

Online Resource 1. Further details on pattern-scaling with ClimGen and the 21 CMIP3 models used to define the climate projections in this study.

Spatial and temporal climate change scenarios at 0.5°x0.5° resolution were constructed by pattern-scaling output from 21 CMIP3 GCMs (Meehl et al. 2007) with ClimGen (Todd et al. 2011). Pattern-scaling is a technique that assumes the dimensionless spatial fields of change in climate variables extracted from GCM output can be rescaled to match a defined change in global mean temperature. It inherently assumes that the relationship between local change in climate and global temperature change is one-directional and linear. This is broadly reasonable for moderate amounts of temperature change (Mitchell 2003) but it may not hold where the rate of temperature change slows or reverses (such scenarios are not considered in this study). The change patterns are calculated separately for each month to preserve the seasonal information. ClimGen uses statistical interpolation to downscale the change fields from the native climate model resolution to the 0.5°x 0.5° resolution of the baseline climatology (CRU TS3.1). The table below displays the 21 CMIP3 models we used to define the climate projections in this study.

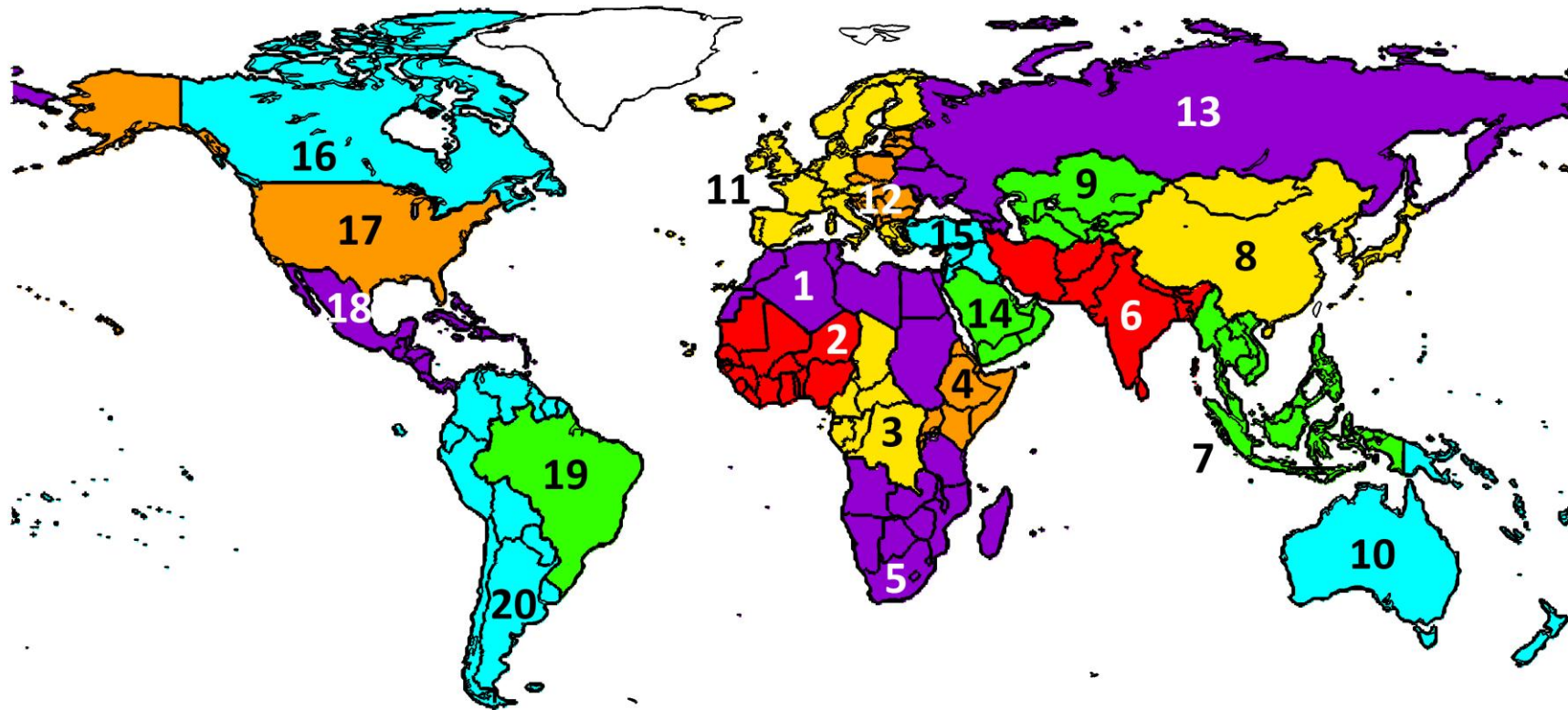
IPCC I.D.	Centre and location
UKMO-HadCM3	Hadley Centre for Climate Prediction and Research (UK)
UKMO-HadGEM1	Hadley Centre for Climate Prediction and Research (UK)
ECHAM5/MPI-OM	Max Planck Institute for Meteorology (Germany)
CSIRO-Mk3.0	CSIRO Atmospheric Research (Australia)
CSIRO-Mk3.5	CSIRO Atmospheric Research (Australia)
CGCM3.1 (T47)	Canadian Centre for Climate Modelling and Analysis (Canada)
CGCM3.1 (T63)	Canadian Centre for Climate Modelling and Analysis (Canada)
IPSL-CM4	Institut Pierre Simon Laplace (France)
CCSM3	National Center for Atmospheric Research (USA)
PCM	National Center for Atmospheric Research (USA)
BCCR-BCM2.0	Bjerknes Centre for Climate Research (Norway)
CNRM-CM3	Météo-France, Centre National de Recherches Météorologiques (France)
GFDL-CM2.0	Geophysical Fluid Dynamics Laboratory (USA)
GFDL-CM2.1	Geophysical Fluid Dynamics Laboratory (USA)
GISS-AOM	NASA/Goddard Institute for Space Studies (USA)
GISS-EH	NASA/Goddard Institute for Space Studies (USA)
GISS-ER	NASA/Goddard Institute for Space Studies (USA)
INM-CM3.0	Institute for Numerical Mathematics (Russia)
MIROC3.2 (medres)	Centre for Climate System Research, National Institute for Environmental Studies, Frontier Research Center for Global Change (Japan)
MIROC3.2 (hires)	Centre for Climate System Research, National Institute for Environmental Studies, Frontier Research Center for Global Change (Japan)
MRI-CGCM2.3.2	Meteorological Research Institute (Japan)

Online Resource 2. Further details on Mac-PDM.09

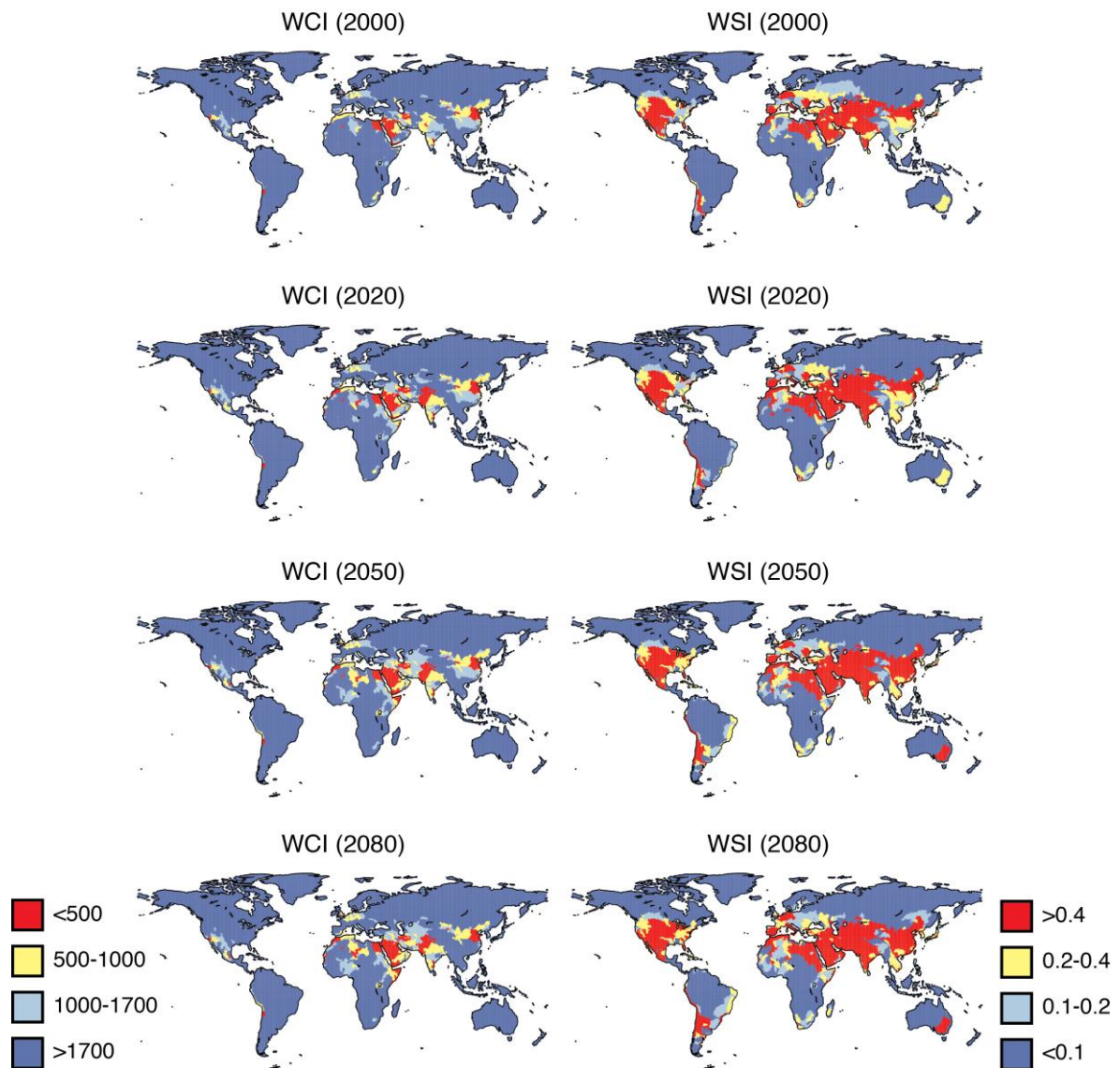
Mac-PDM.09 calculates daily precipitation stochastically for each grid cell from ClimGen input of total monthly precipitation and number of wet days. The occurrence of precipitation is described by a simple two-state, zero-order Markov model with the disaggregated daily data rescaled to maintain the correct monthly total. Monthly temperature is interpolated to the daily time step and then a random component is added with a 'realistic' standard deviation of 2°C across the world. Monthly net radiation data is interpolated to the daily scale. A comprehensive description of Mac-PDM.09 is provided by Gosling and Arnell (2011).

Online Resource 3. The regional classification.

1	North Africa	Algeria, Libya, Morocco, Western Sahara, Sudan, Tunisia, Egypt
2	West Africa	Benin, Burkina Faso, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo
3	Central Africa	Cameroon, Cape Verde, Central African Republic, Chad, Congo, DR Congo, Equatorial Guinea, Gabon, Sao Tome and Principe,
4	East Africa	Burundi, Djibouti, Ethiopia, Eritrea, Kenya, Rwanda, Somalia
5	Southern Africa	Angola, Botswana, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia, Zimbabwe, plus western Indian Ocean islands
6	South Asia	Afghanistan, Bangladesh, Bhutan, India, Iran, Maldives, Nepal, Pakistan, Sri Lanka
7	South East Asia	Brunei, Cambodia, East Timor, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam
8	East Asia	China, Japan, Rep. of Korea, Dem. Rep. of Korea, Mongolia, Taiwan
9	Central Asia	Kazakhstan, Kyrgyz Rep., Tajikistan, Turkmenistan, Uzbekistan
10	Australasia	Australia, New Zealand, Papua New Guinea, Pacific Ocean islands
11	Western Europe	Andorra, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, UK
12	Central Europe	Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Cyprus, Czech Rep., Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia, Macedonia, Montenegro, Serbia
13	Eastern Europe	Azerbaijan, Armenia, Belarus, Georgia, Moldova, Russia, Ukraine
14	Arabian Peninsular	Bahrain, Oman, Saudi Arabia, Qatar, United Arab Emirates, Yemen
15	Mashriq	Iraq, Israel, Jordan, Kuwait, Lebanon, Occupied Palestinian Terr., Syria, Turkey
16	Canada	Canada
17	US	US
18	Central America	Belize, Costa Rica, Cuba, El Salvador, Guatemala, Honduras, Nicaragua, Mexico, Panama, and the Caribbean Islands
19	Brasil	Brasil
20	South America	Argentina, Bolivia, Chile, Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela
	Global	All countries above

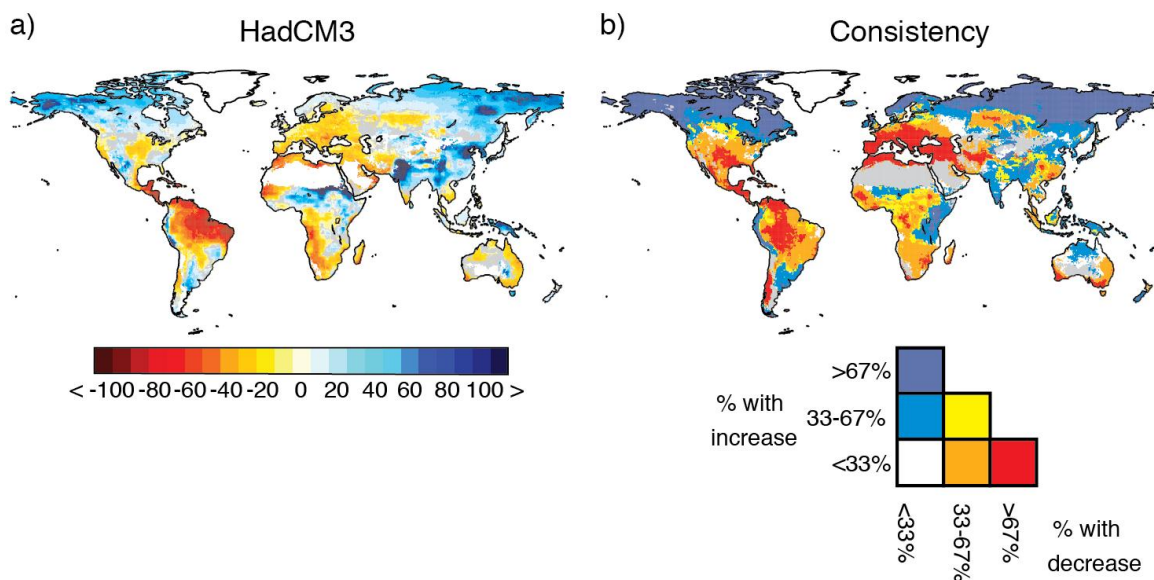


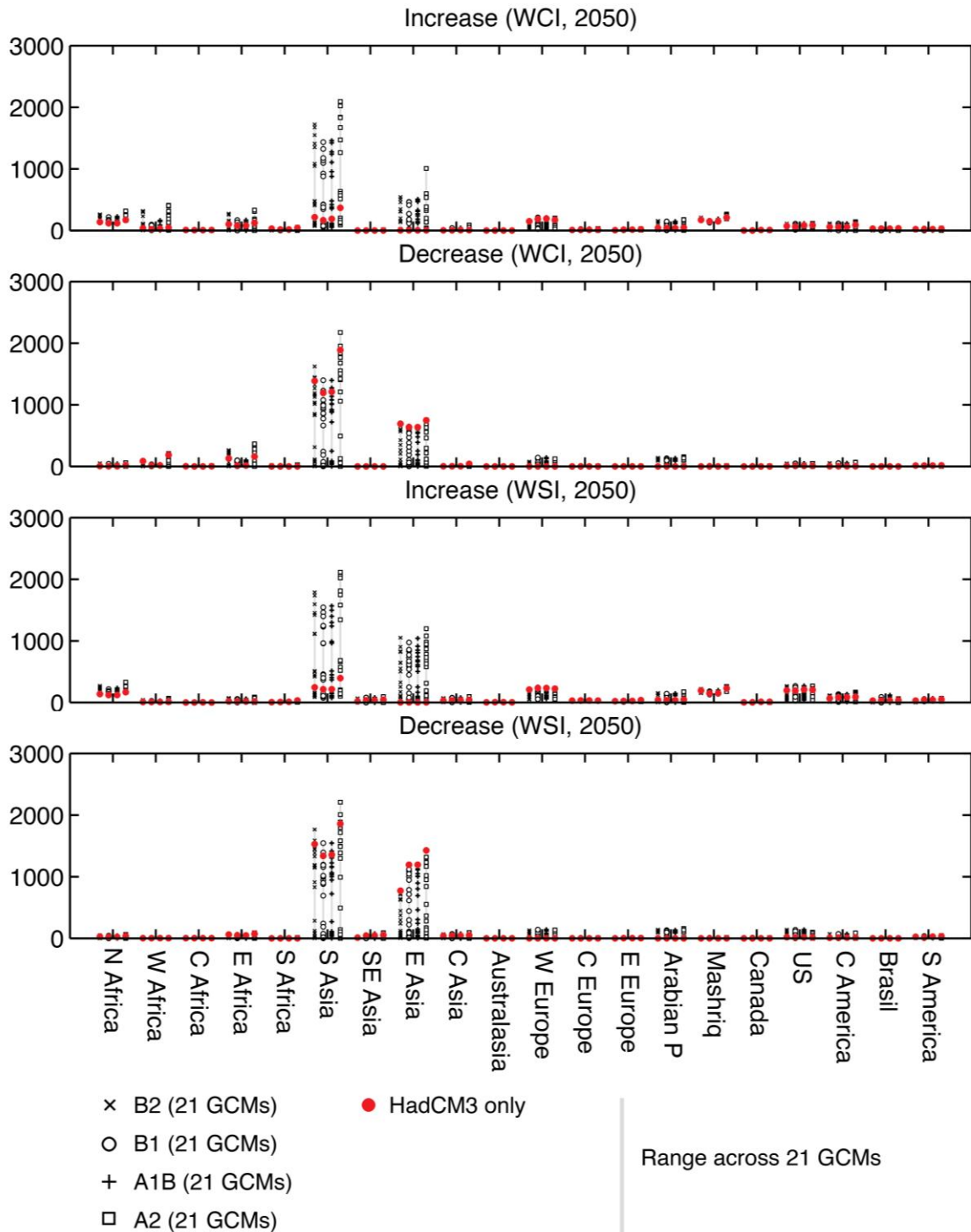
Online Resource 4. Boundaries for the regional classification (see Online Resource 3 for coding).



Online Resource 5. Watershed exposure to water scarcity in the absence of climate change (i.e. due to population change only), using two measures of water scarcity: WCI (left panels) and the WSI (right panels), for four time horizons (2000, 2020, 2050, 2080) under the A1B scenario.

Online Resource 6. Change in average annual runoff by 2050, relative to 1961-1990, under the HadCM3 climate model and SRES A1B emissions with grid cells where the change is less than the standard deviation due to multi-decadal variability shaded grey and grid cells where 1961-1990 average annual runoff is less than 10 mm/year coloured in white, excluding Greenland (a). Consistency in change greater than one standard deviation in average annual runoff across all 21 CMIP3 model patterns for the A1B emissions scenario by 2050 with grid cells where 1961-1990 average annual runoff is less than 10 mm/year shaded grey (b). Both maps are sourced from Arnell and Gosling (2013).





Online Resource 7. Exposure to an increase and decrease in water scarcity attributable solely to climate change (i.e. the increases and decreases are additional to the effects of changes in future population or withdrawals), expressed as millions of people, at 2050, using the WCI (1000 m³/capita/year) and the WSI (0.4). The individual markers denote estimates for individual GCMs, with a different marker shape assigned to each SRES scenario. Filled red circles denote the HadCM3 GCM. The vertical grey bars denote the range across 21 GCMs.

Online Resource 8. Exposure to increased (INC) and decreased (DEC) water scarcity due to climate change, for 20 regions and globally, at three time horizons, under A1B, assuming thresholds for the WCI of 1,000 m³/capita/year (a) and WSI of 0.4 (b). Exposure is expressed in millions of people (M) and as a percentage of regional population (%) respectively. The minimum (Min) and maximum (Max) exposure associated with patterns of climate change from 21 GCMs are displayed for each region along with the estimates associated with a single GCM, HadCM3 (Had).

a) WCI		INC									DEC								
		2020			2050			2080			2020			2050			2080		
		Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max
North Africa	M	76.7	99	137	108.7	116.6	226.2	114.1	120.8	232.5	0	0.3	35	0	0.4	43.9	0	0.3	47.1
	%	34	44	60	41	44	85	42	45	87	0	0	15	0	0	17	0	0	18
West Africa	M	0	12.6	28.9	0	26	160.9	0	25.9	292.2	0	0	9.2	0	16	34.2	0	19.9	36.5
	%	0	4	8	0	6	35	0	5	60	0	0	3	0	4	8	0	4	7
Central Africa	M	0	0	3.4	0	5.2	5.7	0	6	6.5	0	0	0	0	0	5.3	0	0	6
	%	0	0	3	0	3	3	0	3	3	0	0	0	0	0	3	0	0	3
East Africa	M	0	5.7	51.3	0	78.6	167.2	0	85.6	228.3	0	5.7	14.2	0	12.3	97.2	0	68.9	163.1
	%	0	3	23	0	25	53	0	25	66	0	3	6	0	4	31	0	20	47
Southern Africa	M	0	16	22.6	0	16.6	16.6	0	16.9	16.9	0	0	1.9	0	0	10.7	0	0	12.1
	%	0	8	11	0	7	7	0	7	7	0	0	1	0	0	5	0	0	5
South Asia	M	18.3	94.5	1041.6	51.5	186.8	1459.8	43.3	171.7	1401.8	0	1023.6	1181.1	0	1210.3	1396.7	0	1077.7	1248.7
	%	1	5	57	2	9	70	2	9	73	0	56	64	0	58	67	0	56	65
South East Asia	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Asia	M	0	0.4	225.1	0	0.4	506.4	0	0.3	563	0	681.8	694.6	0	636.6	649	0	452.1	467.9
	%	0	0	14	0	0	33	0	0	44	0	42	43	0	42	42	0	35	36
Central Asia	M	0	1.3	3	0.1	3	39.9	0.1	3.6	70.3	0	0.1	0.1	0	0.1	1.4	0	0.1	1.8
	%	0	2	4	0	3	46	0	4	80	0	0	0	0	0	2	0	0	2
Australasia	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Western Europe	M	18.5	147.1	169.2	23.9	192.1	211.3	21.7	185.8	215.2	0	0	94.9	0	0	143.1	0	0	149
	%	5	37	42	6	45	50	5	44	51	0	0	24	0	0	34	0	0	35
Central Europe	M	0	9.4	10.5	2	8.7	31.9	0.6	7.3	42.7	0	0	6.7	0	0	6.3	0	0	5.4
	%	0	7	8	2	7	27	1	7	42	0	0	5	0	0	5	0	0	5

Eastern Europe	M	0	14	17.4	0.3	13.5	24.8	0.2	12.7	23.3	0	0	1.2	0	0	3.7	0	0	4
	%	0	6	8	0	7	12	0	7	13	0	0	1	0	0	2	0	0	2
Arabian Peninsula	M	0.3	15.5	76.7	0.5	36.9	144.7	0.5	39.8	192.6	0	0	51.7	0	0	130.6	0	0	177.9
	%	0	19	93	0	25	100	0	21	100	0	0	63	0	0	90	0	0	92
Mashriq	M	49	86.2	124.3	132.2	148.4	185.8	123.9	145.6	178.4	0	0	7.2	0	0	10.2	0	0	10.7
	%	28	49	71	64	72	91	64	75	92	0	0	4	0	0	5	0	0	6
Canada	M	0	0	5.9	0	6.6	6.7	0	6.9	9.2	0	0	5.9	0	0	6.6	0	0	6.8
	%	0	0	17	0	17	17	0	17	22	0	0	17	0	0	17	0	0	17
US	M	0	23.6	68.5	20.4	83.1	116.2	35.1	90.3	153.5	0	0	34.7	0	6.2	48.8	0	6.4	50.2
	%	0	7	20	5	21	29	8	22	37	0	0	10	0	2	12	0	2	12
Central America	M	0	27.3	75.8	0	56	112.3	0.8	108.3	187.5	0	0	27.3	0	0.4	52.8	0	0.4	49.8
	%	0	13	35	0	22	45	0	43	75	0	0	13	0	0	21	0	0	20
Brasil	M	0	0	0	0	28	28	0	26.5	26.5	0	0	0	0	0	0	0	0	0
	%	0	0	0	0	13	13	0	13	13	0	0	0	0	0	0	0	0	0
South America	M	0	14.7	14.7	0	20.3	31	0	32.9	32.9	0	0	4.5	0	12.4	17.8	0	12.8	18.4
	%	0	7	7	0	8	12	0	12	12	0	0	2	0	5	7	0	5	7
Global	M	256.3	567.5	1769.7	530.9	1026.8	3100.1	622.9	1086.8	3118.9	19.7	1711.6	1711.6	173.6	1894.7	2194.3	207.9	1638.7	1993
	%	3	8	24	6	13	38	8	14	40	0	23	23	2	23	27	3	21	25
b) WSI						INC									DEC				
			2020			2050			2080				2020			2050			2080
		Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max
North Africa	M	83.7	102.6	154.5	116.9	121.5	234.2	116.5	121.5	240.2	0	9.8	34.9	0	20.7	44.2	0	19	48
	%	37	45	68	44	46	88	43	45	89	0	4	15	0	8	17	0	7	18
West Africa	M	0	3.1	3.2	0	6.1	30.1	0	19.7	106.6	0	0	3.2	0	0.4	5	0	0.5	6
	%	0	1	1	0	1	7	0	4	22	0	0	1	0	0	1	0	0	1
Central Africa	M	0	0	0	0	0.1	0.4	0	0.1	0.8	0	0	0	0	0	0	0	0	0
	%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Africa	M	0	4.4	37.3	0	14.8	58.4	0	14.2	92.8	0	9.7	11.9	0	46	56.6	0	48.2	68.7
	%	0	2	17	0	5	19	0	4	27	0	4	5	0	15	18	0	14	20
Southern Africa	M	0	0.5	6.5	0.1	11	17.5	0	14.2	20.8	0	0	0.1	0	0	0	0	0	0
	%	0	0	3	0	5	8	0	6	8	0	0	0	0	0	0	0	0	0
South Asia	M	46.2	131.4	1142.6	74.6	215.7	1567.3	67.3	202.4	1468.3	0	1095	1277.4	0	1355.8	1545.6	0	1263.8	1433.7
	%	3	7	62	4	10	75	4	11	77	0	60	70	0	65	74	0	66	75

South East Asia	M	0	15.2	22.9	0	35	78.4	0	55.1	93.9	0	0	22.9	0	43.4	75.3	0	38.8	68.2
	%	0	2	4	0	5	11	0	8	14	0	0	4	0	6	10	0	6	10
East Asia	M	0	0	645.5	0	0.4	1041.4	0.3	0.3	1023.6	0	709.3	718.4	0.6	1191.5	1191.5	0.5	1000.8	1000.8
	%	0	0	40	0	0	68	0	0	80	0	44	44	0	78	78	0	78	78
Central Asia	M	0	2.4	62.2	1.5	31.8	76.9	1.6	33.2	78.7	0	3.9	57.1	0	39.6	73.2	0	39.9	77
	%	0	3	87	2	37	89	2	38	90	0	5	80	0	46	85	0	46	88
Australasia	M	0	2.3	2.3	0	2.9	2.9	0	2.8	2.8	0	0	0	0	0	2.9	0	0	2.7
	%	0	6	6	0	6	6	0	6	6	0	0	0	0	0	6	0	0	6
Western Europe	M	33.1	208	213.7	58.6	233.4	243.9	57.1	257	294	0	0	116.1	0	0	139.8	0	0	171.4
	%	8	52	54	14	55	58	14	61	70	0	0	29	0	0	33	0	0	41
Central Europe	M	2.9	34.2	34.2	24.7	31.1	33.5	21.2	26.7	28.9	0	0	6.7	0	0	6.3	0	0	5.4
	%	2	27	27	21	26	28	21	26	28	0	0	5	0	0	5	0	0	5
Eastern Europe	M	3.4	23.6	25.2	10	24.1	34.8	10.6	29.9	33	0	0	0	0	0.1	7.7	0	0.1	7.8
	%	2	11	11	5	12	17	6	16	18	0	0	0	0	0	4	0	0	4
Arabian Peninsula	M	0.3	16.2	77.5	0.5	36.4	144.2	0.5	38.7	192.1	0	0	57.2	0	0	131.5	0	0	178
	%	0	20	94	0	25	99	0	20	100	0	0	69	0	0	90	0	0	92
Mashriq	M	104.5	116.4	141.4	130.4	148.7	194.5	126.3	145.5	186.5	0	0	6.6	0	0	10.2	0	0	10.7
	%	60	66	81	64	73	95	65	75	96	0	0	4	0	0	5	0	0	6
Canada	M	0	0.1	8.9	0	9	11.5	0	10.4	12.8	0	0	7.9	0	0	10.1	0	0	10.4
	%	0	0	25	0	22	29	0	25	31	0	0	22	0	0	25	0	0	25
US	M	4	83.9	175.4	37.5	210.2	269.2	48.3	222.9	367	0	1.6	66.3	0	15.3	140.8	0	34.1	170.8
	%	1	25	52	9	52	67	12	54	88	0	0	20	0	4	35	0	8	41
Central America	M	0	40.8	86.4	7.9	85.8	134.3	7.7	142.7	199.4	0	0.3	35.9	0	10.4	71.9	0	20.5	68.6
	%	0	19	40	3	34	54	3	57	80	0	0	17	0	4	29	0	8	27
Brasil	M	0	0	0	0	28	118.5	0	26.5	111.9	0	0	0	0	0	0	0	0	47.1
	%	0	0	0	0	13	53	0	13	53	0	0	0	0	0	0	0	0	22
South America	M	0	7.7	22.3	17.8	40.5	68.8	18	53.2	87.2	0	10.2	29.3	1.7	25.2	36	1.7	54.9	65.2
	%	0	4	10	7	15	26	7	19	31	0	5	13	1	9	14	1	20	24
Global	M	405.2	792.5	2467.5	751.7	1286.4	3919.3	924.5	1416.9	4067	43.2	1839.7	1839.7	128.9	2748.4	2748.4	178	2520.6	2564.6
	%	6	11	34	9	16	48	12	18	52	1	25	25	2	34	34	2	32	33

Online Resource 9. Exposure to increased (INC) and decreased (DEC) water scarcity due to climate change, for 20 regions and globally, at three time horizons, under B1, assuming thresholds for the WCI of 1,000 m³/capita/year (a) and WSI of 0.4 (b). Exposure is expressed in millions of people (M) and as a percentage of regional population (%) respectively. The minimum (Min) and maximum (Max) exposure associated with patterns of climate change from 21 GCMs are displayed for each region along with the estimates associated with a single GCM, HadCM3 (Had).

a) WCI		INC									DEC								
		2020			2050			2080			2020			2050			2080		
		Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max
North Africa	M	76.7	98.5	133.7	108.4	116.6	216.9	109	116.8	231.6	0	0.3	35	0	0.4	43.8	0	0.3	47.1
	%	34	43	59	41	44	82	41	43	86	0	0	15	0	0	16	0	0	18
West Africa	M	0	12.6	24.9	0	19.3	94.8	0	25.8	217.9	0	0	9.2	0	16	34.2	0	19.9	36.5
	%	0	4	7	0	4	21	0	5	45	0	0	3	0	4	8	0	4	7
Central Africa	M	0	0	3.4	0	5.2	5.2	0	6	6.5	0	0	0	0	0	5.3	0	0	6
	%	0	0	3	0	3	3	0	3	3	0	0	0	0	0	3	0	0	3
East Africa	M	0	7.9	46.7	0	75.3	167.1	0	90.8	213.1	0	5.7	13.9	0	11	97.2	0	68.9	163.1
	%	0	4	21	0	24	53	0	26	61	0	3	6	0	3	31	0	20	47
Southern Africa	M	0	16	22.6	0	16.4	16.4	0	12.1	16.9	0	0	1.9	0	0	10.7	0	0	12.1
	%	0	8	11	0	7	7	0	5	7	0	0	1	0	0	5	0	0	5
South Asia	M	15.6	92.3	1039.3	50.3	163.5	1434.3	42.6	170.2	1358.1	0	1023.6	1181.1	0	1192.7	1396.7	0	1062.5	1239.4
	%	1	5	57	2	8	69	2	9	71	0	56	64	0	57	67	0	55	65
South East Asia	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Asia	M	0	0.4	225.1	0	0.4	462.8	0	0	443.1	0	681.8	681.8	0	636.6	645.5	0	450.9	467.5
	%	0	0	14	0	0	30	0	0	35	0	42	42	0	42	42	0	35	36
Central Asia	M	0	1.3	3	0.1	2	39	0.1	3.6	40.8	0	0.1	0.1	0	0.1	1.4	0	0.1	1.5
	%	0	2	4	0	2	45	0	4	47	0	0	0	0	0	2	0	0	2
Australasia	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Western Europe	M	9.7	143.9	165.4	23.7	184.6	211.1	17.8	180.1	208.5	0	0	94.9	0	0	143.1	0	0	149
	%	2	36	42	6	44	50	4	43	50	0	0	24	0	0	34	0	0	35
Central Europe	M	0	9.4	10.5	0.8	8.7	24.2	0	6.6	8	0	0	6.7	0	0	6.3	0	0	5.4
	%	0	7	8	1	7	21	0	7	8	0	0	5	0	0	5	0	0	5

Eastern Europe	M	0	14	17.4	0.3	13.5	20.9	0	6.1	19.7	0	0	1.2	0	0	0.6	0	0	4
	%	0	6	8	0	7	10	0	3	11	0	0	1	0	0	0	0	0	2
Arabian Peninsula	M	0.3	15.5	76.7	0.5	36.5	144.7	0.5	39.4	192.4	0	0	51.7	0	0	130.6	0	0	177
	%	0	19	93	0	25	100	0	20	100	0	0	63	0	0	90	0	0	92
Mashriq	M	49	86.2	121.8	126.7	148.4	157.9	111.3	144.4	150.4	0	0	4.5	0	0	10.2	0	0	10.4
	%	28	49	70	62	72	77	57	75	78	0	0	3	0	0	5	0	0	5
Canada	M	0	0	5.9	0	0	6.7	0	6.8	6.9	0	0	5.9	0	0	6.6	0	0	6.8
	%	0	0	17	0	0	17	0	17	17	0	0	17	0	0	17	0	0	17
US	M	0	23.6	68.5	10.6	61.5	109.1	21	88.8	124.6	0	0	34.7	0	5.7	48.8	0	6.4	50.2
	%	0	7	20	3	15	27	5	21	30	0	0	10	0	1	12	0	2	12
Central America	M	0	25.4	75.8	0	56	110.8	0	55.6	158	0	0	21.5	0	0.1	52.8	0	0.4	49.8
	%	0	12	35	0	22	44	0	22	63	0	0	10	0	0	21	0	0	20
Brasil	M	0	0	0	0	28	28	0	26.5	26.5	0	0	0	0	0	0	0	0	0
	%	0	0	0	0	13	13	0	13	13	0	0	0	0	0	0	0	0	0
South America	M	0	14.7	14.7	0	18.7	31	0	20.9	32	0	0	4.5	0	12.4	17.8	0	12.8	18.4
	%	0	7	7	0	7	12	0	8	12	0	0	2	0	5	7	0	5	7
Global	M	230.4	561.7	1689.8	499.8	954.5	2773	505.7	1000.7	2892.2	19.7	1711.6	1711.6	104.8	1875	1875	179.5	1622.2	1991.9
	%	3	8	23	6	12	34	6	13	37	0	23	23	1	23	23	2	21	25
b) WSI						INC										DEC			
			2020			2050			2080				2020			2050			2080
		Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max
North Africa	M	83.7	102.6	143.1	115.1	120.4	217.2	116.5	121.5	240.2	0	9.8	34.9	0	20.7	43.2	0	19	47.2
	%	37	45	63	43	45	82	43	45	89	0	4	15	0	8	16	0	7	18
West Africa	M	0	3.1	3.2	0	6	25.6	0	8.9	85.2	0	0	3.2	0	0.4	5	0	0.5	6
	%	0	1	1	0	1	6	0	2	17	0	0	1	0	0	1	0	0	1
Central Africa	M	0	0	0	0	0	0	0	0.1	0.4	0	0	0	0	0	0	0	0	0
	%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Africa	M	0	4.4	38.1	0	14.8	57.1	0	19.5	70.1	0	9.7	11.9	0	46	56.6	0	48.2	68.7
	%	0	2	17	0	5	18	0	6	20	0	4	5	0	15	18	0	14	20
Southern Africa	M	0	0.5	6.5	0	8	13	0	14	15.4	0	0	0.1	0	0	0	0	0	0
	%	0	0	3	0	3	6	0	6	6	0	0	0	0	0	0	0	0	0
South Asia	M	45.9	128.9	1141.1	74.6	215.7	1544.1	66.6	202.4	1459.1	0	1095	1277.4	0	1336.7	1544	0	1248.6	1429.5
	%	3	7	62	4	10	74	3	11	76	0	60	70	0	64	74	0	65	75

South East Asia	M	0	15.2	22.9	0	34.2	78.4	0	55.1	93.9	0	0	22.9	0	43.4	50.6	0	38.8	68.2
	%	0	2	4	0	5	11	0	8	14	0	0	4	0	6	7	0	6	10
East Asia	M	0	0	644.2	0	0.4	972.5	0.1	0.3	906.5	0	709.3	709.3	0.6	1191.5	1191.5	0.5	999.5	999.5
	%	0	0	40	0	0	63	0	0	71	0	44	44	0	78	78	0	78	78
Central Asia	M	0	2.4	62.1	1.5	31.8	76.9	1.6	33.2	78.7	0	1	57.1	0	39.6	71.4	0	39.9	74.8
	%	0	3	87	2	37	89	2	38	90	0	1	80	0	46	83	0	46	86
Australasia	M	0	2.3	2.3	0	2.9	2.9	0	2.8	2.8	0	0	0	0	0	2.9	0	0	2.7
	%	0	6	6	0	6	6	0	6	6	0	0	0	0	0	6	0	0	6
Western Europe	M	24.3	204.8	210.6	50.2	233.4	243.9	52	256	274.2	0	0	116.1	0	0	139.8	0	0	171.4
	%	6	51	53	12	55	58	12	61	65	0	0	29	0	0	33	0	0	41
Central Europe	M	2.9	34.2	34.2	24.7	31.1	33.5	21.2	26.7	28.8	0	0	6.7	0	0	6.3	0	0	5.4
	%	2	27	27	21	26	28	21	26	28	0	0	5	0	0	5	0	0	5
Eastern Europe	M	3.4	23.6	25.2	6.3	24.1	25.5	9.6	23.3	32.7	0	0	0	0	0.1	7.7	0	0.1	7.8
	%	2	11	11	3	12	13	5	13	18	0	0	0	0	0	4	0	0	4
Arabian Peninsula	M	0.3	16.2	77.5	0.5	36	144	0.5	38.4	192.4	0	0	57.2	0	0	131.5	0	0	178
	%	0	20	94	0	25	99	0	20	100	0	0	69	0	0	90	0	0	92
Mashriq	M	104.5	114.6	141.4	128.6	148.7	181.6	124.8	145.5	183.5	0	0	3.9	0	0	10.2	0	0	10.4
	%	60	65	81	63	73	89	64	75	95	0	0	2	0	0	5	0	0	5
Canada	M	0	0	8.9	0	2.3	11	0	9.2	11.8	0	0	7.9	0	0	10.1	0	0	10.4
	%	0	0	25	0	6	28	0	22	29	0	0	22	0	0	25	0	0	25
US	M	4	78.5	175.4	27.4	193.3	266.6	38.5	221.5	319.9	0	0	54.8	0	12.3	136.1	0	29.5	162.5
	%	1	23	52	7	48	66	9	53	77	0	0	16	0	3	34	0	7	39
Central America	M	0	40.8	86.4	6.3	82.2	134.3	7.5	88.1	178.7	0	0.3	34.6	0	10.1	71.6	0	9.8	67.8
	%	0	19	40	3	33	54	3	35	71	0	0	16	0	4	29	0	4	27
Brasil	M	0	0	0	0	28	90.5	0	26.5	111.9	0	0	0	0	0	0	0	0	47.1
	%	0	0	0	0	13	40	0	13	53	0	0	0	0	0	0	0	0	22
South America	M	0	7.7	22.1	17.8	40.5	55.6	18	53.2	73.5	0	10.2	26.7	1.7	12.4	36	1.7	52.9	64
	%	0	4	10	7	15	21	7	19	27	0	5	12	1	5	14	1	19	23
Global	M	372.7	779.7	2460.3	724.2	1253.7	3702.4	755.4	1346	3883.4	43.2	1835.3	1835.3	124	2713.2	2713.2	163.2	2486.9	2486.9
	%	5	11	33	9	15	45	10	17	50	1	25	25	2	33	33	2	32	32

Online Resource 10. Exposure to increased (INC) and decreased (DEC) water scarcity due to climate change, for 20 regions and globally, at three time horizons, under B2, assuming thresholds for the WCI of 1,000 m³/capita/year (a) and WSI of 0.4 (b). Exposure is expressed in millions of people (M) and as a percentage of regional population (%) respectively. The minimum (Min) and maximum (Max) exposure associated with patterns of climate change from 21 GCMs are displayed for each region along with the estimates associated with a single GCM, HadCM3 (Had).

a) WCI		INC									DEC								
		2020			2050			2080			2020			2050			2080		
		Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max
North Africa	M	90.6	109.4	154.3	130.8	137.8	260.9	133.9	140.7	270.8	0	0.4	37.6	0	4.7	50.2	0	5.2	53.7
	%	37	45	63	42	44	84	41	43	83	0	0	15	0	2	16	0	2	16
West Africa	M	0	13.7	48.4	0.2	35.4	318.1	1	42.7	471	0	0	10	0	83.5	102.9	0	232.6	254.4
	%	0	4	13	0	6	52	0	6	63	0	0	3	0	14	17	0	31	34
Central Africa	M	0	3.2	3.7	0	6.8	7.4	0	9	14.4	0	0	0	0	0.6	7.4	0	0.8	9.8
	%	0	2	3	0	3	3	0	3	5	0	0	0	0	0	3	0	0	3
East Africa	M	0	50	55.1	0	101.4	273.6	0	143.3	373.6	0	6.1	16	0	128.7	261.4	0	212.2	353.4
	%	0	21	23	0	25	68	0	27	71	0	3	7	0	32	65	0	40	67
Southern Africa	M	0	25.4	25.4	0	29.1	32.4	0	37	42.6	0	0	2	0	0	22.3	0	0	24.8
	%	0	11	11	0	9	11	0	10	12	0	0	1	0	0	7	0	0	7
South Asia	M	21.8	113.8	1099.6	70.1	214.5	1721	76.1	223.5	1864.7	0	1071.6	1237.2	0	1386.4	1621.9	0	1488.4	1712.5
	%	1	6	57	3	9	72	3	9	75	0	56	64	0	58	68	0	60	69
South East Asia	M	0	0	0	0	0	0	0	0	9.1	0	0	0	0	0	0	0	0	0
	%	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
East Asia	M	0	0.4	335.2	0	0.4	540.9	0	0.3	552.6	0	721.9	732.6	0	692.4	694.2	0	614.7	616.6
	%	0	0	20	0	0	33	0	0	38	0	43	44	0	42	43	0	43	43
Central Asia	M	0	1.3	3	0.4	2.8	6.8	1.5	3.2	6.8	0	0.1	0.1	0	0.1	1.3	0	0.1	1.3
	%	0	2	4	0	3	9	2	4	9	0	0	0	0	0	2	0	0	2
Australasia	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Western Europe	M	16.6	146.6	168.2	14.9	147.1	165.2	10.8	132.8	152.5	0	0	94.1	0	0	77.5	0	0	73.3
	%	4	37	42	4	39	43	3	38	44	0	0	24	0	0	20	0	0	21
Central Europe	M	0.9	9.3	10.3	2.3	7.9	8.8	1.9	6.6	7.2	0	0	6.5	0	0	0	0	0	0
	%	1	7	8	2	7	8	2	7	8	0	0	5	0	0	0	0	0	0

Eastern Europe	M	0.3	13.3	16.6	0.2	4.2	19.3	0.2	4.1	16.9	0	0	0	0	0	3.2	0	0	3.1
	%	0	6	8	0	3	12	0	3	12	0	0	0	0	0	2	0	0	2
Arabian Peninsula	M	0.3	16.1	82.4	0.5	39.9	154.7	0.6	45.9	208.8	0	0	52.7	0	0	139.2	0	0	190.8
	%	0	19	98	0	26	100	0	22	100	0	0	63	0	0	90	0	0	91
Mashriq	M	76.2	91	128.9	150.9	171.1	210.7	159.9	186.9	222.6	0	0	7.4	0	0	11.1	0	0	12.2
	%	42	50	71	65	74	91	66	78	92	0	0	4	0	0	5	0	0	5
Canada	M	0	0	6	0	0	6.8	0	6.4	8.6	0	0	6	0	0	6.7	0	0	6.4
	%	0	0	17	0	0	17	0	17	22	0	0	17	0	0	17	0	0	17
US	M	0	36.9	70.9	20.3	71.5	111.6	31.7	90.1	138.8	0	0	35	0	6.2	48.4	0	6.5	51
	%	0	11	21	5	18	28	8	21	33	0	0	10	0	2	12	0	2	12
Central America	M	0	28.2	78.3	0	57.7	116.1	0	105.4	168.1	0	0	48.2	0	0.4	54.8	0	0.4	53.1
	%	0	13	35	0	22	45	0	41	65	0	0	22	0	0	21	0	0	20
Brasil	M	0	26	26	0	28.9	28.9	0	27.7	27.7	0	0	0	0	0	0	0	0	0
	%	0	13	13	0	13	13	0	13	13	0	0	0	0	0	0	0	0	0
South America	M	0	15.2	15.2	0	20.9	31.9	0	21.5	32.2	0	0	4.6	0	12.7	18.3	0	12.9	18.6
	%	0	7	7	0	8	12	0	8	11	0	0	2	0	5	7	0	5	7
Global	M	279.9	699.8	1985.1	567.7	1077.4	3490.7	638.5	1227.2	3849.6	33.2	1800	1800	163	2315.8	2315.8	302.5	2573.8	2800.5
	%	4	9	26	6	12	39	7	13	41	0	24	24	2	26	26	3	28	30
b) WSI						INC									DEC				
			2020			2050			2080				2020			2050			2080
		Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max
North Africa	M	100.4	110.4	167.2	132.6	137.8	269.6	134.6	139	283.4	0	10.6	37.6	0	27	50.6	0	29.6	54
	%	41	45	68	43	44	86	41	43	87	0	4	15	0	9	16	0	9	17
West Africa	M	0	3.3	4.1	0	8.2	42.4	0	30.9	158.8	0	0.1	1.9	0	0.5	6.6	0	0.7	9
	%	0	1	1	0	1	7	0	4	21	0	0	1	0	0	1	0	0	1
Central Africa	M	0	0	0	0	0	0	0	0.1	0.7	0	0	0	0	0	0	0	0	0
	%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Africa	M	0	6	40	0	18.6	72.4	0	28.5	105.5	0	10.5	15.1	0	59.1	77.7	0	73.4	101.2
	%	0	3	17	0	5	18	0	5	20	0	4	6	0	15	19	0	14	19
Southern Africa	M	0	0.5	0.5	0	2.8	6.6	0	13.6	13.7	0	0	0	0	0	0	0	0	0
	%	0	0	0	0	1	2	0	4	4	0	0	0	0	0	0	0	0	0
South Asia	M	43.4	142	1197.2	84.7	244.1	1788.1	85.2	255.2	1887.6	0	1146.5	1336.4	0	1527	1765.9	0	1627.8	1852.7
	%	2	7	62	4	10	75	3	10	76	0	60	70	0	64	74	0	65	74

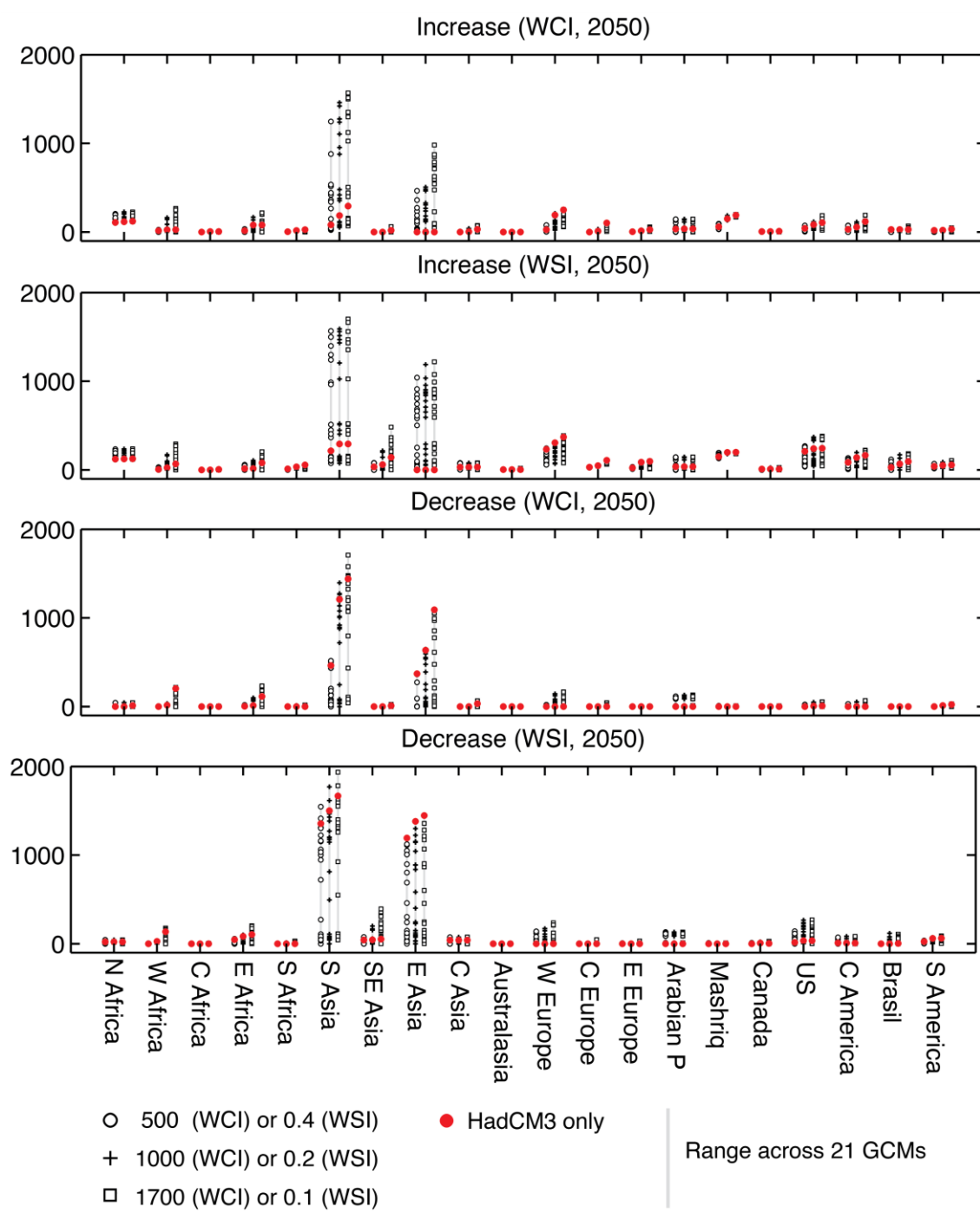
South East Asia	M	0	15.7	23.7	0	18.6	67.2	0	35.9	81.1	0	0	23.7	0	9.3	27.9	0	0	18.4
	%	0	2	4	0	2	9	0	5	11	0	0	4	0	1	4	0	0	2
East Asia	M	0	0	783.7	0	0.4	1050.9	0	0.3	1029.1	0	721.4	749.2	0.7	772.1	772.1	0.6	666	666
	%	0	0	47	0	0	64	0	0	71	0	43	45	0	47	47	0	46	46
Central Asia	M	0	2.3	60.9	1.4	29.4	70.7	1.5	29.3	69	0	3.7	56	0	36.3	67.3	0	34.8	65.9
	%	0	3	87	2	37	90	2	38	90	0	5	80	0	46	85	0	46	86
Australasia	M	0	2.2	2.2	0	2.5	2.6	0	2.5	2.5	0	0	0	0	0	2.5	0	0	2.4
	%	0	6	6	0	6	6	0	6	6	0	0	0	0	0	6	0	0	6
Western Europe	M	41.2	212	220.7	44.8	209.3	218.9	43.3	187.2	194.3	0	0	124	0	0	128.2	0	0	119.1
	%	10	53	56	12	55	58	12	54	56	0	0	31	0	0	34	0	0	34
Central Europe	M	2.8	33.3	33.3	22.3	27.9	30.1	18.5	23.2	25.1	0	0	6.5	0	0	5.7	0	0	4.6
	%	2	27	27	21	26	28	20	26	28	0	0	5	0	0	5	0	0	5
Eastern Europe	M	3.4	22.5	24.1	5.1	22.1	23.7	4.9	19.8	21.1	0	0	0	0	0	3.2	0	0	3.1
	%	2	11	11	3	13	14	4	14	15	0	0	0	0	0	2	0	0	2
Arabian Peninsula	M	0.3	16.8	83.1	0.5	39.4	154	0.6	44.8	208.2	0	0	58.3	0	0	140.3	0	0	192
	%	0	20	99	0	25	99	0	21	99	0	0	69	0	0	90	0	0	92
Mashriq	M	110.2	120.9	146.6	148.9	192.5	220.5	155.3	202.8	232.8	0	0	6.8	0	0	11.1	0	0	12.2
	%	61	67	81	64	83	95	65	84	97	0	0	4	0	0	5	0	0	5
Canada	M	0	0.1	9.1	0	2.3	11.6	0	8.6	11	0	0	9.1	0	0	10.2	0	0	10.2
	%	0	0	25	0	6	29	0	22	29	0	0	25	0	0	25	0	0	26
US	M	3.9	126.6	193.9	35.2	195.9	267.1	51.3	226.1	332.1	0	1.6	70.6	0	18	141.1	0	34.8	174.7
	%	1	37	57	9	49	67	12	54	79	0	0	21	0	4	35	0	8	41
Central America	M	0	42.2	89.2	8.2	65.7	116.4	8.2	79.6	131.8	0	0.3	48.2	0	7.2	71.5	0	18.3	53.1
	%	0	19	40	3	25	45	3	31	51	0	0	22	0	3	28	0	7	20
Brasil	M	0	0	0	0	28.9	28.9	0	27.7	27.7	0	0	0	0	0	0	0	0	0
	%	0	0	0	0	13	13	0	13	13	0	0	0	0	0	0	0	0	0
South America	M	0	7.8	18.5	0	28.1	40.7	0	42.3	71.7	0	12.7	30.1	0.9	23.3	36.1	0.9	26.2	36.6
	%	0	3	8	0	10	15	0	15	26	0	6	13	0	9	13	0	9	13
Global	M	414.7	864.7	2678.3	726	1274.7	4154.2	872.1	1397.5	4383.5	60	1907.4	1907.4	130.8	2479.8	2479.8	139.5	2511.7	2580.5
	%	5	11	35	8	14	46	9	15	47	1	25	25	1	27	27	1	27	28

Online Resource 11. Exposure to increased (INC) and decreased (DEC) water scarcity due to climate change, for 20 regions and globally, at three time horizons, under A2, assuming thresholds for the WCI of 1,000 m³/capita/year (a) and WSI of 0.4 (b). Exposure is expressed in millions of people (M) and as a percentage of regional population (%) respectively. The minimum (Min) and maximum (Max) exposure associated with patterns of climate change from 21 GCMs are displayed for each region along with the estimates associated with a single GCM, HadCM3 (Had).

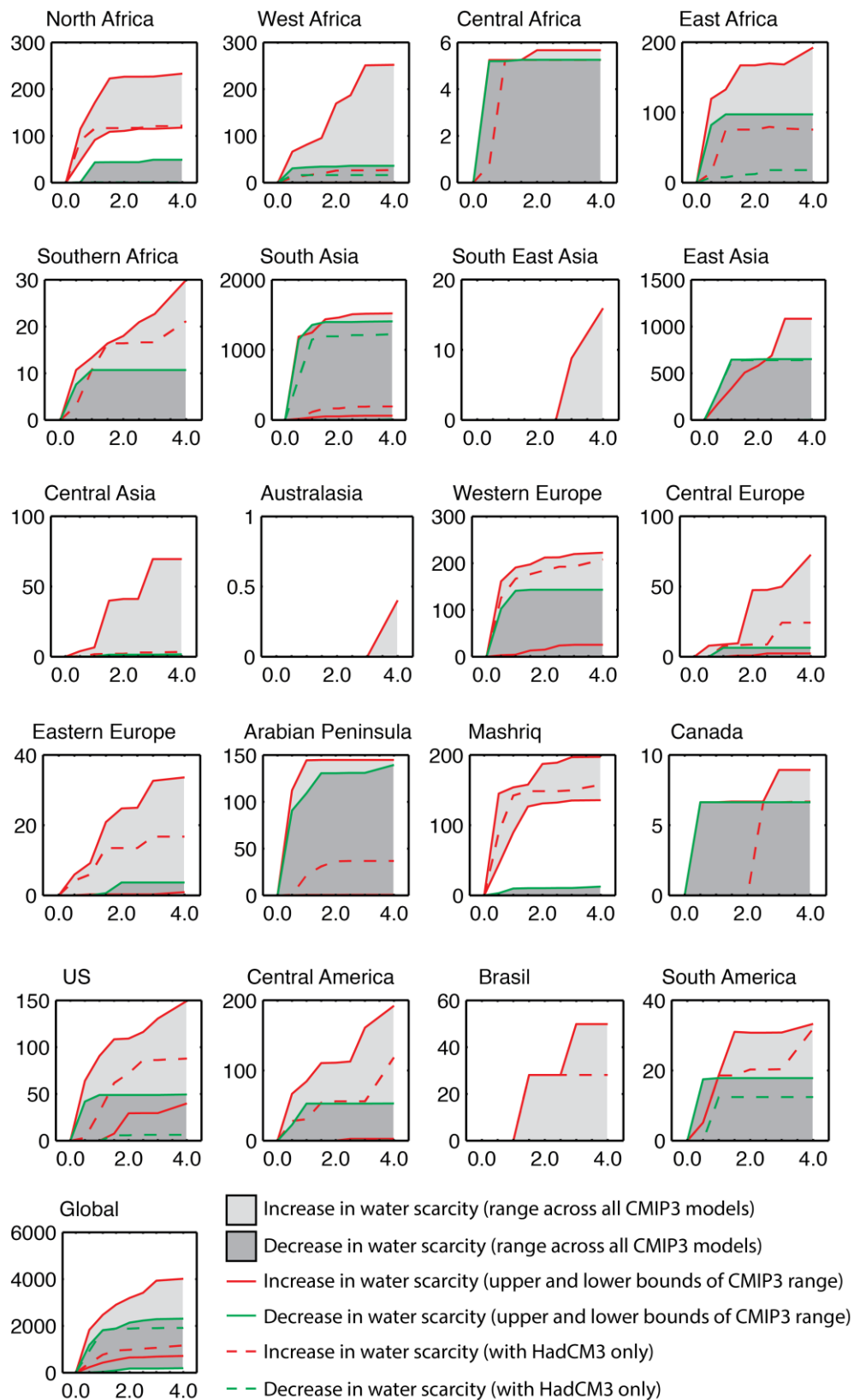
a) WCI		INC									DEC								
		2020			2050			2080			2020			2050			2080		
		Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max
North Africa	M	90.2	115.7	153.3	161	169.5	317.1	192.1	201.3	412.5	0	0.4	39.7	0	17.3	60.8	0	21.7	82.8
	%	35	45	59	42	45	83	42	44	90	0	0	15	0	5	16	0	5	18
West Africa	M	0	18.7	58.8	0.2	43.8	409.9	1.9	107.5	828	0	0	14.7	0	184	208	0	472.1	528.8
	%	0	5	14	0	6	55	0	10	81	0	0	4	0	25	28	0	46	52
Central Africa	M	0	3.4	3.9	0	8.2	9.1	0	51.3	51.3	0	0	3.4	0	0.7	8.9	0	1.1	19.4
	%	0	2	3	0	3	3	0	13	13	0	0	2	0	0	3	0	0	5
East Africa	M	0	51	56.2	0	122.6	332.1	0	184	551.1	0	6.6	62.5	0	160.3	363.7	0	331.7	532
	%	0	20	22	0	25	68	0	26	78	0	3	25	0	33	74	0	47	75
Southern Africa	M	0	26	26	0	38.9	50.2	3.2	133.8	133.8	0	0	7.4	0	0	26.6	0	1.8	46
	%	0	11	11	0	11	14	1	28	28	0	0	3	0	0	7	0	0	10
South Asia	M	18.5	111.9	1169	91	367.6	2094.1	108.9	444.9	2399.6	0	1138.5	1315.4	0	1888.3	2173.1	0	2213.2	2488.6
	%	1	5	57	3	13	74	3	14	76	0	56	64	0	67	77	0	70	78
South East Asia	M	0	0	0	0	0	10.5	0	24	35.4	0	0	0	0	0	0	0	0	0
	%	0	0	0	0	0	1	0	3	4	0	0	0	0	0	0	0	0	0
East Asia	M	0	0.4	225.8	0	0.4	1007.1	0	0.4	1303.1	0	703.3	703.3	1.1	746.3	755.2	1.1	798.1	805.5
	%	0	0	14	0	0	58	0	0	72	0	42	42	0	43	43	0	44	45
Central Asia	M	0	1.4	4.4	1.4	4.2	87.5	2.2	46.5	102.5	0	0.1	0.1	0	41.2	43.5	0	47.5	54.1
	%	0	2	6	1	4	81	2	38	83	0	0	0	0	38	40	0	39	44
Australasia	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Western Europe	M	6.4	145.8	163.5	19.6	171.3	201.8	20.2	186.4	210	0	0	93.5	0	0	122.7	0	0	145.5
	%	2	37	41	5	42	50	5	45	51	0	0	24	0	0	30	0	0	35
Central Europe	M	2.8	9.5	10.5	2.6	8.7	31.3	2.5	8.8	45.4	0	0	6.6	0	0	6.1	0	0	5.5
	%	2	7	8	2	7	26	2	8	41	0	0	5	0	0	5	0	0	5

Eastern Europe	M	0.3	14.5	18.2	4.4	19	27.8	6.9	21.1	39.4	0	0	1.2	0	0	4.2	0	0	4.8
	%	0	6	8	2	9	13	3	10	19	0	0	1	0	0	2	0	0	2
Arabian Peninsula	M	0.4	16.9	83	0.6	46.4	174.6	1	57.3	247.4	0	0	55.7	0	0	156.7	0	0	227.9
	%	0	19	93	0	26	100	0	23	100	0	0	62	0	0	89	0	0	92
Mashriq	M	87	125.7	138.3	186.8	209.2	263.3	257.7	295.6	309.9	0	0	8	0	0	12.9	0	0	15.9
	%	45	64	71	68	76	96	81	92	97	0	0	4	0	0	5	0	0	5
Canada	M	0	0	5.9	0	6.7	6.8	0	6.8	9.2	0	0	5.9	0	0	6.7	0	0	6.8
	%	0	0	17	0	17	17	0	17	22	0	0	17	0	0	17	0	0	17
US	M	0	23.6	68.8	20.5	83.4	114.5	44.7	98.8	181.9	0	0	34.8	0	6.2	49	0	12.4	55
	%	0	7	20	5	21	28	10	22	40	0	0	10	0	2	12	0	3	12
Central America	M	0	29.9	83.2	0	89.7	141.8	15.4	182.7	306.4	0	0	23.5	0	0.5	66.6	0	22.8	99.2
	%	0	13	35	0	29	46	4	50	85	0	0	10	0	0	21	0	6	27
Brasil	M	0	0	0	0	34.6	34.6	0	39.2	126.3	0	0	0	0	0	0	0	0	0
	%	0	0	0	0	13	13	0	13	40	0	0	0	0	0	0	0	0	0
South America	M	0	16.1	16.1	0	25.2	38.2	0	46.8	70	0	11.1	16	0	15.2	21.8	0.3	35.3	43
	%	0	7	7	0	8	12	0	12	18	0	5	7	0	5	7	0	9	11
Global	M	282.7	710.5	1886.1	704.6	1449.6	4747.1	1088.8	2137.3	6191	28.8	1860	1860	260.3	3060	3312.2	514.2	3957.7	4323.5
	%	4	9	24	7	14	46	9	18	51	0	24	24	3	29	32	4	33	36
b) WSI						INC									DEC				
			2020			2050			2080				2020			2050			2080
		Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max	Min	Had	Max
North Africa	M	96.1	116.7	173.8	162	168.3	329.8	189.4	197.2	398.1	0	11.4	39.7	0	33.6	61.3	0	42.1	81.5
	%	37	45	67	43	44	87	41	43	87	0	4	15	0	9	16	0	9	18
West Africa	M	0	3.5	4.4	0	9.9	67.7	0	93.3	471.5	0	0	3.7	0	0.5	7.9	0	0.9	25.7
	%	0	1	1	0	1	9	0	9	46	0	0	1	0	0	1	0	0	3
Central Africa	M	0	0	0	0	0	0.7	0	0.1	1	0	0	0	0	0	0	0	0	0
	%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Africa	M	0	5	43.8	0	15.8	87.7	0	26	210.8	0	11.2	13.7	0	71.8	87.6	0	124	160
	%	0	2	17	0	3	18	0	4	30	0	4	5	0	15	18	0	17	23
Southern Africa	M	0	0.6	21	2.9	31	32.4	11.6	73.4	73.4	0	0	0.1	0	0	12	0	0	21.9
	%	0	0	9	1	9	9	2	16	16	0	0	0	0	0	3	0	0	5
South Asia	M	52.3	144.8	1271.1	100.6	394.8	2114.2	114.8	444.7	2399.3	0	1266.1	1470.9	0	1857	2210.5	0	2186.4	2465.7
	%	3	7	62	4	14	75	4	14	76	0	62	72	0	66	78	0	69	78

South East Asia	M	0	29.6	70	0	41.7	93.3	0	45.7	102	0	32.2	40.4	0	51.7	89.6	0	44.9	87.5
	%	0	4	10	0	5	11	0	5	11	0	5	6	0	6	10	0	5	9
East Asia	M	0	0	767.2	0.2	0.4	1197.2	0.4	0.4	1483.1	0	1300.3	1300.3	0.7	1424.2	1424.2	0.7	1474.5	1474.5
	%	0	0	46	0	0	69	0	0	82	0	78	78	0	82	82	0	82	82
Central Asia	M	0	2.6	68.2	1.9	39.9	96.5	2.2	46.5	111.3	0	1.1	62.7	0	49.8	91.9	0	55.8	107.7
	%	0	3	87	2	37	90	2	38	90	0	1	80	0	46	86	0	45	87
Australasia	M	0	2.3	2.3	0	2.8	2.8	0	3	3	0	0	0	0	0	0	0	0	0
	%	0	6	6	0	6	6	0	6	6	0	0	0	0	0	0	0	0	0
Western Europe	M	23.7	186.9	207.6	54.5	221.9	230.4	58.5	222.3	273.3	0	0	114.8	0	0	134.2	0	0	142.2
	%	6	47	53	13	55	57	14	54	67	0	0	29	0	0	33	0	0	35
Central Europe	M	2.8	34	34	24.1	30.2	32.7	22	27.6	44.1	0	0	6.6	0	0	6.1	0	0	5.5
	%	2	27	27	20	26	28	20	25	39	0	0	5	0	0	5	0	0	5
Eastern Europe	M	3.7	33.7	37.2	11.9	37.3	39.4	13.6	39	58.7	0	0	0	0	0.1	8.9	0	0	4.8
	%	2	15	16	6	18	19	7	19	29	0	0	0	0	0	4	0	0	2
Arabian Peninsula	M	0.4	17.7	83.8	0.6	45.4	173.6	1	56	245.7	0	0	61.7	0	0	157.9	0	0	226.6
	%	0	20	94	0	26	99	0	23	99	0	0	69	0	0	90	0	0	91
Mashriq	M	116.4	129.4	157.5	176.1	227.8	260	252.2	297.5	309.4	0	0	7.2	0	0	12.9	0	0	15.9
	%	60	66	81	64	83	95	79	93	97	0	0	4	0	0	5	0	0	5
Canada	M	0	0	9	0	9.1	11.1	0	10.4	11.8	0	0	7.9	0	0	10.2	0	0	10.4
	%	0	0	25	0	22	28	0	25	29	0	0	22	0	0	25	0	0	25
US	M	4.1	78.7	175.9	36.8	202.7	267.7	53.2	239.9	358.9	0	0	66.5	0	12	98.6	0	18.7	119.8
	%	1	23	52	9	50	66	12	53	79	0	0	20	0	3	24	0	4	26
Central America	M	0	44.8	103.4	10	89.7	166.7	11.6	127.2	262.3	0	0.3	37.9	0	8.7	86.3	0	29.9	99.6
	%	0	19	44	3	29	54	3	35	72	0	0	16	0	3	28	0	8	27
Brasil	M	0	0	0	0	34.6	61.5	0	39.2	95.9	0	0	0	0	0	0	0	0	0
	%	0	0	0	0	13	22	0	13	31	0	0	0	0	0	0	0	0	0
South America	M	0	8.3	23.6	20.8	48.7	66.5	23.9	73.7	97	0	11.1	29	1.1	30.9	43.1	1.2	38.8	52
	%	0	4	10	6	15	21	6	19	26	0	5	12	0	10	13	0	10	14
Global	M	447.9	838.6	2849.8	894.1	1651.9	4935.8	1253.3	2063.2	6225.7	42.2	2633.8	2633.8	143	3540.2	3540.2	218.2	4016.1	4021.5
	%	6	11	36	9	16	48	10	17	52	1	33	33	1	34	34	2	33	33



Online Resource 12. Comparison of WCI and WSI water scarcity measure thresholds. Exposure to an increase or decrease in water scarcity due to climate change is expressed as millions of people in 2050, assuming the A1B scenario.



Online Resource 13. Relationship between global temperature increase above 1961-1990 and exposure to water scarcity due to climate change, using the WCI. Expressed in millions of people, under an A1B socio-economic scenario in 2050.

Online Resource 14. Investigation into whether our results are robust across the CMIP3 and CMIP5 models.

We conducted our assessment at a time when a new set of global change scenarios was being released; the GCMs of CMIP5 (Taylor et al. 2011) with the Representative Concentration Pathways (RCPs; van Vuuren et al. (2011)) and the Shared Socio-economic Pathways (SSPs; Kriegler et al. (2012)). To assess whether our results would be consistent with these new scenarios, we compared our WCI water scarcity results with those from Arnell & Lloyd-Hughes (submitted), who used 19 CMIP5 GCMs with four RCPs and five SSPs. Here we compare impacts under RCP8.5 and SSP3 at 2050 with the CMIP3 SRES A2 simulations at 2050. A2 is analogous to RCP8.5 (Riahi et al. 2011) and SSP3 (Kriegler et al. 2012). The CMIP5-RCP-SSP scenarios were generated by calculating delta changes between a 30-year period centred on 2050 from each GCM and applying these to the climate for 1961-1990 simulated by each respective GCM and statistically downscaling to $0.5^{\circ} \times 0.5^{\circ}$, rather than by pattern-scaling. This means that some of the difference between the CMIP3-SRES and CMIP5-RCP-SSP simulations will reflect multi-decadal variability as well as different sensitivities to forcing. This would likely increase the spread of results across CMIP5 GCMs when compared with the CMIP3 results but attribution is not straightforward. The figure on the next page shows that the CMIP5 and CMIP3 simulations are broadly consistent. For some regions, the range across all GCMs is greater with CMIP5 (e.g. Southern Africa) while for relatively fewer others it is greater with CMIP3 (e.g. Western Europe). The range is comparable at the global scale and for many individual regions, however. This suggests our conclusions are robust across the CMIP3 and CMIP5 models with the differences due to the application of different scenarios and the use of direct GCM data (CMIP5) compared with pattern-scaled data (CMIP3). A comprehensive analysis of water scarcity under the CMIP5-RCP-SSP scenarios is presented by (Arnell and Lloyd-Hughes (submitted)).

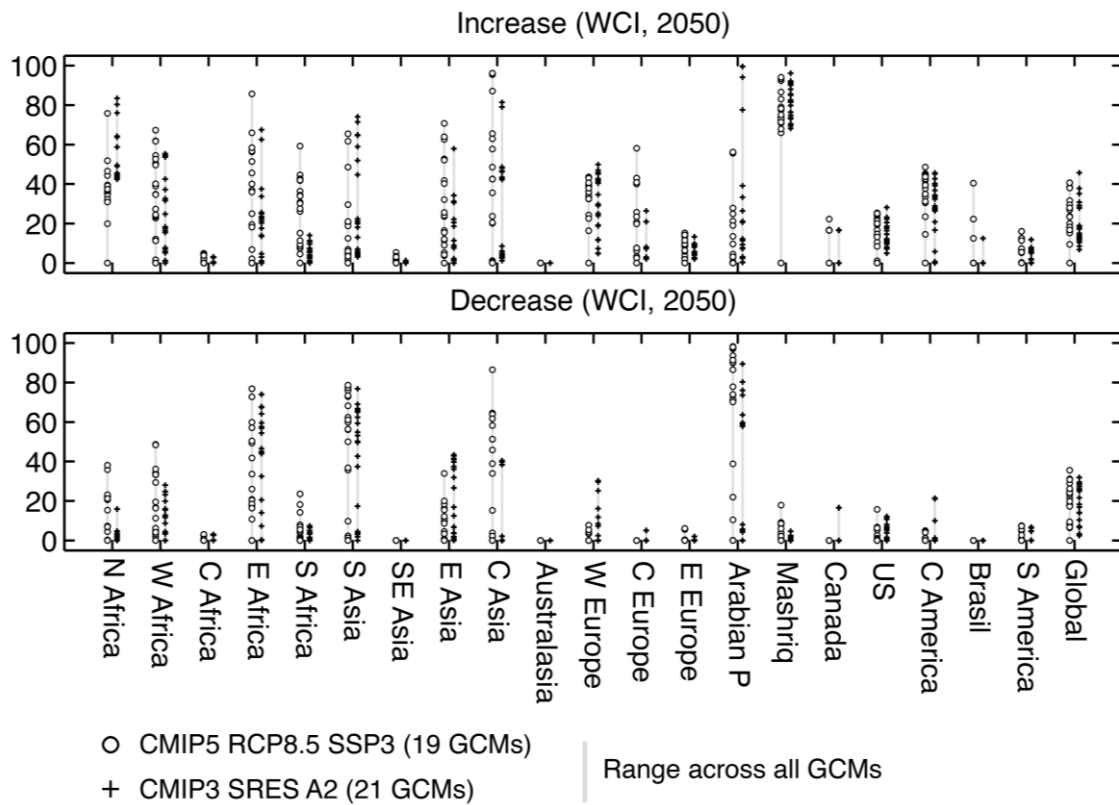


Figure for Online Resource 14. Exposure to an increase and decrease in water scarcity attributable solely to climate change (i.e. the increases and decreases are additional to the effects of changes in future population), expressed as a percentage of future regional population, at 2050, using the WCI ($1000 \text{ m}^3/\text{capita}/\text{year}$). The individual markers denote estimates for individual GCMs, with a different marker shape assigned to either the CMIP3 SRES A2 simulations or the CMIP5 RCP8.5 SSP3 simulations respectively. The vertical grey bars denote the range across 19 GCMs (CMIP5) and 21 GCMs (CMIP3).

Online Resource 15. Acknowledgements.

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