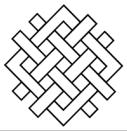
Freshwater Resources

Sources: AQUASTAT Information System on Water and Agriculture,
The Blue Plan: Environment and Development in Mediterranean Countries



	Renewable Water Resources (annual) {a}						Water Withdrawals (annual)							
	Internal Renewable Water Resources (IRWR)				Natural Renewable Water Resources {b}						Sectoral Share (percent) {c}			
	Ground-water Recharge (km^3) {e}	Sur-face Water (km^3) {e}	Over-lap (km^3)	Total {d} (km^3)	Total (km^3)	Per Capita (m^3 per person) {f}	Year	Total (million m^3)	Per Capita (m^3 per person)	as a % of Renew-able Water Resources	Agri-culture	Dom-estic	Indus-try	Desalinated Water Production (million m^3) {g}
WORLD	**11,358**	**40,594**	**10,067**	**43,219**	**..**	**..**	**1990**	**3,414,000**	**650**	**..**	**71**	**9**	**20**	**..**
ASIA (EXCL. MIDDLE EAST)	**2,472**	**10,985**	**2,136**	**11,321**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**
Armenia	4.2	6.3	1.4	9.1	11	2,778	1994	2,925	784	28	66	30	4	0
Azerbaijan	6.5	6.0	4.4	8.1	30	3,716	1995	16,533	2,151	58	70	5	25	0
Bangladesh	21	84	0	105	1,211	8,444	1990	14,636	133	2	86	12	2	0
Bhutan	..	95	..	95	95	43,214	1987	20	13	0	54	36	10	0
Cambodia	18	116	13	121	476	34,561	1987	520	60	0	94	5	1	0
China	829	2,712	728	2,812	2,830	2,186	1993	525,489	439	20	78	5	18	0
Georgia	17	57	16	58	63	12,149	1990	3,468	635	5	59	21	20	0
India	419	1,222	380	1,261	1,897 h	1,822 h	1990	500,000	592	32	92	5	3	0
Indonesia	455	2,793	410	2,838	2,838	13,046	1990	74,346	407	3	93	6	1	0
Japan	27	420	17	430	430	3,372	1992	91,400	735	22	64	19	17	0
Kazakhstan	6.1	69	0	75	110	6,839	1993	33,674	2,010	29	81	2	17	1,328
Korea, Dem People's Rep	13	66	12	67	77	3,415	1987	14,160	742	22	73	11	16	0
Korea, Rep	13	62	11	65	70	1,471	1994	23,668	531	36	63	26	11	0
Kyrgyzstan	14	44	11	46	21 h	4,078 h	1994	10,086	2,231	55	94	3	3	0
Lao People's Dem Rep	38	190	38	190	334	60,318	1987	990	259	0	82	8	10	0
Malaysia	64	566	50	580	580	25,178	1995	12,733	636	3	77	11	13	0
Mongolia	6.1	33	4.0	35	35	13,451	1993	428	182	1	53	20	27	0
Myanmar	156	875	150	881	1,046	21,358	1987	3,960	103	0	90	7	3	0
Nepal	20	198	20	198	210	8,703	1994	28,953	1,451	17	99	1	0	0
Pakistan	55	47	50	52	223 h	2,812 h	1991	155,600	1,382	100	97	2	2	0
Philippines	180	444	145	479	479	6,093	1995	55,422	811	13	88	8	4	0
Singapore	..	..	..	..	..	..	1975	..	..	..	4	45	51	..
Sri Lanka	7.8	49	7.0	50	50	2,592	1990	9,770	574	22	96	2	2	0
Tajikistan	6.0	63	3.0	66	16 h	2,587 h	1994	11,874	2,096	81	92	3	4	0
Thailand	42	199	31	210	410	6,371	1990	33,132	605	10	91	5	4	0
Turkmenistan	0.4	1.0	0	1.4	25 h	5,015 h	1994	23,779	5,801	116	98	1	1	0
Uzbekistan	8.8	9.5	2	16	50 h	1,968 h	1994	58,051	2,598	132	94	4	2	0
Viet Nam	48	354	35	367	891	11,109	1990	54,330	822	7	87	4	10	0
EUROPE	**1,318**	**6,223**	**986**	**6,590**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**
Albania	6.2	23	2.4	27	42	13,178	1995	1,400	440	3	71	29	0	..
Austria	6.0	55	6.0	55	78	9,629	1991	2,360	303	3	9	33	58	..
Belarus	18	37	18	37	58	5,739	1990	2,734	266	5	35	22	43	0
Belgium	0.9	12	0.9	12	18	1,781	..	..	..	..	..	..	..	..
Bosnia and Herzegovina	..	..	..	36	38	9,088	1995	1,000	292	3	60	30	10	..
Bulgaria	6.4	20	5.5	21	21	2,734	1988	13,900	1,573	58	22	3	75	..
Croatia	11	27	0.5	38	106	22,654	1996	764	164	1	0	50	50	..
Czech Rep	1.4	13	1.4	13	13	1,283	1991	2,740	266	21	2	41	57	..
Denmark	4.3	3.7	2.0	6.0	6	1,123.0	1990	1,200	233	21	43	30	27	..
Estonia	4.0	12	3.0	13	13	9,413	1995	158	106	1	5	56	39	0
Finland	2.2	107	2.0	107	110	21,223	1991	2,200	439	2	3	12	85	..
France	100	177	98	179	204	3,414	1999	32,300	547	16	10	18	72	..
Germany	46	106	45	107	154	1,878	1991	46,270	579	31	20	11	69	..
Greece	10	56	7.8	58	74	6,984	1997	8,700	826	12	87	10	3	..
Hungary	6.0	6.0	6.0	6.0	104	10,541	1991	6,810	659	6	36	9	55	..
Iceland	24	166	20	170	170	599,944	1991	160	622	0	6	31	63	..
Ireland	11	48	10	49	52	13,408	1980	790	232	2	10	16	74	..
Italy	43	171	31	183	191	3,330	1998	42,000	730	22	48	19	34	..
Latvia	2.2	17	2.0	17	35	14,820	1994	285	112	1	13	55	32	0
Lithuania	1.2	15	1.0	16	25	6,763	1995	254	68	1	3	81	16	0
Macedonia, FYR	..	5.4	..	5.4	6	3,120.6	1996	1,850	936	30	74	12	15	..
Moldova, Rep	0.4	1.0	0.4	1.0	12	2,726	1992	2,963	678	25	26	9	65	0
Netherlands	4.5	11	4.5	11	91	5,691	1991	7,810	519	9	34	5	61	..
Norway	96	376	90	382	382	84,787	1985	2,030	489	1	8	20	72	..
Poland	13	53	12	54	62	1,598	1991	12,280	321	20	11	13	76	..
Portugal	4.0	38	4.0	38	69 h	6,837 h	1990	7,290	736	11	48	15	37	..
Romania	8.3	42	8.0	42	212	9,486	1994	26,000	1,141	12	59	8	33	..
Russian Federation	788	4,037 i	512	4,313 i	4,507 i	31,354 i	1994	77,100	519	2	20	19	62	0
Serbia and Montenegro	3.0	42	1.4	44	209	19,815	1995	13,000	1,233	6	8	6	86	..
Slovakia	1.7	13	1.7	13	50	9,265	1991	1,780	337	4	..	..	..	..
Slovenia	14	19	13	19	32	16,070	1996	1,280	642	4	1	20	80	..
Spain	30	110	28	111	112	2,793	1997	35,210	884	32	68	13	19	..
Sweden	20	170	19	171	174	19,721	1991	2,930	340	2	9	36	55	..
Switzerland	2.5	40	2.5	40	54	7,464	1991	1,190	172	2	4	23	73	..
Ukraine	20	50	17	53	140	2,868	1992	25,991	500	17	30	18	52	0
United Kingdom	9.8	144	9.0	145	147	2,464	1991	11,790	204	8	3	20	77	..
MIDDLE EAST & N. AFRICA	**149**	**374**	**60**	**518**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**
Afghanistan	..	..	..	55	65	2,790	1987	26,110	2,007	72	99	1	0	0
Algeria	1.7	13	1.0	14	14	460	1995	5,000	181	39	52	34	14	64
Egypt	1.3	0.5	0	1.8	58 h	830 h	1996	66,000	1,055	127	82	7	11	25
Iran, Islamic Rep	49	97	18	129	138	1,900	1993	70,034	1,122	59	92	6	2	2.9
Iraq	1.2	34	0	35	75 h	3,111 h	1990	42,800	2,478	80	92	3	5	0
Israel	0.5	0.3	0	0.8	2	265.0	1997	1,620	287	108	54	39	7	..
Jordan	0.5	0.4	0.2	0.7	1	169.4	1993	984	255	151	75	22	3	2.0
Kuwait	0	0	0	0	0.02	9.9	1994	538	306	3,097	60	37	2	231
Lebanon	3.2	4.1	2.5	4.8	4 h	1,219.5 h	1996	1,300	400	33	68	27	6	0
Libyan Arab Jamahiriya	0.5	0.2	0.1	0.6	1	108.5	1999	4,500	870	801	84	13	3	70
Morocco	10	22	3.0	29	29	936	1998	11,480	399	43	89	10	2	3.4
Oman	1.0	0.9	0.9	1.0	1	363.6	1991	1,223	658	181	94	5	2	34
Saudi Arabia	2.2	2.2	2.0	2.4	2	110.6	1992	17,018	1,056	955	90	9	1	714
Syrian Arab Rep	4.2	4.8	2.0	7.0	26 h	1,541 h	1995	12,000	844	55	90	8	2	0
Tunisia	1.5	3.1	0.4	4.2	5	576.5	1996	2,830	312	54	86	13	1	8.3
Turkey	69	186	28	227	229 h	3,344 h	1997	35,500	558	17	73	16	12	0.5
United Arab Emirates	0.1	0.2	0.1	0.2	0	55.5	1995	2,108	896	1,614	67	24	9	385
Yemen	1.5	4.0	1.4	4.1	4	205.9	1990	2,932	253	123	92	7	1	10

	Renewable Water Resources (annual) {a}						Water Withdrawals (annual)							
	Internal Renewable Water Resources (IRWR)				Natural Renewable Water Resources {b}						Sectoral Share (percent) {c}			
	Ground-water Recharge (km^3) {e}	Sur-face Water (km^3) {e}	Over-lap (km^3)	Total {d} (km^3)	Total (km^3)	Per Capita (m^3 per person) {f}	Year	Total (million m^3)	Per Capita (m^3 per person)	as a % of Renew-able Water Resources	Agri-culture	Dom-estic	Indus-try	Desalinated Water Production (million m^3) {g}
SUB-SAHARAN AFRICA	**1,549**	**3,812**	**1,468**	**3,901**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**
Angola	72	182	70	184	184	13,203	1987	480	54	0	76	14	10	0
Benin	1.8	10	1.5	10	25	3,741	1994	145	27	1	67	23	10	0
Botswana	1.7	1.7	0.5	2.9	14	9,209	1992	113	86	1	48	32	20	0
Burkina Faso	9.5	8.0	5.0	13	13	1,024	1992	376	40	4	81	19	0	0
Burundi	2.1	3.5	2.0	3.6	4	538.3	1987	100	19	4	64	36	0	0
Cameroon	100	268	95	273	286	18,378	1987	400	38	0	35	46	19	0
Central African Rep	56	141	56	141	144	37,565	1987	70	25	0	74	21	5	0
Chad	12	14	10	15	43	5,125	1987	180	34	1	82	16	2	0
Congo	198	222	198	222	832	259,547	1987	40	20	0	11	62	27	0
Congo, Dem Rep	421	899	420	900	1,283	23,639	1990	357	10	0	23	61	16	0
Côte d'Ivoire	38	74	35	77	81	4,853	1987	709	62	1	67	22	11	0
Equatorial Guinea	10	25	9.0	26	26	53,841	1987	10	30	0	6	81	13	0
Eritrea	..	..	..	2.8	6	1,577.7	..	..	..	..	..	..	..	0
Ethiopia	40	110	40	110	110	1,666	1987	2,200	51	3	86	11	3	0
Gabon	62	162	60	164	164	126,789	1987	60	70	0	6	72	22	0
Gambia	0.5	3.0	0.5	3.0	8	5,836.0	1982	20	29	1	91	7	2	0
Ghana	26	29	25	30	53	2,637	1970	300	35	1	52	35	13	0
Guinea	38	226	38	226	226	26,964	1987	740	132	0	87	10	3	0
Guinea-Bissau	14	12	10	16	31	24,670	1991	17	17	0	36	60	4	0
Kenya	3.0	17	0	20	30	947	1990	2,050	87	9	76	20	4	0
Lesotho	0.5	5.2	0.5	5.2	3 h	1,455.6 h	1987	50	32	2	56	22	22	0
Liberia	60	200	60	200	232	70,348	1987	130	59	0	60	27	13	0
Madagascar	55	332	50	337	337	19,925	1984	16,300	1,611	8	99	1	..	0
Malawi	1.4	16	1.4	16	17	1,461	1994	936	95	6	86	10	3	0
Mali	20	50	10	60	100	8,320	1987	1,360	167	2	97	2	1	0
Mauritania	0.3	0.1	0	0.4	11	4,029	1985	1,630	923	23	92	6	2	1.7
Mozambique	17	97	15	99	216	11,382	1992	605	42	0	89	9	2	0
Namibia	2.1	4.1	0.04	6.2	18 h	9,865 h	1991	249	175	2	68	29	3	0
Niger	2.5	1.0	0	3.5	34	2,891	1988	500	69	2	82	16	2	0
Nigeria	87	214	80	221	286	2,384	1987	3,630	46	2	54	31	15	0
Rwanda	3.6	5.2	3.6	5.2	5	638.2	1993	768	141	22	94	5	2	0
Senegal	7.6	24	5.0	26	39	3,977	1987	1,360	202	5	92	5	3	0
Sierra Leone	50	150	40	160	160	33,237	1987	370	98	0	89	7	4	0
Somalia	3.3	5.7	3.0	6.0	14	1,413	1987	810	119	8	97	3	0	0.1
South Africa	4.8	43	3.0	45	50	1,131	1990	13,309	366	32	72	17	11	0
Sudan	7.0	28	5.0	30	65 h	1,981 h	1995	17,800	637	32	94	4	1	0.4
Tanzania, United Rep	30	80	28	82	91	2,472	1994	1,165	39	2	89	9	2	0
Togo	5.7	11	5.0	12	15	3,076	1987	91	29	1	25	62	13	0
Uganda	29	39	29	39	66	2,663	1970	200	21	1	60	32	8	0
Zambia	47	80	47	80	105	9,676	1994	1,706	190	2	77	16	7	0
Zimbabwe	5.0	13	4.0	14	20	1,530	1987	1,220	131	9	79	14	7	0
NORTH AMERICA	**1,670**	**4,702**	**1,522**	**4,850**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**
Canada	370	2,840	360	2,850	2,902	92,810	1991	45,100	1,607	2	12	18	70	..
United States	1,300 j	1,862 j	1,162 j	2,800	3,051	10,574	1990	467,340	1,834	26	42	13	45	..
C. AMERICA & CARIBBEAN	**359**	**1,050**	**231**	**1,186**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**
Belize	..	..	..	16	19	78,763	1993	95	485	1	0	12	88	0
Costa Rica	37	75	0	112	112	26,764	1997	5,772	1,540	6	80	13	7	0
Cuba	6.5	32	0	38	38	3,382	1995	5,211	475	14	51	49	0	0
Dominican Rep	12	21	12	21	21	2,430	1994	8,339	1,102	45	89	11	0	0
El Salvador	6.2	18	6	18	25	3,872	1992	729	137	4	46	34	20	0
Guatemala	34	101	25	109	111	9,277	1992	1,158	126	1	74	9	17	0
Haiti	2.2	11	..	13	14	1,670	1991	980	139	8	94	5	1	0
Honduras	39	87	30	96	96	14,250	1992	1,520	294	2	91	4	5	0
Jamaica	3.9	5.5	0	9.4	9	3,587.5	1993	900	371	10	77	15	7	0
Mexico	139	361	91	409	457	4,490	1998	77,812	812	18	78	17	5	0
Nicaragua	59	186	55	190	197	36,784	1998	1,285	267	1	84	14	2	0
Panama	21	144	18	147	148	50,299	1990	1,643	685	1	70	28	2	0
Trinidad and Tobago	..	..	..	3.8	4	2,940.4	1997	297	233	8	6	68	26	0
SOUTH AMERICA	**3,693**	**12,198**	**3,645**	**12,246**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**
Argentina	128	276	128	276	814	21,453	1995	28,583	822	4	75	16	9	0
Bolivia	130	277	104	304	623	71,511	1987	1,210	197	0	87	10	3	0
Brazil	1,874	5,418	1,874	5,418	8,233	47,125	1992	54,870	359	1	61	21	18	0
Chile	140	884	140	884	922	59,143	1987	20,289	1,629	3	84	5	11	0
Colombia	510	2,112	510	2,112	2,132	49,017	1996	8,938	228	0	37	59	4	0
Ecuador	134	432	134	432	432	32,948	1997	16,985	1,423	4	82	12	6	0
Guyana	103	241	103	241	241	314,963	1992	1,460	1,993	1	99	1	1	0
Paraguay	41	94	41	94	336	58,148	1987	430	112	0	78	15	7	0
Peru	303	1,616	303	1,616	1,913	72,127	1992	18,973	849	1	86	7	7	0
Suriname	80	88	80	88	122	289,848	1987	460	1,171	0	89	6	5	0
Uruguay	23	59	23	59	139	41,065	1965	650	..	..	91	6	3	0
Venezuela	227	700	205	722	1,233	49,144	1970	4,100	382	1	46	44	10	0
OCEANIA	**..**	**1,241**	**20**	**1,693**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**
Australia	72	440	20	492	492	25,185	1985	14,600	933	4	33	65	2	..
Fiji	..	..	..	29	29	34,330	1987	30	42	0	60	20	20	..
New Zealand	..	..	..	327	327	85,221	1991	2,000	588	1	44	46	10	..
Papua New Guinea	..	801	..	801	801	159,171	1987	100	29	0	49	29	22	0
Solomon Islands	..	..	..	45	45	93,405	1987	..	..	..	40	40	20	..
DEVELOPED	**3,153**	**12,084**	**2,584**	**13,016**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**
DEVELOPING	**8,128**	**28,500**	**7,483**	**29,289**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**

a. Although data were obtained from FAO in 2002, they are long-term averages originating from multiple sources and years. For more information, please consult the original source at http://www.fao.org/waicent/faoinfo/agricult/agl/aglw/aquastat/water_res/index.stm. **b**. Natural Renewable Water Resources include Internal Renewable Water Resources plus or minus the flows of surface and groundwater entering or leaving the country. **c**. Sectoral withdrawal data may not add up to 100 because of rounding. **d**. At the country level, Total Internal Renewable Water Resources = Surface water + Groundwater - Overlap. Regional and global totals represent a sum of available country-level data. **e**. Groundwater and surface water cannot be added together to calculate total available water resources because of overlap--water that is counted in both the groundwater and surface water totals. **f**. Calculation is based on withdrawals from various years, and population data from 2002. **g**. Data on desalinated water originate from FAO country surveys conducted in various regions between 1992 and 2000. **h**. Data account for the portion of flow secured through treaties or agreements to other countries. **i.** River discharges in Siberia are not well documented and highly uncertain. **j.** Data are for the continental United States.

VARIABLE DEFINITIONS AND METHODOLOGY

Internal Renewable Water Resources (IRWR) include the average annual flow of rivers and the recharge of groundwater (aquifers) generated from endogenous precipitation--precipitation occurring within a country's borders. IRWR are measured in cubic kilometers per year (km^3/year).

Groundwater Recharge is the total volume of water entering aquifers within a country's borders from endogenous precipitation and surface water flow. Groundwater resources are estimated by measuring rainfall in arid areas where rainfall is assumed to infiltrate into aquifers. Where data are available, groundwater resources in humid areas have been considered as equivalent to the base flow of rivers.

Surface Water produced internally includes the average annual flow of rivers generated from endogenous precipitation and base flow generated by aquifers. Surface water resources are usually computed by measuring or assessing total river flow occurring in a country on a yearly basis.

Overlap is the volume of water resources common to both surface and groundwater. It is subtracted when calculating IRWR to avoid double counting. Two types of exchanges create overlap: contribution of aquifers to surface flow, and recharge of aquifers by surface run-off. In humid temperate or tropical regions, the entire volume of groundwater recharge typically contributes to surface water flow. In karstic domains (regions with porous limestone rock formations), a portion of groundwater resources are assumed to contribute to surface water flow. In arid and semi-arid countries, surface water flows recharge groundwater by infiltrating through the soil during floods. This recharge is either directly measured or inferred by characteristics of the aquifers and piezometric levels.

Total Internal Renewable Water Resources is the sum of surface and groundwater resources minus overlap; in other words, IRWR = Surface Water Resources + Groundwater Recharge – Overlap.

Natural Renewable Water Resources, measured in cubic kilometers per year (km^3/year), is the sum of internal renewable water resources and natural flow originating outside of the country. Natural Renewable Water Resources are computed by adding together both internal renewable water resources (IRWR—see above) and natural flows (flow to and from other countries). Natural incoming flow is the average amount of water which would flow into the country without human influence. In some arid and semi-arid countries, actual water resources are presented instead of natural renewable water resources. These actual totals, labeled with a footnote in the freshwater data table, include the quantity of flows reserved to upstream and downstream countries through formal and informal agreements or treaties. The actual flows are often much lower than natural flow due to water scarcity in arid and semi-arid regions.

Per Capita Natural Renewable Water Resources are measured in cubic meters per person per year (m^3/person/year). Per capita values were calculated by using national population data for 2002. For more information about the collection methodology and reliability of the UN data, please refer to the technical notes in the population data table.

Water Withdrawals (annual), measured in million cubic meters, refers to total water removed for human uses in a single year, not counting evaporative losses from storage basins. Water withdrawals also include water from nonrenewable groundwater sources, river flows from other countries, and desalination plants.

Per Capita Annual Withdrawals were calculated using national population data for the year the withdrawal data were collected.

Water Withdrawals as a Percent of Renewable Water Resources is the proportion of renewable water resources withdrawn on a per capita basis, expressed in cubic meters per person per year (m^3/person/year). The value is calculated by dividing water withdrawals per capita by actual renewable water resources per capita.

Sectoral Share of water withdrawals, expressed as a percentage, refers to the proportion of water used for one of three purposes: agriculture, industry, and domestic uses. All water withdrawals are allocated to one of these three categories.
Agricultural uses of water primarily include irrigation and, to a lesser extent, livestock maintenance.
Domestic uses include drinking water plus water withdrawn for homes, municipalities, commercial establishments, and public services (e.g. hospitals).
Industrial uses include cooling machinery and equipment, producing energy, cleaning and washing goods produced as ingredients in manufactured items, and as a solvent.

Desalinated Water Production, expressed in million cubic meters, refers to the amount of water produced by the removal of salt from saline waters--usually seawater--using a variety of techniques including reverse osmosis. Most desalinated water is used for domestic purposes.

Most Freshwater resources data were provided by AQUASTAT, a global database of water statistics maintained by the Food and Agriculture Organization of the United Nations. AQUASTAT collects its information from a number of sources--national water resources and irrigation master plans; national yearbooks, statistics and reports; FAO reports and project documents; international surveys; and, results from surveys done by national or international research centers. In most cases, a critical analysis of the information was necessary to ensure consistency among the different data collected for a given country.
When possible, cross-checking of information among countries was used to improve assessment in countries where information was limited. When several sources gave different or contradictory figures, preference was always given to information collected at the national or sub-national level. This preference is based on the assumption by FAO that no regional information can be more accurate than studies carried out at the country level. Unless proven to be wrong, official rather than unofficial sources were used. In the case of shared water resources, a comparison among countries was made to ensure consistency at river-basin level.

For more information on the methodology used to collect these data, please refer to the original source or: Food and Agriculture Organization of the United Nations (FAO): Water Resources, Development and Management Service. October, 2001. ***Statistics on Water Resources by Country in FAO's AQUASTAT Programme*** (available on-line at http://www.fao.org/ag/agl/aglw/aquastat/water_res/index.stm). Rome: FAO.

FREQUENCY OF UPDATE BY DATA PROVIDERS
AQUASTAT was developed by the Food and Agriculture Organization of the United Nations in 1993; data have been available on-line since 2001. Most freshwater data are not available in a time series, and the global data set contains data collected over a time span of up to 30 years. AQUASTAT updates their website as new data become available, or when FAO conducts special regional studies. Studies were conducted in Africa in 1994, the Near East in 1995-96, the former Soviet republics in 1997, selected Asian countries in 1998-99, and Latin America & the Caribbean in 2000. Data from the Blue Plan on Mediterranean water withdrawals were last updated in 2002. Most data updates include revisions of past data.

DATA RELIABILITY AND CAUTIONARY NOTES
While AQUASTAT represents the most complete and careful compilation of country-level water resources statistics to date, freshwater data are generally of poor quality. Information sources are various but rarely complete. Some governments will keep internal water resources information confidential because they are competing for water resources with bordering countries. Many instances of water scarcity are highly localized and are not reflected in national statistics. In addition, the accuracy and reliability of information vary greatly among regions, countries, and categories of information, as does the year in which the information was gathered. As a result, no consistency can be ensured among countries on the duration and dates of the period of reference. All data should be considered order-of-magnitude estimates.

Groundwater Recharge tends to be overestimated in arid areas and underestimated in humid areas.

Natural Renewable Water Resources vary with time. Exchanges between countries are complicated when a river crosses the same border several times. Part of the incoming water flow may thus originate from the same country in which it enters, making it necessary to calculate a "net" inflow to avoid double counting of

resources. In addition, the water that is actually accessible to humans for consumption is often much smaller than the total renewable water resources indicated in the data table.

Renewable Water Resources Per Capita contains water resources data from a different set of years than the population data used in the calculation. While the water resources data are usually long-term averages, inconsistencies may arise when combining it with 2002 population data.

Water Withdrawals as a Percentage of Actual Water Resources are also calculated using per capita data from two different years. While this ratio can indicate that some countries are depleting their water resources, it does not accurately reflect localized over-extraction from aquifers and streams. In addition, the calculation does not distinguish between ground and surface water.

Sectoral Withdrawal Data may not add to 100 because of rounding. Evaporative losses from storage basins are not considered; users should keep in mind, however, that in some parts of the world up to 25 percent of water that is withdrawn and placed in reservoirs evaporates before it is used by any sector.

Desalinated Water Production may exist in some countries where the volume of production is indicated to be zero, since AQUASTAT assumes that production is zero if no value has been given for those countries where information on water use is available.

SOURCES

Renewable Water Resources: Food and Agriculture Organization of the United Nations (FAO): Water Resources, Development and Management Service. 2002. ***AQUASTAT Information System on Water in Agriculture: Review of Water Resource Statistics by Country***. Rome: FAO. Available on-line at http://www.fao.org/waicent/faoinfo/agricult/agl/aglw/aquastat/water_res/index.htm.

Water Withdrawals: Food and Agriculture Organization of the United Nations (FAO): Water Resources, Development and Management Service. 2002. ***AQUASTAT Information System on Water in Agriculture***. Rome: FAO. Available on-line at http://www.fao.org/waicent/faoinfo/agricult/agl/aglw/aquastat/dbase/index.htm. Data for Mediterranean countries were provided directly to WRI from: J. Margat, 2002. ***Present Water Withdrawals in Mediterranean Countries***. Paris: Blue Plan.

Population Data (for per capita calculations): Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat. 2002. ***World Population Prospects: The 2000 Revision***. New York: United Nations. Data set on CD-ROM.