Number | | | | | | | | | | | | | | |
| ! | 2 | Design capacity (Volume) | 1000 m ³ /d | | | | | | | | | | | | | | |
| ! | 3 | Design capacity (BOD) | 1000 kg O ₂ /d | | | | | | | | | | | | | | |
| | 4 | Actual occupation (Volume) | 1000 m ³ /d | | | | | | | | | | | | | | |
| | 5 | Actual occupation (BOD) | 1000 kg O ₂ /d | | | | | | | | | | | | | | |
| | | Secondary urban wastewater treatment | | | | | | | | | | | | | | | |
| | 6 | Number of plants | Number | | | | | | | | | | | | | | |
| ! | 7 | Design capacity (Volume) | 1000 m ³ /d | | | | | | | | | | | | | | |
| ! | 8 | Design capacity (BOD) | 1000 kg O ₂ /d | | | | | | | | | | | | | | |
| | 9 | Actual occupation (Volume) | 1000 m ³ /d | | | | | | | | | | | | | | |
| | 10 | Actual occupation (BOD) | 1000 kg O ₂ /d | | | | | | | | | | | | | | |
| | | Independent wastewater treatment | | | | | | | | | | | | | | | |
| | 11 | Actual occupation (BOD) | 1000 kg O ₂ /d | | | | | | | | | | | | | | |
| | | Sewage sludge production | | | | | | | | | | | | | | | |
| | 12 | Sewage sludge production (dry matter) | 1000 t | | | | | | | | | | | | | | |

Notes: To avoid double counting, water subjected to both primary and secondary treatment should be reported under secondary treatment only. Tertiary treatment should be included into secondary treatment.

:6

| 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 | 1999 | 1998 | 1997 | 1996 | 1995 | 1990 | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------------------|-----|--|-----|
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | 1 |
| | | | | | | | | | | | | | | 1000 m ³ /d | () | | 2 ! |
| | | | | | | | | | | | | | | 1000 kg O ₂ /d | () | | 3 ! |
| | | | | | | | | | | | | | | 1000 m ³ /d | () | | 4 |
| | | | | | | | | | | | | | | 1000 kg O ₂ /d | () | | 5 |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | 6 |
| | | | | | | | | | | | | | | 1000 m ³ /d | () | | 7 ! |
| | | | | | | | | | | | | | | 1000 kg O ₂ /d | () | | 8 ! |
| | | | | | | | | | | | | | | 1000 m ³ /d | () | | 9 |
| | | | | | | | | | | | | | | 1000 kg O ₂ /d | () | | 10 |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 1000 kg O ₂ /d | () | | 11 |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 1000 t | () | | 12 |

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Table W7: Population Connected to Wastewater Treatment

| Priority | Line | Category | Unit | 1990 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|----------|------|--|-----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| ! | 1 | Population connected to urban wastewater collecting system | % of pop. | | | | | | | | | | | | | | |
| ! | 2 | Population connected to urban wastewater treatment | % of pop. | | | | | | | | | | | | | | |
| ! | 3 | <i>of which</i> at least secondary treatment | % of pop. | | | | | | | | | | | | | | |
| | 4 | Population with independent wastewater treatment (e.g. septic tanks) | % of pop. | | | | | | | | | | | | | | |
| | 5 | <i>of which</i> at least secondary treatment | % of pop. | | | | | | | | | | | | | | |
| | 6 | Population not connected to wastewater treatment (100% - (2) - (4)) | % of pop. | | | | | | | | | | | | | | |

:7

| 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 | 1999 | 1998 | 1997 | 1996 | 1995 | 1990 | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------|----------|----------|----------|
| | | | | | | | | | | | | | | % of pop. | | 1 | ! |
| | | | | | | | | | | | | | | % of pop. | | 2 | ! |
| | | | | | | | | | | | | | | % of pop. | | 3 | ! |
| | | | | | | | | | | | | | | % of pop. |) | | 4 |
| | | | | | | | | | | | | | | % of pop. | (| | 5 |
| | | | | | | | | | | | | | | % of pop. | -(2)-(4) | | 6 |
| | | | | | | | | | | | | | | | (100% | | |

**United Nations Statistics Division (UNSD) and United Nations Environment Programme (UNEP)
Questionnaire 2008 on Environment Statistics**

Waste Section

Table R1: Generation of Waste by Source

| Priority | Line | Category | Unit | 1990 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|----------|------|--|--------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | 1 | Agriculture, forestry and fishing (ISIC 01-03) | 1000 t | | | | | | | | | | | | | | |
| ! | 2 | Mining and quarrying (ISIC 05-09) | 1000 t | | | | | | | | | | | | | | |
| ! | 3 | Manufacturing (ISIC 10-33) | 1000 t | | | | | | | | | | | | | | |
| ! | 4 | Energy supply (ISIC 35) | 1000 t | | | | | | | | | | | | | | |
| ! | 5 | Construction (ISIC 41-43) | 1000 t | | | | | | | | | | | | | | |
| | 6 | Other economic activities (ISIC 36-39, 45-99) | 1000 t | | | | | | | | | | | | | | |
| ! | 7 | Households | 1000 t | | | | | | | | | | | | | | |
| ! | 8 | Total waste generation (8 = 1+ ...+ 7) | 1000 t | | | | | | | | | | | | | | |

Notes: * Waste generated by an economic activity includes all kinds of waste generated by enterprises within this activity.

* If the requested data are not available, please leave the cell blank. If the requested variable is not applicable (the phenomenon is not relevant) to the country, the cell should be filled with "0".

:1

| 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 | 1999 | 1998 | 1997 | 1996 | 1995 | 1990 | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|---------------------|---|---|
| | | | | | | | | | | | | | | | (ISIC 01-03) | 1 | |
| | | | | | | | | | | | | | | | (ISIC 05-09) | 2 | ! |
| | | | | | | | | | | | | | | | (ISIC 10-33) | 3 | ! |
| | | | | | | | | | | | | | | | (ISIC 35) | 4 | ! |
| | | | | | | | | | | | | | | | (ISIC 41-43) | 5 | ! |
| | | | | | | | | | | | | | | | (ISIC 36-39, 45-99) | 6 | |
| | | | | | | | | | | | | | | | | 7 | ! |
| | | | | | | | | | | | | | | | (7 + ... + 1 = 8) | 8 | ! |

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Table R2: Generation and Recycling of Selected Waste Materials

| Line | Material | Category | Unit | 1990 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|------|--|-------------------------------|--------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | Paper, paperboard and paper products | Waste generated | 1000 t | | | | | | | | | | | | | | |
| 2 | | Waste collected for recycling | 1000 t | | | | | | | | | | | | | | |
| 3 | Glass | Waste generated | 1000 t | | | | | | | | | | | | | | |
| 4 | | Waste collected for recycling | 1000 t | | | | | | | | | | | | | | |
| 5 | Aluminium | Waste generated | 1000 t | | | | | | | | | | | | | | |
| 6 | | Waste collected for recycling | 1000 t | | | | | | | | | | | | | | |
| 7 | Ferrous metal (including stainless steel) | Waste generated | 1000 t | | | | | | | | | | | | | | |
| 8 | | Waste collected for recycling | 1000 t | | | | | | | | | | | | | | |
| 9 | Plastic | Waste generated | 1000 t | | | | | | | | | | | | | | |
| 10 | | Waste collected for recycling | 1000 t | | | | | | | | | | | | | | |
| 11 | Generation of other selected waste materials | Construction/Demolition waste | 1000 t | | | | | | | | | | | | | | |
| 12 | | Sewage sludge (dry weight) | 1000 t | | | | | | | | | | | | | | |
| 13 | | End-of life vehicles (a) | 1000 t | | | | | | | | | | | | | | |
| 14 | | Used tyres | 1000 t | | | | | | | | | | | | | | |
| 15 | | Electric and electronic scrap | 1000 t | | | | | | | | | | | | | | |
| 16 | | Other, specify | 1000 t | | | | | | | | | | | | | | |

Notes: "Selected Waste Materials" include waste with similar material content from all origins and all economic activities.

(a) Used tyres should be excluded. If not, please specify in the footnote.

:2

| 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 | 1999 | 1998 | 1997 | 1996 | 1995 | 1990 | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|--|--|----|
| | | | | | | | | | | | | | | | | | 1 |
| | | | | | | | | | | | | | | | | | 2 |
| | | | | | | | | | | | | | | | | | 3 |
| | | | | | | | | | | | | | | | | | 4 |
| | | | | | | | | | | | | | | | | | 5 |
| | | | | | | | | | | | | | | | | | 6 |
| | | | | | | | | | | | | | | | | | 7 |
| | | | | | | | | | | | | | | | | | 8 |
| | | | | | | | | | | | | | | | | | 9 |
| | | | | | | | | | | | | | | | | | 10 |
| | | | | | | | | | | | | | | | | | 11 |
| | | | | | | | | | | | | | | | | | 12 |
| | | | | | | | | | | | | | | | | | 13 |
| | | | | | | | | | | | | | | | | | 14 |
| | | | | | | | | | | | | | | | | | 15 |
| | | | | | | | | | | | | | | | | | 16 |

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Table R3: Management of Hazardous Waste

| Priority | Line | Category | Unit | 1990 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|----------|------|--|--------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| ! | 1 | Hazardous waste generated | tonnes | | | | | | | | | | | | | | |
| | 2 | Hazardous waste imported | tonnes | | | | | | | | | | | | | | |
| | 3 | Hazardous waste exported | tonnes | | | | | | | | | | | | | | |
| ! | 4 | Hazardous waste managed in the country (4 = 1 + 2 - 3) | tonnes | | | | | | | | | | | | | | |
| | 5 | <i>Amounts going to:</i> Recycling | tonnes | | | | | | | | | | | | | | |
| ! | 6 | Incineration | tonnes | | | | | | | | | | | | | | |
| ! | 7 | Landfill | tonnes | | | | | | | | | | | | | | |
| | 8 | Other, please specify in the footnote | tonnes | | | | | | | | | | | | | | |

Notes: * Please note that the unit in this table is "**tonnes (metric tons)**".

* If the hazardous waste is treated in a different year than it was generated (temporary storage or accumulation from previous years), the sum of the waste in the different treatment categories can be different from the amount of waste managed. If this is the case, please explain it in a footnote.

* If the requested data are not available, please leave the cell blank. If the requested variable is not applicable (the phenomenon is not relevant) to the country, the cell should be filled with "0". *

:3

| 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 | 1999 | 1998 | 1997 | 1996 | 1995 | 1990 | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|--|--|-----------|---|---|
| | | | | | | | | | | | | | | | | | 1 | ! | |
| | | | | | | | | | | | | | | | | | 2 | | |
| | | | | | | | | | | | | | | | | | 3 | | |
| | | | | | | | | | | | | | | | | | (4=1+2-3) | 4 | ! |
| | | | | | | | | | | | | | | | | | : | 5 | ! |
| | | | | | | | | | | | | | | | | | | 6 | ! |
| | | | | | | | | | | | | | | | | | | 7 | ! |
| | | | | | | | | | | | | | | | | | | 8 | |

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Table R4a: Management of Municipal Waste

| Priority | Line | Category | Unit | 1990 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|----------|------|---|--------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| ! | 1 | Municipal waste collected from households | 1000 t | | | | | | | | | | | | | | |
| | 2 | Municipal waste collected from other origins | 1000 t | | | | | | | | | | | | | | |
| | 3 | Total amount of municipal waste collected (3 = 1 + 2) | 1000 t | | | | | | | | | | | | | | |
| ! | 4 | Municipal waste managed in the country (a) | 1000 t | | | | | | | | | | | | | | |
| | | <i>Amounts going to:</i> | | | | | | | | | | | | | | | |
| ! | 5 | Recycling | 1000 t | | | | | | | | | | | | | | |
| ! | 6 | Composting | 1000 t | | | | | | | | | | | | | | |
| ! | 7 | Incineration | 1000 t | | | | | | | | | | | | | | |
| ! | 8 | <i>of which: with energy recovery</i> | 1000 t | | | | | | | | | | | | | | |
| ! | 9 | Landfill | 1000 t | | | | | | | | | | | | | | |
| ! | 10 | <i>of which: controlled landfill</i> | 1000 t | | | | | | | | | | | | | | |
| | 11 | Other, please specify in the footnote | 1000 t | | | | | | | | | | | | | | |
| | 12 | Percentage of total population served by municipal waste collection | % | | | | | | | | | | | | | | |
| | 13 | Percentage of urban population served by municipal waste collection | % | | | | | | | | | | | | | | |
| | 14 | Percentage of rural population served by municipal waste collection | % | | | | | | | | | | | | | | |

Notes: If the requested data are not available, please leave the cell blank. If the requested variable is not applicable (the phenomenon is not relevant) to the country, the cell should be filled with "0".

(a) The amount of 'Municipal waste managed in the country' (line 4) can be different from 'Total amount of municipal waste collected' (line 3) because of import/export of municipal waste. If there is import/export of municipal waste in your country, please indicate with a footnote.

:() 4

| 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 | 1999 | 1998 | 1997 | 1996 | 1995 | 1990 | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|-------------|--|----|---|
| | | | | | | | | | | | | | | | | | 1 | ! |
| | | | | | | | | | | | | | | | | | 2 | |
| | | | | | | | | | | | | | | | (2 + 1 = 3) | | 3 | |
| | | | | | | | | | | | | | | | () | | 4 | ! |
| | | | | | | | | | | | | | | | : | | 5 | ! |
| | | | | | | | | | | | | | | | | | 6 | ! |
| | | | | | | | | | | | | | | | | | 7 | ! |
| | | | | | | | | | | | | | | | : | | 8 | ! |
| | | | | | | | | | | | | | | | | | 9 | ! |
| | | | | | | | | | | | | | | | | | 10 | ! |
| | | | | | | | | | | | | | | | | | 11 | |
| | | | | | | | | | | | | | | | | | 12 | |
| | | | | | | | | | | | | | | | % | | 13 | |
| | | | | | | | | | | | | | | | % | | 14 | |

" " () (4) (3) *

Table R4b: Composition of Municipal Waste

| Priority | Line | Category | Unit | 1990 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|----------|------|--|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | 1 | Paper, paperboard | % | | | | | | | | | | | | | | |
| | 2 | Textiles | % | | | | | | | | | | | | | | |
| | 3 | Plastics | % | | | | | | | | | | | | | | |
| | 4 | Glass | % | | | | | | | | | | | | | | |
| | 5 | Metals | % | | | | | | | | | | | | | | |
| | 6 | Organic material | % | | | | | | | | | | | | | | |
| | 7 | <i>of which: food and garden waste</i> | % | | | | | | | | | | | | | | |
| | 8 | Other inorganic material | % | | | | | | | | | | | | | | |
| | 9 | TOTAL | % | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Notes: * Usually, the composition of municipal waste is determined from the physical analysis of waste samples using surveying methods. If the survey was not conducted in the years listed above, please provide the year in the footnote.

* If only the composition of household waste is available, please provide the information with a footnote.

* If the requested data are not available, please leave the cell blank. If the requested variable is not applicable (the phenomenon is not relevant) to the country, the cell should be filled with "0".

:() 4

| 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 | 1999 | 1998 | 1997 | 1996 | 1995 | 1990 | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---|---|--|---|
| | | | | | | | | | | | | | | % | | | 1 |
| | | | | | | | | | | | | | | % | | | 2 |
| | | | | | | | | | | | | | | % | | | 3 |
| | | | | | | | | | | | | | | % | | | 4 |
| | | | | | | | | | | | | | | % | | | 5 |
| | | | | | | | | | | | | | | % | | | 6 |
| | | | | | | | | | | | | | | % | : | | 7 |
| | | | | | | | | | | | | | | % | | | 8 |
| 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | % | | | 9 |

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Table R4c: Local Management of Municipal Waste

CITY NAME:

| Priority | Line | Category | Unit | 1990 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|----------|------|--|-----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| ! | 1 | Total population of the city | 1000 inh. | | | | | | | | | | | | | | |
| ! | 2 | Percentage of city population served by municipal waste collection | % | | | | | | | | | | | | | | |
| | 3 | Municipal waste collected from households | 1000 t | | | | | | | | | | | | | | |
| | 4 | Municipal waste collected from other origins | 1000 t | | | | | | | | | | | | | | |
| ! | 5 | Total amount of municipal waste collected (5 = 3 + 4) | 1000 t | | | | | | | | | | | | | | |
| | | <i>Amounts going to:</i> | | | | | | | | | | | | | | | |
| ! | 6 | Recycling | 1000 t | | | | | | | | | | | | | | |
| ! | 7 | Composting | 1000 t | | | | | | | | | | | | | | |
| ! | 8 | Incineration | 1000 t | | | | | | | | | | | | | | |
| ! | 9 | <i>of which: with energy recovery</i> | 1000 t | | | | | | | | | | | | | | |
| ! | 10 | Landfill | 1000 t | | | | | | | | | | | | | | |
| ! | 11 | <i>of which: controlled landfill</i> | 1000 t | | | | | | | | | | | | | | |
| | 12 | Other, please specify in the footnote | 1000 t | | | | | | | | | | | | | | |

Notes: * Countries are kindly asked to provide data for the most populous cities of the country. Please do not hesitate to duplicate this table if you can provide data for additional cities.

* If the requested data are not available, please leave the cell blank. If the requested variable is not applicable (the phenomenon is not relevant) to the country, the cell should be filled with "0".

:() 4

| 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 | 1999 | 1998 | 1997 | 1996 | 1995 | 1990 | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---|--|--|------|
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | 1 ! |
| | | | | | | | | | | | | | | % | | | 2 ! |
| | | | | | | | | | | | | | | | | | 3 |
| | | | | | | | | | | | | | | | | | 4 |
| | | | | | | | | | | | | | | | | | 5 ! |
| | | | | | | | | | | | | | | | | | 6 ! |
| | | | | | | | | | | | | | | | | | 7 ! |
| | | | | | | | | | | | | | | | | | 8 ! |
| | | | | | | | | | | | | | | | | | 9 ! |
| | | | | | | | | | | | | | | | | | 10 ! |
| | | | | | | | | | | | | | | | | | 11 ! |
| | | | | | | | | | | | | | | | | | 12 |

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Table R5: Waste Treatment and Disposal Facilities

| Priority | Line | Category | Unit | 1990 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|----------|------|---|--------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| ! | 1 | Landfill sites: number | number | | | | | | | | | | | | | | |
| ! | 2 | annual inputs | 1000 t | | | | | | | | | | | | | | |
| | 3 | <i>of which: controlled landfill</i> number | number | | | | | | | | | | | | | | |
| | 4 | annual inputs | 1000 t | | | | | | | | | | | | | | |
| | 5 | <i>of which: uncontrolled landfill</i> number | number | | | | | | | | | | | | | | |
| | 6 | annual inputs | 1000 t | | | | | | | | | | | | | | |
| ! | 7 | Incineration plants: number | number | | | | | | | | | | | | | | |
| ! | 8 | annual capacity | 1000 t | | | | | | | | | | | | | | |
| | 9 | <i>of which: with energy recovery</i> number | number | | | | | | | | | | | | | | |
| | 10 | annual capacity | 1000 t | | | | | | | | | | | | | | |
| | 11 | <i>of which: without energy recovery</i> number | number | | | | | | | | | | | | | | |
| | 12 | annual capacity | 1000 t | | | | | | | | | | | | | | |
| ! | 13 | Composting plants: number | number | | | | | | | | | | | | | | |
| ! | 14 | annual capacity | 1000 t | | | | | | | | | | | | | | |
| | 15 | Other waste treatment/disposal facilities, please specify in the footnote: number | number | | | | | | | | | | | | | | |
| | 16 | annual capacity | 1000 t | | | | | | | | | | | | | | |

* *Note:* If the requested data are not available, please leave the cell blank. If the requested variable is not applicable (the phenomenon is not relevant) to the country, the cell should be filled with "0".

:5

| 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 | 1999 | 1998 | 1997 | 1996 | 1995 | 1990 | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|--|---|------|
| | | | | | | | | | | | | | | | | | : |
| | | | | | | | | | | | | | | | | | 1 ! |
| | | | | | | | | | | | | | | | | | 2 ! |
| | | | | | | | | | | | | | | | | : | 3 |
| | | | | | | | | | | | | | | | | | 4 |
| | | | | | | | | | | | | | | | | : | 5 |
| | | | | | | | | | | | | | | | | | 6 |
| | | | | | | | | | | | | | | | | : | 7 ! |
| | | | | | | | | | | | | | | | | | 8 ! |
| | | | | | | | | | | | | | | | | : | 9 |
| | | | | | | | | | | | | | | | | | 10 |
| | | | | | | | | | | | | | | | | : | 11 |
| | | | | | | | | | | | | | | | | | 12 |
| | | | | | | | | | | | | | | | | : | 13 ! |
| | | | | | | | | | | | | | | | | | 14 ! |
| | | | | | | | | | | | | | | | | / | 15 |
| | | | | | | | | | | | | | | | | : | 16 |

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يستعرض هذا العدد من مجموعة الإحصاءات البيئية في منطقة اللجنة الاقتصادية والاجتماعية لغربي آسيا حالة البيئة في منطقة الإسكوا. فهو يتضمن بيانات شاملة عن المواضيع الثمانية التالية: (أ) لمحة عامة عن منطقة الإسكوا؛ (ب) موارد المياه العذبة؛ (ج) استهلاك المياه العذبة؛ (د) حسابات المياه ونفقات حماية البيئة؛ (هـ) إدارة النفايات؛ (و) استهلاك الطاقة؛ (ز) تلوث الهواء؛ (ح) الهدف السابع من الأهداف الإنمائية للألفية. وقد استند النهج المعتمد في جمع المعلومات إلى استمارة الإحصاءات البيئية الصادرة عن شعبة الإحصاء في الأمم المتحدة بشأن النفايات والمياه. ثم استكملت البيانات من الإحصاءات الواردة في المطبوعات وقواعد البيانات الوطنية والإقليمية والدولية، بينما أعطيت الأولوية للمصادر الوطنية الرسمية.

This compendium provides a review of the status of the environment in the ESCWA region. It includes comprehensive data on eight themes: an overview of the ESCWA region; freshwater resources; freshwater use; water accounts and environmental protection expenditure; waste management; energy consumption; air pollution; and Goal 7 of the Millennium Development Goals. The collection methodology was based on the United Nations Statistics Division Questionnaire on Environment Statistics on water and waste, and was complemented by statistics from national, regional and international publications and databases, with priority given to official national sources.



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