

Notes

Chapter 1

- 1 Deaton 2004.
- 2 McNeill 2000.
- 3 Cain and Rotella 2001.
- 4 Woods, Watterson and Woodward 1988; Szreter and Mooney 1998.
- 5 Cutler, Deaton and Lleras-Muney 2005.
- 6 Hassan 1985; Szreter and Mooney 1998.
- 7 Cited in Bryer 2006.
- 8 Troesken 2001.
- 9 Halliday 1999.
- 10 Hassan 1985.
- 11 Rosenberg 1962.
- 12 Cutler and Miller 2005.
- 13 Cutler and Miller 2005; Cain and Rotella 2001.
- 14 McNeill 2000.
- 15 UNDP 2003a.
- 16 WHO and UNICEF 2005.
- 17 Uganda 2004.
- 18 Molle and Berkoff 2006.
- 19 Howard and Bartram 2003.
- 20 Earth Policy Institute 2006.
- 21 Allen, Davila and Hoffman 2006.
- 22 Gandy 2006.
- 23 Bakker and others 2006.
- 24 Ito 2005; Shalizi 2006; Cai 2006.
- 25 On Lahore and Karachi see World Bank 2005c; Urban Resource Centre 2004; Molle and Berkoff 2006.
- 26 WHO and UNICEF 2005; WHO 2001.
- 27 ADB 2004.
- 28 UN-HABITAT 2003.
- 29 Redhouse 2005.
- 30 Rao and others 2003.
- 31 Nyong and Kanaroglu 2001.
- 32 WHO and others 2006.
- 33 Smets 2004; Van Hofwegen 2006.
- 34 Dutta and others 2003; Sang and others 1997.
- 35 These findings are consistent with wider micro-level research into other indicators for ill-health. One study in northern Ghana, for example, found that infection rates from worms were eight times higher among households collecting water from streams and rivers than for those using piped water. It also found that the incidence of illness reported by households rose from 5% to 24% during periods of water scarcity. Buor 2004.
- 36 Commission on Macroeconomics and Health 2001.
- 37 Kremer and Miguel 1999.
- 38 Strauss and Thomas 1998.
- 39 Hutton and Haller 2004.
- 40 Tanzania 2002.
- 41 UNICEF 2005b.
- 42 UNICEF 1999.
- 43 Uganda 2005.
- 44 Uganda 2004.
- 45 Lenton, Wright and Lewis 2005.
- 46 James and others 2002.
- 47 Joshi 2005.
- 48 Smith [1776] 1976.
- 49 Redhouse 2005.
- 50 Mukherjee 2001.
- 51 Wagstaff 2000.
- 52 Wagstaff 2001.
- 53 Gasparini and Tornarolli 2006.
- 54 Uganda 2004.
- 55 Bakker and others 2006.
- 56 McIntosh 2003.
- 57 Collignon and Vézina 2000.
- 58 Swyngedouw 2004; Molle and Berkoff 2006.
- 59 Phan, Frias and Salter 2004.
- 60 Rao and others 2003.
- 61 On financing estimates see Winpenny 2003; Toubkiss 2006; Smets 2004.
- 62 Calculated on the basis of population size from indicator table 5, GDP from indicator table 14 and health expenditure from indicator table 6.
- 63 Hutton and Haller 2004.
- 64 Slaymaker and Newborne 2004; WSP 2003.
- 65 WSP-AF 2004e.
- 66 Scanlon, Cassar and Nemes 2004.
- 67 This section is based on Development Initiatives 2006; Van Hofwegen 2006.
- 68 WSP-AF 2005a.
- 69 Development Initiatives 2006.
- 70 G-8 2003.
- 71 The Global Fund to Fight AIDS, Tuberculosis and Malaria 2006a; Sperling and Balu 2005.
- 72 World Bank 2006c; Sperling and Balu 2005; World Bank and IMF 2003; the Global Fund to Fight AIDS, Tuberculosis and Malaria 2006b; AfDB 2005b.
- 73 AfDB 2005b.
- 3 Sen 1981.
- 4 Connors 2005.
- 5 Collignon and Vézina 2000.
- 6 Komives and others 2005.
- 7 Foster, Pattanayak and Prokopy 2003.
- 8 Collignon and Vézina 2000.
- 9 Howard and Bartram 2003.
- 10 Thompson and others 2002.
- 11 WUP 2003.
- 12 Collignon and Vézina 2000.
- 13 Equivalent to 7.5 cubic metres a month.
- 14 Collignon and Vézina 2000.
- 15 Collignon and Vézina 2000.
- 16 WSP-AF 2004b.
- 17 Parker and Skytta 2000.
- 18 Parker and Skytta 2000.
- 19 Bakker 2003b.
- 20 Wolff and Hallstein 2005.
- 21 Hall and others 2002.
- 22 McIntosh 2003.
- 23 Tortajada 2006c.
- 24 Wolff and Hallstein 2005.
- 25 Komives and others 2005.
- 26 Franceys 1997.
- 27 Caseley 2003.
- 28 Bakker and others 2006.
- 29 De Miras and Le Tellier 2005; Jamati 2003.
- 30 Slattery 2003.
- 31 *The Economist* 2004.
- 32 Delfino, Casarin and Delfino 2005.
- 33 *Afrol News* 2006.
- 34 Coing 2003; Smith 2005.
- 35 Pangare, Kulkarni and Pangare 2005.
- 36 Pietilä and others 2004.
- 37 Foster and Yepes 2005. Affordability is defined within the threshold of water representing at most 5% of household income.
- 38 Foster and Yepes 2005.
- 39 Komives 1999.
- 40 Gómez-Lobo and Contreras 2003.
- 41 Komives and others 2005.
- 42 Based on data in Komives and others 2005. See also Raghupati and Foster 2002; Foster, Pattanayak and Prokopy 2003.
- 43 Foster, Pattanayak and Prokopy 2003.
- 44 Foster, Pattanayak and Prokopy 2003.
- 45 Graham and Woods 2006.
- 46 WSP-AF 2004b.
- 47 Slaymaker and Newborne 2004.
- 48 WSP-AF forthcoming.

Chapter 2

- 1 CESCR 2002.
- 2 Sen 1982.

- 49 Tanzania 2002.
- 50 WaterAid 2005.
- 51 Tanzania 2002.
- 52 Slaymaker and Newborne 2004.
- 53 WSP-SA 1999; Dhanuraj, Das Gupta and Puri 2006.
- 54 Van Hofwegen 2006.
- 55 Van Hofwegen 2006.

Chapter 3

- 1 Hugo [1862] 1982, book II, chapter 1.
- 2 Satterthwaite and McGranahan 2006; Satterthwaite 2006.
- 3 Winpenny 2003.
- 4 Briscoe 2005.
- 5 Ringler, Rosegrant and Paisner 2000.
- 6 WSP-AF 2005d.
- 7 Satterthwaite and McGranahan 2006; Hunt 2006.
- 8 Hunt 2006; Esrey and others 1991.
- 9 Cairncross and others 1996.
- 10 Cairncross and others 2003.
- 11 Curtis and Clarke 2002; Curtis and Cairncross 2003.
- 12 WSP-AF 2002b.
- 13 Biran, Tabyshalieva and Salmorbekova 2005.
- 14 WSP-AF 2004a,f.
- 15 Mukherjee 2001.
- 16 Satterthwaite 2006
- 17 Hanchett and others 2003.
- 18 Kar and Bongartz 2006.
- 19 WSP-SA 2005.
- 20 Luong, Chanacharnmongkol and Thatsanatheb 2002.
- 21 Levine and the What Works Working Group 2004; WHO and UNICEF 2004a; World Bank 2004d; 2005d; 2006g.
- 22 World Bank 2004a; Crook and Sverrisson 2001.
- 23 Jenkins and Sugden 2006; Practical Action Consulting 2006a,c.
- 24 Melo 2005; Heller 2006.
- 25 WSP-SA 2005.
- 26 Jenkins and Sugden 2006; Practical Action Consulting 2006a,c.
- 27 World Bank 2004b.
- 28 Phan, Frias and Salter 2004.
- 29 WSP-AF 2004c.
- 30 World Bank 2004b; WSP 2002d.
- 31 Sakthivel and Fitzgerald 2002.

Chapter 4

- 1 Malthus [1798] 1826.
- 2 WWC 2000.
- 3 Brown 2003.
- 4 Reisner 1986.
- 5 This section is based on McNeill 2000; World Water Assessment Programme 2006; Postel 1992.
- 6 Rijsberman 2004c. Such threshold levels are, by their very nature, arbitrary. Scarcity is subject to considerable regional variation due to factors not captured by these thresholds. Such factors include the state of water storage

- infrastructure and influences on water demand, such as climate, the nature and extent of productive water use and the development of agricultural systems. However, a major advantage lies in their simplicity: data are readily available and their meaning is intuitive and easy to understand.
- 7 McNeill 2000.
- 8 Shalizi 2006.
- 9 Rijsberman 2004a.
- 10 Rijsberman 2004c.
- 11 Shalizi 2006.
- 12 Falkenmark and Rockström 2005; SIWI and others 2006.
- 13 McNeill 2000.
- 14 McNeill 2000.
- 15 Rijsberman, Manning and de Silva 2006.
- 16 Rijsberman, Manning and de Silva 2006.
- 17 Rosegrant, Cai and Cline 2002a; Meinzen-Dick and Rosegrant 2001; Alcamo, Henrichs, and Rösch 2000.
- 18 FAO 2006. Annual per capita water withdrawals in the United States, however, continue to remain amongst the highest in the world: 1,650 cubic metres against a world average of just over 600 cubic metres.
- 19 IWMI 2006; Rosegrant and Cai 2001.
- 20 Quoted in Worthington 1983.
- 21 Ballabh 2005.
- 22 Smakhtin, Revenga and Döll 2004.
- 23 Cai 2006; Postel 1999.
- 24 Pearce 2006.
- 25 Smakhtin, Revenga and Döll 2004.
- 26 Shetty 2006.
- 27 Pearce 2006.
- 28 On groundwater depletion see Molden, Amarasinghe and Hussain 2001; World Bank 2004e; Buechler and Mekala 2005.
- 29 Guevara-Sanginés 2006.
- 30 WRI 2005.
- 31 Hinrichsen, Robey and Upadhyay 1997.
- 32 World Bank 2001; Cai 2006; Shalizi 2006.
- 33 Shah and others 2003.
- 34 Moench, Burke and Moench 2003.
- 35 World Bank 2005c.
- 36 Vira, Iyer and Cassen 2004.
- 37 Kurnia, Avianto and Bruns 2000.
- 38 Vira, Iyer and Cassen 2004; Saravanan and Appasamy 1999.
- 39 Briscoe 2005.
- 40 Hanchate and Dyson 2004.
- 41 Abderrahman 2002; Csaki and De Haan 2003; SIWI, Tropp and Jägerskog 2006.
- 42 Shetty 2006.
- 43 Shetty 2006.
- 44 Environmental Working Group 2005.
- 45 On the national accounting problem see Repetto and others 1989; Solórzano and others 1991; Daly and Cobb 1989.
- 46 Anand and Sen 1994.
- 47 Pagiola, Arcenas and Platais 2005.
- 48 On desalination see World Water Assessment Programme 2006; Rijsberman 2004a.

- 49 World Bank 2006h.
- 50 Allan 1998; Rosegrant, Cai and Cline 2002b.
- 51 OECD 2006a.
- 52 Rosegrant, Cai and Cline 2002b.
- 53 World Water Assessment Programme 2006
- 54 Scott, Faruqui and Raschid-Sally 2004; IWMI 2006.
- 55 Scott, Faruqui and Raschid-Sally 2004; IWMI 2006.
- 56 BESA 2000.
- 57 Cai and Rosegrant 2003.
- 58 Shah and Keller 2002.
- 59 World Bank 2006h.
- 60 See for example Gleick 2003, 2005.
- 61 World Bank 2006h.
- 62 Gleick 2003.
- 63 Postel and Richter 2003.
- 64 Grey and Sadoff 2006.
- 65 Miller and Reidinger 1998.
- 66 Grey and Sadoff 2006.
- 67 Brown and Lall 2006.
- 68 Shetty 2006.
- 69 Awulachew and others 2005
- 70 World Bank 2006f.
- 71 World Bank 2006e
- 72 Grey and Sadoff 2006.
- 73 World Commission on Dams 2000.
- 74 World Commission on Dams 2000; Berkamp and others 2000.
- 75 Hussain and Hanjra 2003.
- 76 UN 1992.
- 77 Dixon, Smith and Guill 2003; Fischer and others 2005; Stern Review on the Economics of Climate Change 2006.
- 78 Fischer, Shah and van Velthuisen 2002.
- 79 IPCC 2001; Arnell and Liu 2001.
- 80 Briscoe 2005; World Water Assessment Programme 2006.
- 81 Conway 2005; Maslin 2004.
- 82 Stern Review on the Economics of Climate Change 2006.
- 83 IPCC 2001.
- 84 Hare and Meinhausen 2004.
- 85 Den Elzen and Meinhausen 2005.
- 86 Den Elzen and Meinhausen 2005. In order to reach a target of 450 ppm global emissions will need to decline at 2.5% a year from a peak level in 2012. Delaying the peak by 10 years doubles the required rate of reduction to 5% a year.
- 87 Hadley Centre 2004.
- 88 Bronstert and others 2005.
- 89 Fischer and others 2005; Parry, Rosenzweig and Livermore 2005; Nyong 2005.
- 90 Stern 2006. IPCC SRES A2 scenario, which corresponds to 520–640 ppm carbon dioxide levels by 2050—not an unreasonable scenario.
- 91 Tanzanian submission to the IPCC quoted in Murray and Orindi 2005.
- 92 Murray and Orindi 2005.
- 93 Dixon, Smith and Guill 2003; Desanker and Magadza 2001.

- 94 Fischer and others 2005.
 95 Barnett, Adam and Lettenmaier 2005.
 96 World Bank 2006a.
 97 Maslin 2004.
 98 Ellis, Corfee-Morlot and Winkler 2004; Ellis and Levina 2005. At the end of 2005 there were 35 registered projects under the Clean Development Mechanism (CDM), with more than 600 in the pipeline. Projected financial flows of \$1 billion are estimated through the CDM for 2012. Most of the projects involved are in the energy sector, with a heavy concentration on Brazil, China, India, Republic of Korea and Mexico (which account for about 70% of CDM trading). The only Sub-Saharan country involved is Nigeria, which accounts for less than 2% of total CDM credits. Wider multilateral aid efforts on global warming have been led by the Global Environment Facility, which by 2004 had committed about \$1.8 billion in grants for climate change projects, leveraging about four times more in co-financing. Around two-thirds of the total has been committed to large mitigation projects. As with the CDM, there has been a focus on larger developing countries, with 10 countries receiving more than half of the total financing.
 99 Stern Review on the Economics of Climate Change 2006.
 100 GEF 2006.
 101 Calculated from OECD 2006b.
 102 Sachs and others 2005.

Chapter 5

- 1 Quoted in Briscoe 2005.
 2 World Bank 2006f.
 3 Hussain 2005.
 4 World Bank 2006h.
 5 Rosegrant, Cai and Cline 2002b.
 6 World Bank 2006h.
 7 World Bank 2006h.
 8 Seckler and others 2000; Rosegrant, Cai and Cline 2002b; FAO 2003b.
 9 FAO 2005; Grey and Sadoff 2006.
 10 Commission for Africa 2005
 11 Molle and Berkoff 2006; Narain 2006; Cai 2006.
 12 Molle and Berkoff 2006.
 13 Gandy 2006.
 14 *Gulf Times* 2006.
 15 Meinzen-Dick and Pradhan 2005.
 16 Kenney 2005; Meinzen-Dick and Ringler 2006.
 17 Villarejo 1997, cited in Meinzen-Dick and Ringler 2006.
 18 NNMLS 2000, cited in Meinzen-Dick and Ringler 2006.
 19 Peña, Luraschi and Valenzuela 2004.
 20 Miguel Solanes, personal communication.
 21 Cai 2006; World Bank 2001; Shalizi 2006; Molle and Berkoff 2006.
 22 Kurnia, Avianto and Bruns 2000.

- 23 Palanisami 1994; Palanisami and Malaisamy 2004.
 24 Rosegrant and Perez 1997.
 25 Cotula 2006; Sylla 2006.
 26 Sylla 2006.
 27 Sylla 2006.
 28 Van Koppen 1998; Pander 2000.
 29 Cotula 2006; Adams, Berkoff and Daley 2006.
 30 World Bank 2005c.
 31 Hussain and Wijerathna 2004b; Lipton 2004a. Analysis of agricultural production in India and Pakistan identified inequity in the distribution of land and canal water, poor quality of groundwater (especially at tail-end areas where the availability of canal water is less), and farm-level practices (sowing of older varieties, delay in timing of sowing and application of inputs), as the key factors explaining low agricultural productivity. See also World Bank 2002.
 32 Hussain 2005; Hussain and Wijerathna 2004b.
 33 Hussain and Hanjra 2003; Hussain 2005.
 34 Azam and Rinaud 2000, pp. 8–10, cited in Lipton 2004a, p. 17.
 35 Lipton 2004a.
 36 Briscoe 2005.
 37 Briscoe 2005; World Bank 2005c.
 38 Boelens, Dourojeanni and Hoogendam 2005.
 39 Hussain 2005.
 40 Briscoe 2005.
 41 Tortajada 2006b.
 42 Shah and others 2002.
 43 Marcus 2006.
 44 Sarwan, Subijanto and Rodgers 2005; Vermillion 2005.
 45 Faysse 2004.
 46 Hussain 2004, cited in Lipton 2004a.
 47 Meinzen-Dick and Zwarteveen 1998; van Koppen 2002.
 48 Bastidas 1999, p. 16.
 49 Interagency Task Force on Gender and Water 2004.
 50 Oweis, Hachum and Kijne 1999; Vaidyanathan 2001.
 51 Narain 2006.
 52 Rijsberman 2004b.
 53 Rijsberman 2004b.
 54 Narain 2006.
 55 Vaidyanathan 2001.
 56 FAO 2005.
 57 Awulachew and others 2005; Inocencio and others 2005.
 58 World Bank 2006h.
 59 Shah and Keller 2002.
 60 Shah and others 2002.
 61 Inocencio, Sally and Merrey 2003.
 62 Shah and others 2000; Polak 2005a.
 63 Namara 2005.
 64 Rijsberman 2004b. Assumes a 10% discount rate.
 65 Polak 2005b.
 66 Brown 2003.

- 67 Cleaver and Gonzalez 2003.
 68 Cleaver and Gonzalez 2003.
 69 World Bank 2006h.
 70 Commission for Africa 2005.

Chapter 6

- 1 Giordano and Wolf 2002.
 2 Jägerskog and Phillips 2006.
 3 Medzini and Wolf 2006; World Bank 2006h.
 4 Calculated from Wolf and others 1999, table 4; CIA 2006.
 5 Elhance 1999, p. 60.
 6 MRC 2006; HDRO calculations.
 7 Bonheur 2001; Keskinen and others 2005.
 8 Nguyen and others 2000, p. 4.
 9 Kayombo and Jorgensen 2006, p. 433.
 10 UNEP 2004b.
 11 Jolley, Béné and Neiland 2001, p. 31; Kayombo and Jorgensen 2006, p.433; Klohn and Andjelic 1997, p.1; Odada, Oyebande and Oguntola 2006, p. 77.
 12 ALT 2003, p. 468.
 13 Puri and Arnold 2002.
 14 Coe and Foley 2001.
 15 Sarch and Birkett 2000.
 16 IUCN 2004.
 17 Sikes 2003; UNEP 2004a, p. 19.
 18 Odada, Oyebande and Oguntola 2006, p. 83.
 19 Quoted in McNeill 2000.
 20 Peachey 2004; Weinthal 2006.
 21 Greenberg 2006.
 22 UNDP 2002.
 23 GEF 2002.
 24 There is a certain irony in this. Historically, the "prior appropriation" doctrine was used by the United States to assert upstream claims against Mexico.
 25 Sadoff and Grey 2002.
 26 Wolf 2006.
 27 Itaipu Binacional 2006.
 28 Sadoff and Grey 2005.
 29 Wolf, Yoffe and Giordano 2003.
 30 Hamner and Wolf 1998.
 31 Wolf 2006.
 32 Quoted in Priscoli 1998, p. 633.
 33 Fischhendler and Feitelson 2003, p. 563.
 34 WSP International 2003; NEL-SAP 2002.
 35 UNECA 2000.
 36 White 2006.
 37 Nicol 2002; Jägerskog and Phillips 2006, p. 20.