



# 3.5

## Freshwater

	Renewable internal freshwater resources <sup>a</sup>		Annual freshwater withdrawals				Water productivity	Access to an improved water source		
	Flows billion cu. m	Per capita cu. m	billion cu. m	% of internal resources	% for agriculture	% for industry	% for domestic	GDP/water use 2000 \$ per cu. m	% of urban population	% of rural population
	2007	2007	2007 <sup>b</sup>	2007 <sup>b</sup>	2007 <sup>b</sup>	2007 <sup>b</sup>	2007 <sup>b</sup>	2007 <sup>b</sup>	2006	2006
Afghanistan	55	..	23.3	42.3	98	0	2	..	..	..
Albania	27	8,456	1.7	6.4	62	11	27	2.2	97	97
Algeria	11	332	6.1	54.0	65	13	22	9.0	87	81
Angola	148	8,696	0.4	0.2	60	17	23	26.1	62	39
Argentina	276	6,987	29.2	10.6	74	9	17	9.7	98	80
Armenia	9	3,023	3.0	32.5	66	4	30	0.6	99	96
Australia	492	23,412	23.9	4.9	75	10	15	16.9	100	100
Austria	55	6,614	2.1	3.8	1	64	35	91.9	100	100
Azerbaijan	8	947	12.2	150.5	76	19	4	0.8	95	59
Bangladesh	105	662	79.4	75.6	96	1	3	0.6	85	78
Belarus	37	3,834	2.8	7.5	30	47	23	4.6	100	99
Belgium	12	1,129	..	..	..	..	..	..	100	..
Benin	10	1,141	0.1	1.3	45	23	32	18.2	78	57
Bolivia	304	31,892	1.4	0.5	81	7	13	5.8	96	69
Bosnia and Herzegovina	36	9,409	..	..	..	..	..	..	100	98
Botswana	2	1,276	0.2	8.1	41	18	41	31.8	100	90
Brazil	5,418	28,277	59.3	1.1	62	18	20	10.9	97	58
Bulgaria	21	2,742	10.5	50.0	19	78	3	1.2	100	97
Burkina Faso	13	846	0.8	6.4	86	1	13	3.3	97	66
Burundi	10	1,184	0.3	2.9	77	6	17	2.5	84	70
Cambodia	121	8,346	4.1	3.4	98	0	1	0.9	80	61
Cameroon	273	14,731	1.0	0.4	74	8	18	10.2	88	47
Canada	2,850	86,426	46.0	1.6	12	69	20	15.8	100	99
Central African Republic	141	32,463	0.0	0.0	4	16	80	38.4	90	51
Chad	15	1,394	0.2	1.5	83	0	17	6.0	71	40
Chile	884	53,270	12.6	1.4	64	25	11	6.0	98	72
China	2,812	2,132	630.3	22.4	68	26	7	1.9	98	81
Hong Kong, China	..	..	..	..	..	..	..	..	..	..
Colombia	2,112	48,014	10.7	0.5	46	4	50	8.8	99	77
Congo, Dem. Rep.	900	14,423	0.4	0.0	31	17	53	12.0	82	29
Congo, Rep.	222	58,937	0.0	0.0	9	22	70	76.1	95	35
Costa Rica	112	25,189	2.7	2.4	53	17	29	6.0	99	96
Côte d'Ivoire	77	3,988	0.9	1.2	65	12	24	11.2	98	66
Croatia	38	8,499	..	..	..	..	..	..	100	98
Cuba	38	3,386	8.2	21.5	69	12	19	..	95	78
Czech Republic	13	1,272	2.6	19.6	2	57	41	22.0	100	100
Denmark	6	1,099	1.3	21.2	43	25	32	126.0	100	100
Dominican Republic	21	2,153	3.4	16.1	66	2	32	5.8	97	91
Ecuador	432	32,385	17.0	3.9	82	5	12	0.9	98	91
Egypt, Arab Rep.	2	24	68.3	3,794.4	86	6	8	1.5	99	98
El Salvador	18	2,590	1.3	7.2	59	16	25	10.3	94	68
Eritrea	3	578	0.6	20.8	95	0	5	1.2	74	57
Estonia	13	9,475	0.2	1.2	5	38	57	35.6	100	99
Ethiopia	122	1,543	5.6	4.6	94	0	6	1.6	96	31
Finland	107	20,232	2.5	2.3	3	84	14	49.2	100	100
France	179	2,893	40.0	22.4	10	74	16	33.2	100	100
Gabon	164	123,291	0.1	0.1	42	8	50	42.2	95	47
Gambia, The	3	1,758	0.0	1.0	65	12	23	13.8	91	81
Georgia	58	13,224	1.6	2.8	65	13	22	2.7	100	97
Germany	107	1,301	47.1	44.0	20	68	12	40.4	100	100
Ghana	30	1,291	1.0	3.2	66	10	24	5.1	90	71
Greece	58	5,182	7.8	13.4	80	3	16	16.2	100	99
Guatemala	109	8,181	2.0	1.8	80	13	6	9.6	99	94
Guinea	226	24,093	1.5	0.7	90	2	8	2.1	91	59
Guinea-Bissau	16	9,441	0.2	1.1	82	5	13	1.2	82	47
Haiti	13	1,354	1.0	7.6	94	1	5	3.9	70	51

	Renewable internal freshwater resources <sup>a</sup>		Annual freshwater withdrawals					Water productivity	Access to an improved water source	
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	2007	2007	2007 <sup>b</sup>	2007 <sup>b</sup>	2007 <sup>b</sup>	2007 <sup>b</sup>	2007 <sup>b</sup>	2007 <sup>b</sup>	2006	2006
Honduras	96	13,527	0.9	0.9	80	12	8	8.3	95	74
Hungary	6	597	7.6	127.3	32	59	9	6.3	100	100
India	1,261	1,122	645.8	51.2	86	5	8	0.7	96	86
Indonesia	2,838	12,578	82.8	2.9	91	1	8	2.0	89	71
Iran, Islamic Rep.	129	1,809	93.3	72.6	92	1	7	1.4	99	84
Iraq	35	..	66.0	187.5	79	15	7	0.4	..	..
Ireland	49	11,223	1.1	2.3	0	77	23	85.3	100	..
Israel	1	104	2.0	260.5	58	6	36	67.0	100	100
Italy	183	3,074	44.4	24.3	45	37	18	24.7	100	..
Jamaica	9	3,514	0.4	4.4	49	17	34	19.6	97	88
Japan	430	3,365	88.4	20.6	62	18	20	52.8	100	100
Jordan	1	119	0.9	138.0	65	4	31	12.1	99	91
Kazakhstan	75	4,871	35.0	46.4	82	17	2	0.5	99	91
Kenya	21	552	2.7	13.2	79	4	17	5.0	85	49
Korea, Dem. Rep.	67	2,817	9.0	13.5	55	25	20	..	100	100
Korea, Rep.	65	1,338	18.6	28.7	48	16	36	27.5	97	71
Kuwait	..	..	0.9	..	54	2	44	42.9	..	..
Kyrgyz Republic	46	8,873	10.1	21.7	94	3	3	0.1	99	83
Lao PDR	190	32,495	3.0	1.6	90	6	4	0.6	86	53
Latvia	17	7,355	0.3	1.8	13	33	53	26.1	100	96
Lebanon	5	1,172	1.3	27.3	60	11	29	15.7	100	100
Lesotho	5	2,607	0.1	1.0	20	40	40	17.1	93	74
Liberia	200	53,290	0.1	0.1	55	18	27	5.1	72	52
Libya	1	97	4.3	721.0	83	3	14	8.0	72	68
Lithuania	16	4,610	0.3	1.7	7	15	78	42.3	..	..
Macedonia, FYR	5	2,651	..	..	..	..	..	..	100	99
Madagascar	337	17,133	15.0	4.4	96	2	3	0.3	76	36
Malawi	16	1,159	1.0	6.3	80	5	15	1.7	96	72
Malaysia	580	21,846	9.0	1.6	62	21	17	10.4	100	96
Mali	60	4,865	6.5	10.9	90	1	9	0.4	86	48
Mauritania	0	128	1.7	425.0	88	3	9	0.6	70	54
Mauritius	3	2,182	0.7	26.4	68	3	30	6.9	100	100
Mexico	409	3,885	78.2	19.1	77	5	17	7.4	98	85
Moldova	1	264	2.3	231.0	33	58	10	0.6	96	85
Mongolia	35	13,322	0.4	1.3	52	27	20	2.5	90	48
Morocco	29	940	12.6	43.4	87	3	10	2.9	100	58
Mozambique	100	4,693	0.6	0.6	87	2	11	6.7	71	26
Myanmar	881	18,051	33.2	3.8	98	1	1	..	80	80
Namibia	6	2,971	0.3	4.9	71	5	24	11.4	99	90
Nepal	198	7,051	10.2	5.1	96	1	3	0.5	94	88
Netherlands	11	672	7.9	72.2	34	60	6	48.5	100	100
New Zealand	327	77,336	2.1	0.6	42	9	48	24.1	100	..
Nicaragua	190	33,854	1.3	0.7	83	2	15	3.0	90	63
Niger	4	247	2.2	62.3	95	0	4	0.8	91	32
Nigeria	221	1,493	8.0	3.6	69	10	21	5.7	65	30
Norway	382	81,119	2.2	0.6	11	67	23	76.8	100	100
Oman	1	539	1.3	94.4	88	1	10	16.9	85	73
Pakistan	55	339	169.4	308.0	96	2	2	0.4	95	87
Panama	147	44,130	0.8	0.6	28	5	67	14.2	96	81
Papua New Guinea	801	126,658	0.1	0.0	1	42	56	49.6	88	32
Paraguay	94	15,358	0.5	0.5	71	8	20	14.4	94	52
Peru	1,616	57,925	20.1	1.2	82	10	8	2.6	92	63
Philippines	479	5,450	28.5	6.0	74	9	17	2.7	96	88
Poland	54	1,406	16.2	30.2	8	79	13	10.6	100	..
Portugal	38	3,582	11.3	29.6	78	12	10	10.0	99	100
Puerto Rico	7	1,801	..	..	..	..	..	..	..	..



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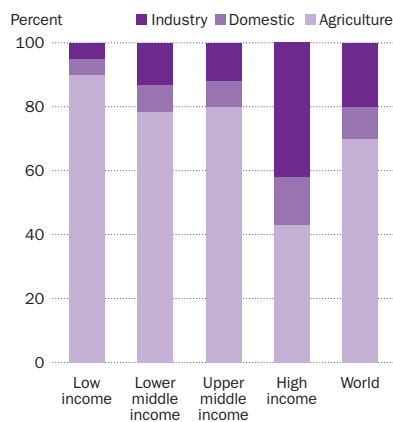
	Renewable internal freshwater resources <sup>a</sup>		Annual freshwater withdrawals				Water productivity	Access to an improved water source		
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	2007	2007	2007 <sup>b</sup>	2007 <sup>b</sup>	2007 <sup>b</sup>	2007 <sup>b</sup>	2007 <sup>b</sup>	2007 <sup>b</sup>	2006	2006
Romania	42	1,963	23.2	54.8	57	34	9	1.6	99	76
Russian Federation	4,313	30,350	76.7	1.8	18	63	19	3.4	100	88
Rwanda	10	976	0.2	1.6	68	8	24	11.6	82	61
Saudi Arabia	2	99	23.7	986.1	88	3	9	9.9	97	..
Senegal	26	2,079	2.2	8.6	93	3	4	2.2	93	65
Serbia	44 <sup>c</sup>	5,419 <sup>c</sup>	..	..	..	..	..	..	99 <sup>d</sup>	..
Sierra Leone	160	27,358	0.4	0.2	92	3	5	1.7	83	32
Singapore	1	131	..	..	..	..	..	..	100	..
Slovak Republic	13	2,334	..	..	..	..	..	..	100	100
Slovenia	19	9,251	..	..	..	..	..	..	..	..
Somalia	6	690	3.3	55.0	99	0	0	..	63	10
South Africa	45	936	12.5	27.9	63	6	31	10.6	100	82
Spain	111	2,478	35.6	32.0	68	19	13	16.3	100	100
Sri Lanka	50	2,499	12.6	25.2	95	2	2	1.3	98	79
Sudan	30	778	37.3	124.4	97	1	3	0.3	78	64
Swaziland	3	2,306	1.0	39.5	97	1	2	1.4	87	51
Sweden	171	18,692	3.0	1.7	9	54	37	83.0	100	100
Switzerland	40	5,351	2.6	6.4	2	74	24	97.2	100	100
Syrian Arab Republic	7	352	16.7	238.4	88	4	9	1.3	95	83
Tajikistan	66	9,837	12.0	18.0	92	5	4	0.1	93	58
Tanzania	84	2,078	5.2	6.2	89	0	10	2.0	81	46
Thailand	210	3,290	87.1	41.5	95	2	2	1.4	99	97
Togo	12	1,748	0.2	1.5	45	2	53	8.2	86	40
Trinidad and Tobago	4	2,881	0.3	8.1	6	26	68	26.3	97	93
Tunisia	4	410	2.6	62.9	82	4	14	7.4	99	84
Turkey	227	3,072	40.1	17.7	74	11	15	7.0	98	95
Turkmenistan	1	274	24.7	1,812.5	98	1	2	0.1	..	..
Uganda	39	1,261	..	..	..	..	..	..	90	60
Ukraine	53	1,142	37.5	70.7	52	35	12	0.8	97	97
United Arab Emirates	0	34	4.0	2,665.3	83	2	15	24.5	100	100
United Kingdom	145	2,377	9.5	6.6	3	75	22	152.1	100	100
United States	2,800	9,283	479.3	17.1	41	46	13	20.4	100	94
Uruguay	59	17,750	3.2	5.3	96	1	3	6.6	100	100
Uzbekistan	16	608	58.3	357.0	93	2	5	0.2	98	82
Venezuela, RB	722	26,287	8.4	1.2	47	7	46	14.0	..	..
Vietnam	367	4,304	71.4	19.5	68	24	8	0.4	98	90
West Bank and Gaza	..	..	..	..	..	..	..	..	90	88
Yemen, Rep.	2	94	3.4	161.9	90	2	8	2.8	68	65
Zambia	80	6,728	1.7	2.2	76	7	17	1.9	90	41
Zimbabwe	12	915	4.2	34.3	79	7	14	1.6	98	72
<b>World</b>	<b>43,464 s</b>	<b>6,624 w</b>	<b>3,850.0 s</b>	<b>9.0 w</b>	<b>70 w</b>	<b>20 w</b>	<b>10 w</b>	<b>10.3 w</b>	<b>96 w</b>	<b>77 w</b>
<b>Low income</b>	5,985	4,619	554.6	9.4	90	5	5	1.0	84	60
<b>Middle income</b>	27,963	6,589	2,374.8	8.5	76	15	9	3.7	97	83
Lower middle income	14,116	4,117	2,929.5	8.7	78	13	8	3.2	96	82
Upper middle income	13,847	16,993	1,937.8	13.8	80	12	8	2.5	98	83
<b>Low &amp; middle income</b>	33,947	6,128	437.0	3.2	57	26	17	8.8	94	76
East Asia & Pacific	9,454	4,945	959.0	10.2	74	20	7	3.4	96	81
Europe & Central Asia	5,167	11,806	368.4	7.2	60	30	10	3.7	99	88
Latin America & Carib.	13,425	23,965	264.9	2.0	71	10	19	9.9	97	73
Middle East & N. Africa	225	728	275.6	122.3	86	6	8	2.7	95	81
South Asia	1,819	1,196	941.1	51.7	89	4	6	1.1	94	84
Sub-Saharan Africa	3,858	4,823	120.5	3.2	87	3	10	4.1	81	46
<b>High income</b>	9,516	9,313	920.5	10.4	43	42	15	31.6	100	98
Euro area	930	2,907	200.0	22.3	38	48	15	33.7	100	100

a. Excludes river flows from other countries because of data unreliability. b. Refers to data reported to the Food and Agriculture Organization as of 2007. See *Primary data documentation* for year of most recent water withdrawals survey. c. Includes Montenegro. d. Includes Kosovo.

## About the data

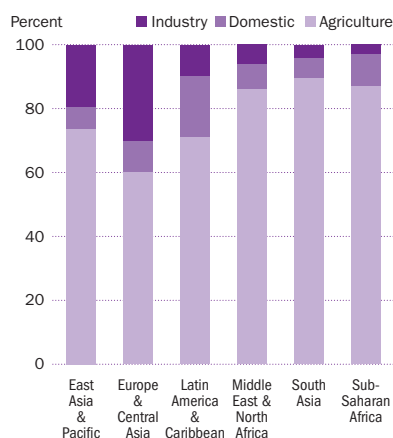
The data on freshwater resources are based on estimates of runoff into rivers and recharge of groundwater. These estimates are based on different sources and refer to different years, so cross-country comparisons should be made with caution. Because the data are collected intermittently, they may hide significant variations in total renewable water resources from year to year. The data also fail to distinguish between seasonal and geographic variations in water availability within countries. Data for small countries and countries in arid and semiarid zones are less reliable than those for larger countries and countries with greater rainfall.

### Agriculture is still the largest user of water, accounting for some 70 percent of global withdrawals 3.5a



Source: Table 3.5.

### The share of withdrawals for agriculture approaches 90 percent in some developing regions 3.5b



Source: Table 3.5.

Caution should also be used in comparing data on annual freshwater withdrawals, which are subject to variations in collection and estimation methods. In addition, inflows and outflows are estimated at different times and at different levels of quality and precision, requiring caution in interpreting the data, particularly for water-short countries, notably in the Middle East and North Africa.

Water productivity is an indication only of the efficiency by which each country uses its water resources. Given the different economic structure of each country, these indicators should be used carefully, taking into account the countries' sectoral activities and natural resource endowments.

The data on access to an improved water source measure the percentage of the population with ready access to water for domestic purposes. The data are based on surveys and estimates provided by governments to the Joint Monitoring Programme of the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF). The coverage rates are based on information from service users on actual household use rather than on information from service providers, which may include nonfunctioning systems. Access to drinking water from an improved source does not ensure that the water is safe or adequate, as these characteristics are not tested at the time of survey. While information on access to an improved water source is widely used, it is extremely subjective, and such terms as *safe*, *improved*, *adequate*, and *reasonable* may have different meaning in different countries despite official WHO definitions (see *Definitions*). Even in high-income countries treated water may not always be safe to drink. Access to an improved water source is equated with connection to a supply system; it does not take into account variations in the quality and cost (broadly defined) of the service.

## Definitions

- **Renewable internal freshwater resources flows** are internal renewable resources (internal river flows and groundwater from rainfall) in the country.
- **Renewable internal freshwater resources per capita** are calculated using the World Bank's population estimates (see table 2.1).
- **Annual freshwater withdrawals** are total water withdrawals, not counting evaporation losses from storage basins. Withdrawals also include water from desalination plants in countries where they are a significant source. Withdrawals can exceed 100 percent of total renewable resources where extraction from nonrenewable aquifers or desalination plants is considerable or where water reuse is significant. Withdrawals for agriculture and industry are total withdrawals for irrigation and livestock production and for direct industrial use (including for cooling thermoelectric plants). Withdrawals for domestic uses include drinking water, municipal use or supply, and use for public services, commercial establishments, and homes.
- **Water productivity** is calculated as GDP in constant prices divided by annual total water withdrawal.
- **Access to an improved water source** is the percentage of the population with reasonable access to an adequate amount of water from an improved source, such as piped water into a dwelling, plot, or yard; public tap or standpipe; tubewell or borehole; protected dug well or spring; and rainwater collection. Unimproved sources include unprotected dug wells or springs, carts with small tank or drum, bottled water, and tanker trucks. Reasonable access is defined as the availability of at least 20 liters a person a day from a source within 1 kilometer of the dwelling.

## Data sources

Data on freshwater resources and withdrawals are from the Food and Agriculture Organization of the United Nations AQUASTAT data. The GDP estimates used to calculate water productivity are from the World Bank national accounts database. Data on access to water are from WHO and UNICEF's *Progress on Drinking Water and Sanitation* (2008).