



3.5 Freshwater

	Freshwater resources cubic meters per capita 1998	Annual freshwater withdrawals				Access to safe water				
		billion cu. m ^a	% of total resources ^a	% for agriculture ^b	% for industry ^b	% for domestic ^b	Urban % of population		Rural % of population	
						1982-85 ^c	1990-96 ^c	1982-85 ^c	1990-96 ^c	
Albania	12,758 ^d	1.4	3.3 ^d	71	0	29	100	97	88	70
Algeria	478 ^d	4.5	31.5 ^d	60 ^e	15 ^e	25 ^e	..	..	..	..
Angola	15,783	0.5	0.3	76 ^e	10 ^e	14 ^e	80	69	15	15
Argentina	27,865 ^d	28.6	2.8 ^d	75	9	16	63	71	17	24
Armenia	2,767 ^d	2.9	27.9 ^d	66	4	30	..	..	..	..
Australia	18,772	15.1	4.3	33	2	65	..	..	..	..
Austria	10,399 ^d	2.2	2.7 ^d	9	60	31	100	..	98	..
Azerbaijan	3,831 ^d	16.5	54.6 ^d	70	25	5	..	..	..	..
Bangladesh	9,636 ^d	14.6	1.2 ^d	86	2	12	29	47	43	85
Belarus	5,665 ^d	2.7	4.7 ^d	35	43	22	..	..	..	..
Belgium	1,228 ^d	9.0	72.2 ^d	4	85	11	100	..	91	..
Benin	4,337 ^d	0.2	0.6 ^d	67 ^e	10 ^e	23 ^e	45	41	9	53
Bolivia	38,625	1.4	0.4	48	20	32	81	..	27	..
Bosnia and Herzegovina	9,952	..	..	..	..	..	..	..	..	..
Botswana	9,413 ^d	0.1	0.7 ^d	48 ^e	20 ^e	32 ^e	..	100	..	53
Brazil	42,459 ^d	54.9	0.5 ^d	61	18	21	..	..	52	..
Bulgaria	24,663 ^d	13.9	6.8 ^d	22	76	3	95	..	67	..
Burkina Faso	1,671	0.4	2.2	81 ^e	0 ^e	19 ^e	50	..	26	..
Burundi	561	0.1	2.8	64 ^e	0 ^e	36 ^e	33	..	22	..
Cambodia	41,407	0.5	0.1	94	1	5	..	20	..	12
Cameroon	18,737	0.4	0.1	35 ^e	19 ^e	46 ^e	46	71	30	24
Canada	92,142	45.1	1.6	9	80	11	100	..	100	..
Central African Republic	41,250	0.1	0.0	73 ^e	6 ^e	21 ^e	..	..	..	..
Chad	5,904 ^d	0.2	0.4 ^d	82 ^e	2 ^e	16 ^e	27	48	30	17
Chile	32,007	21.4	3.6	84	11	5	97	..	22	..
China	2,285	525.5	18.6	77	18	5	..	93	..	89
Hong Kong, China	..	..	..	..	..	..	..	..	..	..
Colombia	26,722	8.9	0.5	37	4	59	..	88	..	48
Congo, Dem. Rep.	21,134	0.4	0.0	23 ^e	16 ^e	61 ^e	43	..	5	..
Congo, Rep.	298,963 ^d	0.0	0.0 ^d	11 ^e	27 ^e	62 ^e	42	50	7	8
Costa Rica	27,425	5.8	1.4	80	7	13	..	..	..	..
Côte d'Ivoire	5,362	0.7	0.9	67 ^e	11 ^e	22 ^e	30	59	10	81
Croatia	15,863	0.1	0.1	..	50	50	..	75	..	41
Cuba	3,120	5.2	23.5	51	0	49	..	96	..	85
Czech Republic	1,554	2.5	15.8	2	57	41	100	..	100	..
Denmark	2,460 ^d	0.9	9.2 ^d	43	27	30	100	..	99	..
Dominican Republic	2,467	8.3	14.9	89	1	11	72	74	24	67
Ecuador	26,305	17.0	1.8	82	6	12	83	82	33	55
Egypt, Arab Rep.	949 ^d	55.1	94.5 ^d	86 ^e	8 ^e	6 ^e	93	82	61	50
El Salvador	3,197	0.7	5.3	46	20	34	76	78	47	37
Eritrea	2,269	..	..	..	..	..	..	..	..	..
Estonia	8,829	0.2	1.3 ^d	5	39	56	..	..	..	..
Ethiopia	1,795	2.2	2.0	86 ^e	3 ^e	11 ^e	..	90	..	20
Finland	21,347	2.4	2.2 ^d	3	85	12	98	100	86	85
France	3,246 ^d	40.6	21.3 ^d	12	73	15	100	100	95	100
Gabon	138,942	0.1	0.0	6 ^e	22 ^e	72 ^e	75	80	34	30
Gambia, The	6,579 ^d	0.0	0.4 ^d	91 ^e	2 ^e	7 ^e	100	..	33	..
Georgia	11,632 ^d	3.5	5.5 ^d	59	20	21	..	..	..	..
Germany	2,169 ^d	46.3	26.0 ^d	0	86	14	..	..	..	..
Ghana	2,882 ^d	0.3 ^f	0.6 ^d	52 ^e	13 ^e	35 ^e	57	70	40	49
Greece	6,562 ^d	7.0	10.2 ^d	81	3	16	91	..	73	..
Guatemala	11,030	1.2	0.6	74	17	9	89	97	39	48
Guinea	31,910	0.7	0.3	87 ^e	3 ^e	10 ^e	..	61	2	62
Guinea-Bissau	23,249 ^d	0.0	0.1 ^d	36 ^e	4 ^e	60 ^e	21	38	37	57
Haiti	1,468	1.0	0.4	94	1	5	..	37	..	23
Honduras	9,258	1.5	2.7	91	5	4	51	81	49	53



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		cubic meters per capita 1998	billion cu. m ^a	% of total resources ^a	% for agriculture ^b	% for industry ^b	% for domestic ^b	Urban % of population		Rural % of population
							1982-85 ^c	1990-96 ^c	1982-85 ^c	1990-96 ^c
Hungary	11,865 ^d	6.3	5.2 ^d	36	55	9	92	..	81	..
India	1,947 ^d	500.0	26.2 ^d	92	3	5	80	85	47	79
Indonesia	12,625	74.3	0.7	93	1	6	60	78	32	54
Iran, Islamic Rep.	1,339	70.0	85.8	92	2	6	90	..	52	..
Iraq	3,451	42.8	56.8	92	5	3	92	..	22	..
Ireland	14,035 ^d	1.2	2.3 ^d	10	74	16	100	..	92	..
Israel	184 ^d	1.7	155.5 ^d	64 ^e	7 ^e	29 ^e	100	100	100	95
Italy	2,909 ^d	57.5	34.4 ^d	45	37	18	100	..	96	..
Jamaica	3,250	0.9	3.9	77	7	15	99	92	93	48
Japan	3,402	91.4	21.3	64	17	19	..	..	..	..
Jordan	198 ^d	1.0	51.1 ^d	75	3	22	100	..	65	..
Kazakhstan	7,029 ^d	33.7	30.7 ^d	81	17	2	..	..	..	..
Kenya	1,031 ^d	2.1	6.8 ^d	76 ^e	4 ^e	20 ^e	61	67	21	49
Korea, Dem. Rep.	3,327	14.2	18.4	73	16	11	..	..	..	..
Korea, Rep.	1,501	23.7	34.0	63	11	26	..	93	..	77
Kuwait	0	0.5	2,700.0	60	2	37	100	100	100	100
Kyrgyz Republic	2,509	10.1	94.9	94	3	3	..	93	..	42
Lao PDR	56,638	1.0	0.4	82	10	8	..	40	..	39
Latvia	14,455 ^d	0.3	0.8 ^d	13	32	55	..	92	..	..
Lebanon	1,140	1.3	26.9	68	4	28	95	100	85	100
Lesotho	2,527	0.1	1.0	56 ^e	22 ^e	22 ^e	37	..	14	64
Libya	151	3.9	486.3	87 ^e	4 ^e	9 ^e	92	90	75	91
Lithuania	6,724 ^d	0.3	1.0 ^d	3	16	81	..	..	..	..
Macedonia, FYR	3,483	..	..	..	..	..	100	..	98	..
Madagascar	23,094	19.7	5.8	99 ^e	0 ^e	1 ^e	81	83	17	10
Malawi	1,775 ^d	0.9	5.0 ^d	86 ^e	3 ^e	10 ^e	70	52	27	44
Malaysia	21,046	12.7	2.1	76	13	11	..	100	..	86
Mali	9,438	1.4	1.4	97 ^e	1 ^e	2 ^e	..	36	..	38
Mauritania	4,508 ^d	16.3	143.0 ^d	92	2	6	80	87	16	41
Mauritius	1,897	0.4 ^f	16.4	77 ^e	7 ^e	16 ^e	100	..	98	..
Mexico	4,779	77.8	17.0	78	5	17	95	91	50	62
Moldova	2,722	3.0	25.3 ^d	26	65	9	..	98	..	18
Mongolia	9,677	0.4	2.2	53	27	20	..	..	..	..
Morocco	1,080	11.1	36.8	92 ^e	3 ^e	5 ^e	63	98	2	14
Mozambique	12,746 ^d	0.6	0.3 ^d	89	2 ^e	9 ^e	82	17	2	40
Myanmar	23,515	4.0	0.4	90	3	7	36	36	21	39
Namibia	27,373 ^d	0.3	0.5 ^d	68 ^e	3 ^e	29 ^e	..	..	..	..
Nepal	9,199	29.0	13.8	99	0	1	78	..	20	..
Netherlands	5,797 ^d	7.8	8.6	34	61	5	100	100	99	100
New Zealand	532	2.0	100.0	44	10	46	100	..	100	..
Nicaragua	37,467	1.3	0.5	84	2	14	77	81	13	27
Niger	3,204 ^d	0.5	1.5 ^d	82 ^e	2 ^e	16 ^e	48	46	34	55
Nigeria	2,318 ^d	4.0	1.4 ^d	54 ^e	15 ^e	31 ^e	60	63	30	26
Norway	88,673 ^d	2.0	0.5 ^d	8	72	20	100	100	95	100
Oman	439	1.2	123.2	94	2	5	90	98	55	56
Pakistan	1,938 ^d	155.6	61.0 ^d	97	2	2	77	77	22	52
Panama	52,961	1.6	0.9	70	2	28	100	99	64	73
Papua New Guinea	177,940	0.1	0.0	49	22	29	54	84	10	17
Paraguay	61,750	0.4	0.1 ^d	78	7	15	49	70	8	6
Peru	1,641	19.0	15.3	86	7	7	73	74	17	24
Philippines	4,393	55.4	9.1	88	4	8	..	91	..	81
Poland	1,629 ^d	12.1	19.2 ^d	11	76	13	89	..	73	..
Portugal	7,223 ^d	7.3	10.1 ^d	48	37	15	97	..	50	..
Puerto Rico	..	..	..	..	..	..	..	..	..	..
Romania	9,222 ^d	26.0	12.5 ^d	59	33	8	91	69	50	..
Russian Federation	30,619 ^d	77.1	1.7 ^d	20	62	19



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		cubic meters per capita 1998	billion cu. m ^a	% of total resources ^a	% for agriculture ^b	% for industry ^b	% for domestic ^b	Urban % of population		Rural % of population	
								1982-85 ^c	1990-96 ^c	1982-85 ^c	1990-96 ^c
Rwanda	798	0.8	12.2	94 ^e	1 ^e	5 ^e	55	..	60	44	
Saudi Arabia	116	17.0	708.3	90	1	9	92	..	87	..	
Senegal	4,359 ^d	1.5	3.8 ^d	92 ^e	3 ^e	5 ^e	63	82	27	28	
Sierra Leone	32,957	0.4	0.2	89 ^e	4 ^e	7 ^e	58	58	8	21	
Singapore	193	0.2	31.7	4	51	45	100	100	..	..
Slovak Republic	15,396	1.4	1.7	..	..	..	..	..	..	..
Slovenia	9,334	0.5	2.7	..	50	50	..	100	..	97	
South Africa	1,208 ^d	13.3	26.6 ^d	72 ^e	11 ^e	17 ^e	..	..	..	..
Spain	2,847 ^d	35.5	31.7 ^d	62	26	12	100	..	95	..	
Sri Lanka	2,329	9.8	14.6	96	2	2	76	..	26	..	
Sudan	5,433	17.8	11.6	94 ^e	1 ^e	5 ^e	49	66	45	45	
Sweden	20,109 ^d	2.7	1.5 ^d	9	55	36	100	..	98	..	
Switzerland	7,458 ^d	2.6	4.9 ^d	0	58	42	100	100	100	100	
Syrian Arab Republic	2,926	14.4	32.2	94	2	4	77	92	65	78	
Tajikistan	13,017 ^d	11.9	14.9 ^d	92	4	4	..	86	..	32	
Tanzania	2,770 ^d	1.2	1.3 ^d	89 ^e	2 ^e	9 ^e	85	65	47	45	
Thailand	6,698 ^d	33.1	8.1 ^d	91	4	5	..	94	..	88	
Togo	2,692 ^d	0.1	0.8 ^d	25 ^e	13 ^e	62 ^e	68	..	26	..	
Trinidad and Tobago	3,991	0.2	2.9	35	38	27	100	83	93	80	
Tunisia	439 ^d	2.8	69.0 ^d	86 ^e	2 ^e	13 ^e	98	..	79	..	
Turkey	3,209 ^d	35.5	17.4 ^d	73 ^e	11 ^e	16 ^e	73	..	65	..	
Turkmenistan	9,644 ^d	23.8	52.3 ^d	98	1	1	..	80	..	5	
Uganda	3,158 ^d	0.2	0.3 ^d	60	8	32	45	47	12	32	
Ukraine	2,776 ^d	26.0 ^f	18.6 ^d	30	52	18	..	77	..	12	
United Arab Emirates	73	2.1	1,055.0	67	9	24	100	98	100	98	
United Kingdom	2,489	9.3	6.4	3	77	20	100	100	100	100	
United States	9,168 ^d	447.7	18.1 ^d	27 ^e	65 ^e	8 ^e	..	..	..	..
Uruguay	37,971 ^d	4.2	0.5 ^d	91	3	6	95	99	27	..	
Uzbekistan	5,476 ^d	58.1	63.4 ^d	94	2	4	..	72	..	46	
Venezuela, RB	57,821 ^d	4.1	0.3 ^d	46	10	44	88	..	65	..	
Vietnam	11,647	54.3	6.1	86	10	4	..	53	..	32	
West Bank and Gaza	..	..	..	..	..	..	..	..	..	..
Yemen, Rep.	254	2.9	71.5	92	1	7	..	74	..	14	
Yugoslavia, FR (Serb./Mont.)	..	..	..	..	..	..	..	..	..	..
Zambia	12,001 ^d	1.7	1.5 ^d	77 ^e	7 ^e	16 ^e	70	64	32	27	
Zimbabwe	1,711 ^d	1.2	6.1	79 ^e	7 ^e	14 ^e	100	99	10	64	
World	8,354 w	..	..	70 w	22 w	8 w	.. w	.. w	.. w	.. w
Low income	4,330	..	..	87	8	5	..	..	..	..
Excl. China & India	9,187	..	..	92	4	4	..	..	..	..
Middle income	15,145	..	..	74	13	12	..	..	..	..
Lower middle income	11,805	..	..	75	15	10	..	..	..	..
Upper middle income	..	..	..	73	10	17	..	..	58	..
Low & middle income	8,113	..	..	82	10	7	..	..	..	..
East Asia & Pacific	..	..	..	80	14	6	..	89	..	82
Europe & Central Asia	14,339	..	..	63	26	11	..	..	..	..
Latin America & Carib.	27,393	..	..	74	9	18	..	..	44	..
Middle East & N. Africa	1,044	..	..	89	4	6	82	..	42	..
South Asia	4,088	..	..	93	2	4	76	83	46	75
Sub-Saharan Africa	8,441	..	..	87	4	9	61	..	26	..
High income	..	..	..	30	59	11	..	..	..	..
Europe EMU	3,771	..	..	21	63	16	100	..	90	..

a. Data refer to any year from 1980 to 1998, unless otherwise noted. b. Unless otherwise noted, sectoral withdrawal shares are estimated for 1987. c. Data refer to the most recent year available in the period. d. Total water resources include river flows from other countries. e. Data refer to years other than 1987 (see *Primary data documentation*). f. Data refer to estimates for years before 1980 (see *Primary data documentation*).



About the data

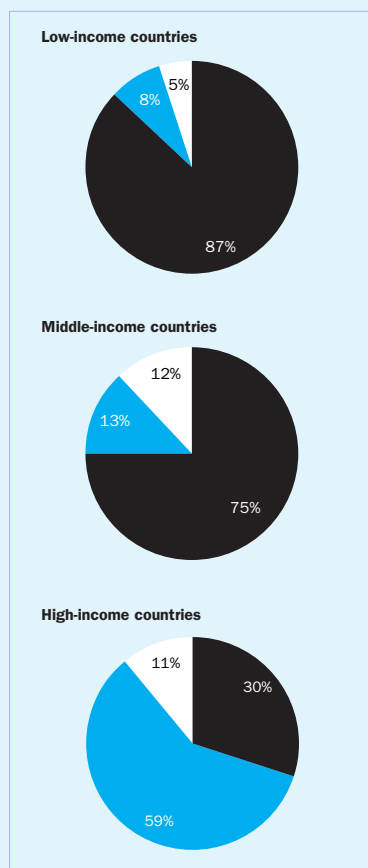
The data on freshwater resources are based on estimates of runoff into rivers and recharge of groundwater. These estimates are based on different sources and refer to different years, so cross-country comparisons should be made with caution. Because they are collected intermittently, the data may hide significant variations in total renewable water resources from one year to the next. 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 higher rainfall. Finally, caution is also needed in comparing data on annual freshwater withdrawals, which are subject to variations in collection and estimation methods.

This year's edition of the *World Development Indicators* and last year's define freshwater resources as including river flows arising outside the country. The data in these editions therefore are not comparable with those published in previous years, which exclude external sources. Because the definition includes river flows entering a country but does not deduct river flows out of countries, it double counts the availability of water from international river ways. This can be important in water-short countries, notably in the Middle East.

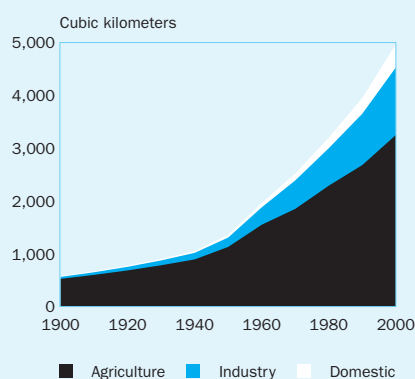
Access to safe water measures the share of the population served by improved sources of water. An improved source can be any form of collection or piping used to make water regularly available. While information on access to safe water is widely used, it is extremely subjective, and such terms as *safe* and *adequate amount* may have very different meanings in different countries despite official World Health Organization (WHO) definitions (see *Definitions* for table 2.15). Even in high-income countries treated water may not always be safe to drink. While access to safe water is equated with connection to a public supply system, this does not take account of variations in the quality and cost (broadly defined) of the service once connected. Thus cross-country comparisons must be made cautiously. Changes over time within countries may result from changes in definitions or measurements.

Figure 3.5

Agriculture accounted for most freshwater withdrawals in developing economies in the past two decades . . .



. . . and for most of the growth in withdrawals in the past century



Source: Table 3.5 and Shiklovanov 1993.

Definitions

• **Freshwater resources** refer to total renewable resources, which include flows of rivers and groundwater from rainfall in the country, and river flows from other countries. Freshwater resources per capita are calculated using the World Bank's population estimates (see table 2.1). • **Annual freshwater withdrawals** refer to total water withdrawal, not counting evaporation losses from storage basins. Withdrawals also include water from desalination plants in countries where they are a significant source. Withdrawal data are for single years between 1980 and 1998 unless otherwise indicated. Withdrawals can exceed 100 percent of total renewable resources where extraction from nonrenewable aquifers or desalination plants is considerable or where there is significant water reuse. Withdrawals for agriculture and industry are total withdrawals for irrigation and livestock production and for direct industrial use (including withdrawals for cooling thermoelectric plants). Withdrawals for domestic uses include drinking water, municipal use or supply, and use for public services, commercial establishments, and homes. For most countries sectoral withdrawal data are estimated for 1987. • **Access to safe water** refers to the percentage of people with reasonable access to an adequate amount of safe water in a dwelling or within a convenient distance of their dwelling (see *About the data*).

Data sources

The data on freshwater resources and withdrawals are compiled by the World Resources Institute from various sources and published in *World Resources 1998–99* and *World Resources 2000–01* (produced in collaboration with the United Nations Environment Programme, United Nations Development Programme, and World Bank). The data on access to safe water come from the WHO.