9 Water Resources and Fisheries

Source: Food and Agriculture Organization of the United Nations

	Actual Renewable Water Resources (a)		Annual Water Withdrawals					Inland and Marine Fisheries Production (thousand metric tons) (c)				Trade in Fish and Fisheries Products (million $US) (c)			Fish Protein as a Percent of Animal Protein Supply
				Per Capita	Withdrawals by Sector (percent), 2000 (b)			Capture		Aquaculture		2000-2002			
	Total (km^3)	Per Capita (m^3 per person)	Total (km^3) 2000	(m^3 per person) 2000	Agri-culture	Indus-try	Dom-estic	1990-1992	2000-2002	1990-1992	2000-2002	Imports	Exports	Number of Fishers 2000	2002
World	..	**8,549**	**3,802.3**	**633**	**70**	**20**	**10**	**84,529.0**	**93,650.8 d**	**14,074.7 d**	**37,694.7 d**	**60,312.2**	**56,520.1**	**34,501,411**	**15**
Asia (excl. Middle East)	..	**4,079**	**2,147.5**	**631**	**81**	**12**	**7**	**34,528.9**	**44,189.1**	**11,745.9**	**33,275.1**	**22,301.9**	**19,051.0**	**28,890,352**	..
Armenia	11	3,450	3.0	949	66	4	30	2.2	0.8	3.4	1.1	3.0	0.7	244	1
Azerbaijan	30	3,585	17.2	2,114	68	28	5	36.1	13.7	1.7	0.2	1.6	2.2	1,500	1
Bangladesh	1,211	8,089	79.4	576	96	1	3	684.2	1,058.8	210.1	718.8	6.2 e	328.3 e	1,320,480	52
Bhutan	95	40,860	0.4	204	95	1	4	0.3	0.3	0.0	0.0	..	..	450	..
Cambodia	476	32,876	4.1	311	98	1	2	106.3	372.9	7.2	14.3	3.2	27.9	73,425	57
China	2,830	2,206	630.3	494	68	26	7	7,449.7	16,690.0	7,206.8	26,132.7	1,927.0	4,029.1	12,233,128	19
Georgia	63	12,481	3.6	685	59	21	20	66.9	2.2	1.4	0.1	1.4	0.3	1,900	1
India	1,897	1,754	645.8	635	86	5	8	2,867.6	3,799.4	1,212.6	2,084.6	23.1	1,351.8	5,958,744	14
Indonesia	2,838	12,749	82.8	391	91	1	8	2,704.3	4,300.8	522.6	855.6	88.2	1,536.6	5,118,571	57
Japan	430	3,365	88.4	696	62	18	20	8,598.8	4,715.7	808.7	797.7	14,204.2	786.3	260,200	45
Kazakhstan	110	7,116	35.0	2,238	82	17	2	70.7	27.7	8.7	0.7	16.5	15.2	16,000	2
Korea, Dem People's Rep	77	3,387	9.0	405	55	25	20	406.0	208.1	56.7	64.7	25.8	138.2	129,000	27
Korea, Rep	70	1,454	18.6	397	48	16	36	2,321.9	1,828.6	364.9	294.9	1,619.9	1,195.9	176,928	40
Kyrgyzstan	21	3,952	10.1	2,048	94	3	3	0.3	0.1	0.9	0.1	1.4	0.0	154	1
Lao People's Dem Rep	334	57,638	3.0	567	90	6	4	18.6	31.2	10.4	50.6	2.0	0.1	15,000	40
Malaysia	580	23,316	9.0	392	62	21	17	966.3	1,270.6	65.8	158.4	335.9	359.6	100,666	38
Mongolia	35	13,232	0.4	178	52	28	20	0.1	0.2	..	..	0.4	0.1	0	0
Myanmar	1,046	20,870	33.2	699	98	1	1	731.6	1,183.1	14.0	113.8	1.4	210.4	610,000	46
Nepal	210	8,171	10.2	433	96	1	3	5.5	17.1	10.1	16.2	0.3	0.0	50,000	4
Pakistan	223	1,415	169.4	1,187	96	2	2	504.0	604.7	11.8	13.8	0.3	136.7	272,273	3
Philippines	479	5,884	28.5	377	74	9	17	1,875.4	1,961.2	391.8	423.9	89.0	396.4	990,872	39
Singapore	1	139	..	..	..	..	..	10.6	3.8	2.1	4.9	509.8	380.0	364	..
Sri Lanka	50	2,602	12.6	678	95	2	2	185.9	290.9	5.5	9.3	73.2	106.3	146,188	51
Tajikistan	16	2,537	12.0	1,965	92	5	4	0.2	0.1	3.1	0.1	0.2	..	200	0
Thailand	410	6,459	87.1	1,429	95	2	2	2,664.2	2,950.3	338.7	702.4	947.7	4,027.6	354,495	40
Turkmenistan	25	5,004	24.6	5,308	98	1	2	38.4	12.6	2.2	0.0	0.2	0.3	611	3
Uzbekistan	50	1,904	58.3	2,342	93	2	5	5.8	3.2	21.7	4.8	1.8	0.1	4,800	0
Viet Nam	891	10,805	71.4	914	68	24	8	826.1	1,483.0	164.4	515.9	44.9	1,764.2	1,000,000	29
Europe	..	**10,655**	**400.3**	**581**	**33**	**52**	**15**	**19,025.1**	**15,773.3**	**1,470.1**	**2,064.1**	**23,051.7**	**19,356.0**	**855,333**	**12**
Albania	42	13,056	1.7	551	62	11	27	5.3	3.5	2.1	0.5	6.5	7.0	1,590	2
Austria	78	9,569	2.1	261	1	64	35	0.5	0.4	3.1	2.5	177.6	11.9	2,300	4
Belarus	58	5,887	2.8	278	30	46	23	1.8	2.4	13.3	6.1	91.6	18.3	5,000	8
Belgium	18	1,770	..	..	..	..	..	39.5	29.7	0.8	1.7	1,030.7	520.2	544	..
Bosnia and Herzegovina	38	8,958	..	..	..	..	..	2.0	2.5	..	4.7	15.6	0.2	3,500	4
Bulgaria	21	2,721	10.5	1,296	19	78	3	41.1	9.5	7.9	3.0	14.7	5.8	1,483	2
Croatia	106	23,890	..	..	..	..	..	26.7	20.3	6.8	8.4	62.4	62.5	65,151	9
Czech Rep	13	1,286	2.6	250	2	57	41	..	4.8	..	19.6	84.0	31.0	2,243	5
Denmark	6	1,116	1.3	238	42	26	32	1,726.9	1,495.5	42.4	39.1	1,781.8	2,762.9	6,711	10
Estonia	13	9,794	0.2	120	5	39	56	266.6	106.6	1.0	0.3	45.7	112.0	13,346	13
Finland	110	21,093	2.5	479	3	84	14	140.6	150.5	18.6	15.4	129.6	15.3	5,879	14
France	204	3,371	40.0	674	10	74	16	595.1	620.3	250.6	256.0	3,082.0	1,067.7	26,113	9
Germany	154	1,866	47.1	572	20	68	12	259.7	213.8	78.6	56.4	2,343.5	1,098.0	4,358	6
Greece	74	6,764	7.8	712	81	3	16	141.2	94.2	14.1	93.6	319.2	221.3	19,847	11
Hungary	104	10,579	7.6	763	32	59	9	11.1	6.8	15.4	12.5	48.3	5.1	4,900	2
Iceland	170	582,192	0.2	543	0	66	34	1,375.8	2,031.0	2.7	3.9	65.2	1,309.5	6,100	29
Ireland	52	13,003	1.1	296	0	77	23	232.9	305.0	27.2	58.3	121.5	407.7	8,478	6
Italy	191	3,336	44.4	771	45	37	18	391.4	295.4	161.4	205.3	2,719.2	392.7	48,770	11
Latvia	35	15,507	0.3	124	12	33	55	341.4	126.1	1.9	0.4	43.5	93.0	6,571	7
Lithuania	25	7,276	0.3	76	7	15	78	330.3	127.0	4.5	1.9	78.5	57.4	4,700	27
Macedonia, FYR	6	..	..	..	..	..	..	0.2	0.2	1.0	1.3	6.7	0.1	8,472	3
Moldova, Rep	12	..	2.3	539	33	58	9	0.9	0.4	5.1	1.3	7.3	0.2	40	8
Netherlands	91	5,608	7.9	500	34	60	6	415.5	492.7	68.9	62.3	1,241.8	1,522.5	3,743	11
Norway	382	83,919	2.2	489	10	67	23	2,015.3	2,710.0	147.5	518.6	627.9	3,488.7	23,552	26
Poland	62	1,598	16.2	419	8	79	13	452.9	221.7	28.7	34.7	334.0	247.2	8,640	12
Portugal	69	6,821	11.3	1,125	78	12	10	310.3	192.9	5.9	8.1	914.3	284.2	25,021	21
Romania	212	9,512	23.2	1,031	57	34	9	86.3	7.3	29.7	9.9	38.8	2.4	8,519	2
Russian Federation	4,507	31,653	76.7	527	18	63	19	6,481.5	3,611.6	156.4	88.5	333.9	1,437.9	316,300	13
Serbia and Montenegro	209	..	..	..	..	..	..	3.0	1.2	2.3	2.7	35.1	0.3	1,429	1
Slovakia	50	9,266	..	..	..	..	..	..	1.5	..	0.9	34.7	2.0	215	5
Slovenia	32	16,080	..	..	..	..	..	3.9	1.8	0.9	1.2	28.7	6.0	231	4
Spain	112	2,711	35.6	874	68	19	13	1,086.7	1,006.9	199.2	296.2	3,640.0	1,777.8	75,434	18
Sweden	174	19,581	3.0	335	9	54	37	265.2	315.1	8.1	5.7	748.4	522.7	2,783	14
Switzerland	54	7,468	2.6	359	2	74	24	3.2	1.6	1.2	1.1	358.3	3.1	522	7
Ukraine	140	2,898	37.5	755	52	35	12	667.0	339.4	67.7	30.9	101.1	31.7	120,000	13
United Kingdom	147	2,474	9.5	163	3	75	22	788.0	726.2	55.9	167.3	2,249.4	1,305.9	17,847	10
Middle East & N. Africa	..	**1,505**	**324.6**	**807**	**86**	**6**	**8**	**2,096.7**	**3,048.9**	**117.7**	**525.5**	**827.6**	**1,354.7**	**746,955**	**10**
Afghanistan	65	2,608	23.3	1,087	98	0	2	1.1	0.9	..	..	..	..	1,500	..
Algeria	14	443	6.1	201	65	13	22	88.5	127.0	0.2	0.4	11.9	5.0	26,151	6
Egypt	58	794	68.7	1,013	78	14	8	272.6	412.7	62.5	353.1	147.1	1.6	250,000	23
Iran, Islamic Rep	138	1,970	72.9	1,097	91	2	7	267.7	348.4	23.1	60.0	30.9 f	48.1 f	138,965	7
Iraq	75	2,917	42.7	1,839	92	5	3	18.1	16.8	2.7	1.7	0.1	0.0	12,000	..
Israel	2	255	2.0	338	63	7	31	6.7	5.2	14.0	21.2	135.9	7.5	1,535	7
Jordan	1	157	1.0	202	75	4	21	0.4	0.5	0.0	0.5	25.5	1.2	721	6
Kuwait	0	8	0.4	198	52	3	45	4.8	5.9	0.0	0.3	16.7	3.6	670	6
Lebanon	4	1,189	1.4	394	67	1	33	1.6	3.8	0.1	0.5	48.3	0.2	9,825	8
Libyan Arab Jamahiriya	1	106	4.8	919	89	3	8	26.5	33.4	0.1	0.1	9.8	10.1	9,500	9
Morocco	29	934	12.8	438	90	2	8	571.9	958.5	0.6	1.6	10.4	913.4	106,096	17
Oman	1	337	1.4	518	91	2	7	115.2	131.0	0.0	0.0	8.1	62.0	28,003	..
Saudi Arabia	2	96	17.3	782	89	1	10	42.3	51.4	2.2	7.0	123.2	9.8	25,360	6
Syrian Arab Rep	26	1,441	19.9	1,205	95	2	3	4.0	8.0	3.7	6.2	56.5	0.0	11,292	3
Tunisia	5	459	2.7	286	82	2	16	86.7	96.9	0.9	1.8	16.3	88.8	50,815	13
Turkey	229	3,171	37.5	550	74	11	15	394.5	532.6	7.6	69.1	37.1	93.7	33,614	11
United Arab Emirates	0	49	2.3	818	68	9	23	94.2	105.2	0.0	0.0	98.3	52.9	15,543	12
Yemen	4	198	6.6	368	95	1	4	79.8	138.7	..	..	5.9	38.0	12,200	16

For more information, please visit http://earthtrends.wri.org/datatables/freshwater

	Actual Renewable Water Resources {a}		Annual Water Withdrawals					Inland and Marine Fisheries Production (thousand metric tons) {c}				Trade in Fish and Fisheries Products (million $US) {c}		Number of Fishers	Fish Protein as a Percent of Animal Protein Supply
					Withdrawals by Sector (percent), 2000 {b}			Capture		Aquaculture		2000-2002			
	Total (km^3)	Per Capita (m^3 per person)	Total (km^3) 2000	Per Capita (m^3 per person) 2000	Agri-culture	Indus-try	Dom-estic	1990-1992	2000-2002	1990-1992	2000-2002	Imports	Exports	2000	2002
Sub-Saharan Africa	**..**	**6,322**	**113.4**	**173**	**88**	**4**	**9**	**4,126.4**	**5,159.6**	**25.4**	**63.1**	**812.1**	**1,862.1**	**1,995,694**	**20**
Angola	184	13,070	0.3	28	61	16	22	121.3	250.6	..	..	17.5	22.4	30,364	34
Benin	25	3,585	0.3	40	74	11	15	35.3	37.1	..	0.0	7.2	2.3	61,793	21
Botswana	14	8,022	0.1	81	43	19	38	1.0	0.1	..	..	6.9	0.0	2,620	3
Burkina Faso	13	933	0.8	66	88	0	11	7.2	8.5	0.0	0.0	1.4	0.1	8,300	8
Burundi	4	509	0.2	37	82	1	17	20.8	11.8	0.0	0.1	0.1	0.2	7,030	17
Cameroon	286	17,520	1.0	65	74	8	18	70.7	114.4	0.1	0.2	23.7	0.5	24,500	34
Central African Rep	144	36,912	0.0	6	4	19	77	13.2	15.0	0.2	0.1	0.3	0.2	5,410	9
Chad	43	4,857	0.2	30	80	1	19	70.0	84.0	..	..	0.3	0.0	300,000	15
Congo	832	217,915	0.0	11	10	30	59	44.4	43.3	0.2	0.2	19.2	2.2	10,500	43
Congo, Dem Rep	1,283	..	0.4	7	31	16	52	171.7	214.6	0.7	2.6	33.5	0.4	108,400	43
Côte d'Ivoire	81	4,794	0.9	59	65	12	23	88.3	76.4	0.2	1.0	154.3	125.7	19,707	..
Equatorial Guinea	26	51,282	0.1	232	1	16	83	3.6	3.5	..	..	4.2	0.7	9,218	..
Eritrea	6	1,466	0.3	82	95	1	4	..	9.9	..	..	0.2	1.3	14,500	11
Ethiopia	110	1,519	2.6	40	93	6	1	4.6	14.5	0.0	0.0	0.2	0.0	6,272	2
Gabon	164	121,392	0.1	102	40	11	48	22.0	43.7	0.0	0.2	12.4	13.5	8,258	33
Gambia	8	5,472	0.0	24	67	11	22	21.5	36.4	0.0	0.0	0.7	2.8	2,000	61
Ghana	53	2,489	0.5	27	48	15	37	393.9	423.6	0.4	5.7	100.4	74.8	230,000	64
Guinea	226	26,218	1.5	187	90	2	8	49.5	100.2	0.0	0.0	6.6	2.0	10,707	43
Guinea-Bissau	31	20,156	0.1	81	91	1	9	5.2	5.0	..	..	0.2	4.4	2,500	6
Kenya	30	932	1.6	52	64	6	30	187.2	174.9	1.2	0.8	4.2	37.8	59,565	8
Lesotho	3	1,678	0.1	30	19	41	40	0.0	0.0	0.0	0.0	..	..	60	0
Liberia	232	66,533	0.1	36	56	15	28	8.3	11.5	0.0	0.0	2.1	0.1	5,143	26
Madagascar	337	18,826	15.0	937	96	2	3	102.3	136.4	0.7	7.7	10.0	106.9	83,310	17
Malawi	17	1,401	1.0	88	81	5	15	68.9	41.6	0.2	0.6	0.4	0.2	42,922	26
Mali	100	7,458	6.9	582	99	0	1	69.3	103.3	0.0	0.5	1.8	0.4	70,000	13
Mauritania	11	3,826	1.7	642	88	3	9	66.6	81.5	..	..	1.0	99.0	7,944	9
Mozambique	216	11,266	0.6	36	87	2	11	32.5	34.8	0.0	0.2	7.6	98.9	20,000	17
Namibia	18	8,921	0.3	142	63	5	33	374.6	587.4	0.0	0.1	16.5	334.6	2,700	14
Niger	34	2,710	2.2	204	95	1	4	3.0	20.2	0.0	0.0	0.6	2.4	7,983	3
Nigeria	286	2,252	8.0	70	69	10	21	287.5	458.2	13.3	26.9	197.6	17.6	481,264	29
Rwanda	5	613	0.1	10	39	14	48	3.2	6.9	0.1	0.4	0.1	..	5,690	8
Senegal	39	3,811	1.6	169	90	4	6	334.9	393.7	0.0	0.1	1.0	245.5	55,547	44
Sierra Leone	160	30,960	0.4	86	93	2	5	63.6	77.6	0.0	0.0	4.1	13.7	17,990	61
Somalia	14	1,309	3.3	378	100	0	0	24.1	19.4	..	..	0.1	3.1	18,900	..
South Africa	50	1,106	15.3	348	73	10	17	574.4	720.0	4.3	4.1	56.1	291.1	10,500	9
Sudan	65	1,879	37.3	1,187	97	1	3	33.2	56.3	0.2	1.2	0.6	0.3	27,700	2
Tanzania, United Rep	91	2,416	2.0	57	93	1	6	357.1	331.1	0.4	0.4	0.4	107.4	92,529	27
Togo	15	2,930	0.2	36	47	8	45	13.0	22.1	0.1	0.4	10.9	6.3	14,120	40
Uganda	66	2,472	0.3	13	39	15	45	241.6	220.7	0.1	2.7	0.1	54.8	57,862	23
Zambia	105	9,630	1.7	167	76	8	16	66.4	65.6	2.5	4.2	1.9	0.4	23,833	22
Zimbabwe	20	1,547	2.6	207	86	5	10	23.1	13.0	0.1	2.2	4.9	3.4	1,804	4
North America	**..**	**19,992**	**525.3**	**1,663**	**38**	**48**	**14**	**6,908.1**	**6,071.6**	**409.1**	**628.6**	**11,651.6**	**6,345.6**	**303,784**	**7**
Canada	2,902	91,419	46.0	1,494	12	69	20	1,471.7	1,026.2	44.9	151.0	1,371.2	2,883.9	8,696	10
United States	3,069	10,333	479.3	1,682	41	46	13	5,291.2	4,866.7	364.2	477.5	10,268.5	3,210.5	290,000	6
C. America & Caribbean	**..**	**6,924**	**100.7**	**603**	**75**	**6**	**18**	**1,753.9**	**1,989.7**	**50.1**	**147.4**	**455.2**	**1,525.4**	**446,390**	**9**
Belize	19	71,111	0.1	519	0	89	11	2.3	30.4	0.2	4.2	2.3	18.6	1,872	18
Costa Rica	112	26,447	2.7	681	53	17	29	16.8	34.4	1.6	12.7	25.0	129.9	6,510	4
Cuba	38	3,365	8.2	732	69	12	19	147.0	46.6	9.8	27.0	36.4	86.2	11,865	14
Dominican Rep	21	2,367	3.4	405	66	2	32	16.4	14.2	0.6	2.8	60.7	1.5	9,286	13
El Salvador	25	3,815	1.3	205	59	16	25	10.6	21.0	0.4	0.5	9.2	26.4	24,534	6
Guatemala	111	8,788	2.0	176	80	13	6	6.7	28.6	1.0	5.7	10.5	25.4	17,275	3
Haiti	14	1,663	1.0	123	94	1	5	5.1	5.0	..	..	5.9	3.6	4,700	9
Honduras	96	13,513	0.9	133	81	11	8	16.5	12.8	4.4	12.4	13.0	72.8	21,000	2
Jamaica	9	3,513	0.4	159	49	17	34	16.0	5.7	3.3	5.1	47.5	8.5	23,465	17
Mexico	457	4,357	78.2	791	77	5	17	1,297.3	1,388.6	24.6	67.9	165.1	659.1	262,401	8
Nicaragua	197	35,142	1.3	256	83	3	14	5.2	24.8	0.1	5.8	6.6	72.6	14,502	8
Panama	148	46,579	0.8	279	28	5	66	155.2	260.2	3.7	3.1	14.6	304.8	13,062	8
Trinidad and Tobago	4	2,938	0.3	237	6	27	67	12.3	10.6	0.0	0.0	9.2	10.8	7,297	14
South America	**..**	**47,044**	**164.4**	**474**	**68**	**12**	**19**	**15,272.4**	**16,314.5**	**198.1**	**868.6**	**568.9**	**5,231.8**	**784,051**	**6**
Argentina	814	20,941	29.1	784	74	9	16	632.9	928.4	0.4	1.5	58.5	810.7	12,320	4
Bolivia	623	69,378	1.4	167	83	3	13	5.7	5.9	0.3	0.4	6.7	0.0	7,754	3
Brazil	8,233	45,573	59.3	345	62	18	20	762.9	798.6	24.6	210.1	271.3	289.3	290,000	4
Chile	922	57,639	12.5	824	64	25	11	5,851.3	4,122.9	49.5	501.1	49.8	1,867.4	50,873	9
Colombia	2,132	47,469	10.7	254	46	4	50	119.9	131.6	15.6	63.9	74.8	177.4	129,410	5
Ecuador	432	32,747	17.0	1,367	82	5	12	282.1	499.2	100.5	66.2	10.4	651.6	162,870	6
Guyana	241	314,211	1.6	2,163	97	1	2	39.6	50.1	0.1	0.6	2.4	55.9	6,571	38
Paraguay	336	55,833	0.5	89	72	9	20	14.5	25.0	0.1	0.1	1.4	0.1	4,469	4
Peru	1,913	69,395	20.1	776	82	10	8	7,089.7	9,137.2	5.9	8.2	20.9	1,136.1	66,361	25
Suriname	122	277,904	0.7	1,565	93	3	4	8.3	18.4	0.0	0.4	3.5	9.0	3,628	22
Uruguay	139	40,419	3.1	941	96	1	2	120.1	109.0	0.0	0.0	13.9	104.0	4,023	4
Venezuela	1,233	47,122	8.4	345	47	7	45	335.2	430.1	1.3	16.0	55.4	130.4	44,302	..
Oceania	**..**	**54,637**	**26.2**	**900**	**72**	**10**	**18**	**817.5**	**1,104.2**	**58.4**	**122.3**	**643.2**	**1,793.6**	**85,324**	**9**
Australia	492	24,708	23.9	1,250	75	10	15	221.8	193.1	14.4	35.3	529.5	933.5	13,800	7
Fiji	29	33,707	0.1	85	78	11	11	29.1	43.6	0.0	1.7	21.5	38.1	8,985	30
New Zealand	327	83,760	2.1	558	42	9	49	394.8	556.9	42.9	83.0	55.4	671.6	1,928	12
Papua New Guinea	801	137,252	0.1	14	1	43	56	26.4	122.8	0.0	0.0	7.4	68.3	16,000	..
Solomon Islands	45	91,039	..	..	..	..	..	49.7	28.8	0.0	0.0	0.5	15.0	11,000	76
Developed	**..**	**11,514**	**1,221.2**	**956**	**46**	**40**	**14**	**35,555.2**	**27,917.4**	**2,806.4**	**3,641.1**	**49,698.5**	**28,159.2**	**1,467,401**	**12**
Developing	**..**	**7,762**	**2,583.9**	**545**	**81**	**11**	**8**	**48,719.3**	**65,694.4**	**11,281.5**	**34,059.6**	**10,704.1**	**28,378.4**	**32,640,482**	**18**

a. Although data were obtained from FAO in 2004, 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.htm. **b**. Sectoral withdrawal data may not add up to 100 percent because of rounding. **c**. Figures are three-year averages for the range of years specified. **d**. World totals were calculated by WRI. **e**. Year ending 30 June. **f**. Year beginning 20-23 March.

Water Resources and Fisheries: Technical Notes

DEFINITIONS AND METHODOLOGY

Actual Renewable Water Resources, measured in cubic kilometers per year (km^3/year), gives the maximum theoretical amount of water actually available for each country, although in reality a portion of this water may be inaccessible to humans. Actual renewable water resources are defined as the sum of internal renewable resources (IRWR) and external renewable resources (ERWR), taking into consideration the quantity of flow reserved to upstream and downstream countries through formal or informal agreements or treaties and possible reduction of external flow due to upstream water abstraction. IRWR include the average annual flow of rivers and the recharge of groundwater (aquifers) generated from endogenous precipitation—the precipitation occurring within a country's borders. ERWR represent the portion of the country's renewable water resources that is not generated within the country. ERWR include inflows from upstream countries (groundwater and surface water) and a portion of the water of border lakes or rivers.

Per Capita Actual Renewable Water Resources are measured in cubic meters per person per year (m3/person/year). Per capita actual water resources were calculated by WRI using population data from the United Nations Population Division for the year 2004.

Annual Water Withdrawals, measured in cubic kilometers per year, is the gross amount of water extracted from any source, either permanently or temporarily, for a given use. It can be either diverted towards distribution networks or directly used. It includes consumptive use, conveyance losses, and return flow. Total water withdrawal is the sum of estimated water use by the agricultural, domestic, and industrial sectors. It does not include precipitation.

Per Capita Annual Withdrawals were calculated by WRI using national population data from the UN Population Division for the year 2000.

Withdrawals by Sector, expressed as a percentage, refers to the proportion of water used for one of three purposes: agriculture, industry, or 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. **Industrial** use measures consumption by self-supplied industries not connected to any distribution network for manufacturing, cooling machinery and equipment, producing energy, cleaning and washing manufactured goods, and as a solvent. **Domestic** uses include drinking water plus water withdrawn for homes, municipalities, commercial establishments, and public services (e.g., hospitals).

Freshwater resources data were provided by AQUASTAT, a global database of water statistics maintained by the Food and Agriculture Organization of the United Nations (FAO). AQUASTAT collects its information from a number of sources—national water resources and irrigation master plans; national yearbooks, statistics, and reports; and national or international surveys.

When possible, FAO cross-checks information between countries to improve assessments in countries where information is limited. When several sources give different or contradictory figures, preference is always given to information collected at national or sub-national level. This preference is based on the assumption that no regional information can be more accurate than studies carried out at the country level. Unless proven inaccurate, official rather than unofficial sources were used. In the case of shared water resources, a comparison between countries was made to ensure consistency at river-basin level.

Inland and Marine Fisheries Production, Capture data refer to the nominal catch of fish, crustaceans, molluscs, aquatic mammals, and other aquatic animals taken for commercial, industrial, recreational, and subsistence purposes from marine, brackish, and inland waters. The harvest from aquaculture and other kinds of farming are excluded. Statistics for aquatic plants are also excluded from country totals. Total capture production includes freshwater fish (carp, tilapias, etc.), diadromous fish (river eels, salmon, etc.), marine fish (flounders, cods, redfishes, tunas, mackerels, sharks, etc.) crustaceans (lobster, shrimp, etc.), and molluscs (oyster, clams, squid, etc.). Data include all quantities caught and landed for both food and feed purposes but exclude catch discarded at sea.

Inland and Marine Fisheries Production, Aquaculture data refer to the harvest of fish, molluscs, crustaceans, and other aquatic animals cultivated in marine, inland, or brackish environments. Data do not include capture production. Statistics for aquatic plants are also excluded. Aquaculture is defined by FAO as "the farming of aquatic organisms, including fish, molluscs, crustaceans, and aquatic plants. Farming implies some form of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc. [It] also implies ownership of the stock being cultivated." Aquatic organisms that are exploitable by the public as a common property resource are not included in aquaculture production.

Production of fish, crustaceans, and molluscs is expressed in live weight, the nominal weight of the aquatic organisms at the time of harvest. For a more detailed listing of the species mentioned above, refer to the original source at http://www.fao.org/waicent/faostat/agricult/fishitems-e-e.html.

Most fisheries statistics are collected by FAO from questionnaires sent to national fisheries agencies. When these data are missing or considered unreliable, FAO estimates fishery production based on regional fishery organizations, project documents, industry magazines, or statistical interpolations. Regional totals represent a sum of available data and may be incomplete.

Trade in Fish and Fisheries Products measures the value of all fisheries products, excluding non-edible shells and aquatic plants, entering (referred to as imports) or leaving (referred to as exports) a country's borders each year through trade. The totals reported here incorporate the same species as the FAO's Yearbook of Fishery Statistics (ftp://ftp.fao.org/fi/stat/summary/default.htm). The value of this trade is expressed in millions of U.S. dollars.

In accordance with internationally recommended practice, import statistics include fish caught by foreign fishing craft, whether or not processed on board, landed in domestic ports; export statistics include fish caught by domestic fishing craft, whether or not processed on board, landed in foreign ports. As such, landbound countries can therefore export marine fish and fish products. Exports are generally on a free-on-board basis (i.e., not including insurance or freight costs). Regional totals are calculated by adding up imports or exports of each country included in that region. The regional totals should not be taken as a net trade for that region, since much trade occurs intra-regionally.

Number of Fishers includes the number of people employed full or part-time in commercial and subsistence fishing (both personnel on fishing vessels and on shore), operating in freshwater, brackish, and marine areas, and in aquaculture production activities. Data on people employed in fishing and aquaculture are collected by the FAO through annual questionnaires submitted to the national reporting offices of the member countries. When possible, other national and regional published sources are also used to estimate figures.

Fish Protein as a Percent of Animal Protein Supply is defined as the quantity of protein from both freshwater and marine fish, seafood, and derived products available for human consumption as a percentage of all available animal protein. FAO calculates per capita protein supply for all products, including fish, in its

collection of Supply/Utilization Accounts (SUAs) and food balance sheets. For each product, the SUA traces supplies from production, imports, and stocks to its utilization in different forms—addition to stocks; exports; animal feed; seed; processing for food and non-food purposes; waste (or losses); and lastly as food available for human consumption, where appropriate. For more detailed information, please refer to the following article: "Supply Utilization Accounts and Food Balance Sheets in the Context of a National Statistical System," maintained on-line by FAO at http://www.fao.org/es/ESS/Suafbs.htm.

FREQUENCY OF UPDATE BY DATA PROVIDERS

Most freshwater data are not available in a time series and are updated intermittently; the global data set maintained on-line by AQUASTAT contains data collected over a time span of up to 30 years. Fisheries production and trade data are updated annually by the Fishery Information, Data and Statistics Unit (FIDI) of FAO. Number of fishers data are updated by FIDI every 2-4 years. The FAO updates the data on fish protein annually; the most recent updates incorporated in these tables are from July 2004.

DATA RELIABILITY AND CAUTIONARY NOTES

Water Resources and Withdrawals: While AQUASTAT represents the most complete and careful compilation to date of statistics on country-level water resources, the quality of the primary information on which it relies varies. Information sources are numerous 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. All data should be considered order-of-magnitude estimates.

Actual Renewable Water Resources: 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.

Actual Renewable Water Resources Per Capita: Water resources data are 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 2000 population data. For more information about the collection methodology and reliability of the UN population data, please refer to the notes accompanying the Demographics and Education table.

Total Fisheries Production and Trade in Fish and Fisheries Products: While FISHSTAT provides the most extensive global time series of fishery statistics since 1950, there are some problems associated with the data. Country-level data are often submitted with a 1-2 year delay. Statistics from smaller artisanal and subsistence fisheries are particularly sparse. While these statistics provide a good overview of regional fisheries trends, data should be used with caution and supplemented with estimates from regional organizations, academic literature, expert consultations, and trade data. For more information, consult *Fishery Statistics Reliability and Policy Implications,* published by the FAO Fisheries Department and available on-line at http://www.fao.org/DOCREP/FIELD/006/Y3354M/Y3354M00.HTM.

Number of Fishers data are gross estimates. Many countries do not submit data on fishers, or submit incomplete information; some countries have occasionally omitted fish farmers from the total or included subsistence and sport fishers, as well as family members living on fishing. Apart from the gaps and the heavy presence of estimates due to non-reporting, the information provided by national statistical offices may not be strictly comparable due to the utilization of different definitions and methods in the assessment of the number of people engaged in fishing and aquaculture. FAO recognizes that these statistics are incomplete and may not accurately reflect the current level of employment in the fishing sector.

Fish Protein as a Percent of Total Protein Supply: Food supply is different from actual consumption. Figures do not account for discards (including bones) and losses during storage and preparation. Supply data should only be used to assess food security if they are combined with an analysis of food availability and accessibility. Nonetheless, the data are subject to "vigorous consistency checks." According to FAO, the food supply statistics, "while often far from satisfactory in the proper statistical sense, do provide an approximate picture of the overall food situation in a country and can be useful for economic and nutritional studies, for preparing development plans and for formulating related projects." For more information see *Food Balance Sheets: A Handbook,* maintained on-line by FAO at http://www.fao.org/DOCREP/003/X9892E/X9892E00.htm.

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