

Index

- Afghanistan 245, 257
Albufeira Agreement 149, 155
 provisions of 152–3
American Water Resources
 Association 48
Andean Community of Nations
 (CAN) 326, 333
 border integration zones 335
 withdrawal of Venezuela (2006)
 335–6
Argentina 160
Asmal, Kim
 South African Minister of Water
 Affairs 181
Australia 6, 9, 193, 313–14, 339–40,
 347
 Australian Capital Territory (ACT)
 309, 313
 Australian Competition and
 Consumer Commission
 (ACCC) 316
 Basin Plan 316–17, 319
 Bureau of Meteorology (BOM)
 316
 Commonwealth Environmental
 Water Holder (CEWH) 316–17
 Constitution of 342
 Council of Australian Governments
 (CoAG) 314
 government of 28, 30, 32, 319
 Interstate Royal Commission (1902)
 312
 MDB Authority 316
 MDB Commission 312–13, 316
 MDB Ministerial Council
 (MDBMC) 312–13
 ‘millennium drought’ (1997–2010)
 6–7, 9, 25
 Murray-Darling Basin (MDB) 6–7,
 9, 16–17, 25, 27, 32, 309–12,
 314, 316–18, 345–6, 349, 351–2
 Murray-Darling Basin Authority
 (MDBA) 30, 98–9, 316
 National Water Commission (NWC)
 316
 National Water Initiative (NWI)
 314–16
 New South Wales (NSW) 309, 311,
 317–18
 Queensland (QLD) 309, 313
 Ramsar Convention of Wetlands of
 International Importance 309
 River Murray Commission (RMC)
 311–12
 River Murray Waters Agreement
 (1914) 312, 318
 South Australia (SA) 309
 Sustainable Diversion Limit (SDL)
 317
 Victoria (VIC) 309, 311, 317–18
 Water Act (2007) 309, 315–16, 318
 Water for the Future 315–16, 346
Azad Jammu and Kashmir 252
Belize
 borders of 326–7
Bharatiya Janata Party (BJP) 226
Brandt Commission
 Report 328
Brazil 9, 126–7, 137, 160, 347
 Constitution of 343
 Doce Integration Committee 133,
 136
 Doce River Basin 120, 131–2, 134–5
 Doce River Basin Committee (CBH
 DOCE) 132–3
 Espírito Santo State (ES) 131–4,
 136
 Federal Constitution 121
 freshwater resources of 120–21, 124
 Minas Gerais State (MG) 131–4, 136
 National Pact for Water

- Management (PNGIRH) 129–30, 136
- National Water Agency (ANA) 123, 126, 130, 133–4, 136
- National Water Law 345
- National Water Resources Management System (SINGREH) 12, 120, 122–4, 127–9, 135–6
- National Water Resources Policy (PRNH) 121–4
- Piracicaba-Capivari-Jundiai River Basin 133
- Water Code (1934) 121
- Brazil Geographic Survey (CPRM) 135
- Burma 23
- Bush, George W.
 - administration of 47
- Canada 9–11, 17, 76, 80, 339–40, 342–3, 346, 348
 - Aboriginal population of 77, 80, 83–4, 93–4
 - Agriculture and Agri-Food Canada 93
 - Alberta 77, 83–5, 90–91, 94–8, 100
 - Arctic Basin 77
 - British Columbia 77, 84
 - Calgary 91
 - Canada-Alberta-Saskatchewan-Manitoba Master Agreement on Apportionment (1969) 97–101, 103
 - Canada Water Act (1970) 79
 - Constitution of 78–80, 82–3, 87, 92–4, 97
 - Council of Ministers of the Environment 99
 - Edmonton 91
 - Environment Ministry 93
 - Federal Water Policy (1987) 79, 86
 - freshwater resources of 76–8, 92
 - Health Canada 93
 - Hudson River Bay 77
 - hydrology of 91–2
 - International Boundary Waters Treaty (IBWT) 78, 82
 - Mackenzie River Basin 11, 81, 83–6
 - Manitoba 77, 90, 94–6, 100
 - Ministry of Environment and Sustainable Resource Development 95–6
 - Natural Resources Ministry 93
 - Northwest Territories 77, 83
 - Nunavut 77
 - Oceans Canada 93
 - Ontario 76, 82
 - Prairie Farm Rehabilitation Administration 95
 - Prairie Provinces Water Board (PPWB) 98
 - Quebec 76
 - Saskatchewan 77, 90, 94–8, 100
 - Saskatchewan River Basin 11, 90, 95–7, 99, 101–3
 - Superior, Lake 82
 - Supreme Court 78–9
 - Throne Speech (2007) 82
 - watershed planning and advisory (WA/WPA) councils 96, 99
 - Winnipeg, Lake 90–91, 97, 101–3
 - Yukon 77
- Canada Inquiry on Federal Water Policy
 - report of 86
- Canadian Council of the Federation 99
- Water Charter (2010) 99
- China xix, 9, 13–15, 23, 245, 261–2, 264–5, 280, 291, 339
 - Accelerating the Water Conservancy Reform and Development* 270, 276
 - Beijing 267, 295, 301, 303
 - Changzhou City 290
 - Constitution of 262, 265, 282
 - economy of 262–3, 275–6
 - environmental protection bureaus (EPBs) 263–4, 266–7
 - Fisheries Law 267
 - Flood Control Law 267, 282
 - Fujian Province 262
 - Guangdong Province 271–3
 - Guangxi Province 271–3, 275
 - Guizhou Province 271–3, 275
 - Han River Basin 297
 - Hebei Province 295, 299, 301
 - Henan Province 295, 299, 301, 303
 - Hong Kong 271–2
 - Hubei Province 15, 295–300, 302
 - Hunan Province 271, 263

- Jiangsu Province 280, 284–5, 289–90
 Jiangxi Province 271, 273, 275
 Law on Environmental Protection 282
 Macau 271–2
 Ministry of Environmental Protection (MEP) 268–9, 274
 Ministry of Water Conservancy 291
 Ministry of Water Resources (MWR) 268–70, 284–5, 287–8, 297–8, 300–302, 304
 Nanjing 290
 National Development and Reform Commission (NDRC) 269, 288, 300
 National Emergency Response Law 271
 National People's Congress 265, 267–8
 Pearl River Basin 261, 271–5
 Pearl River Water Resources Commission (PRWRC) 272–5
 Shaanxi Province 15, 295–9, 301–3
 Shandong Province 301
 Shanghai 280, 286
 Sloping Land Conversion Program 296
 South China Supervisory Centre 275
 special economic zones (SEZs) 272, 298
 State Council 265, 267, 270–71, 280, 282–4, 288, 297, 301
 Suzhou City 281, 286
 Tai Lake Basin Management Agency 285–8, 291
 Tai Lake River Basin 15, 280–85, 287–90
 taxation system of 266
 Tianjin 295, 301
 Water and Soil Conservation Law 267–8
 Water Law 267–8, 270, 282–4, 297, 302, 304
 Water Pollution Prevention and Control Law (WPPCL/LPCWP) 267–8, 282–3, 285, 287–8, 290
 water storage infrastructure of 163
 Wuxi City 15, 280–82, 290
 Xiamen 262
 Yangtze River Basin 295
 Yunnan Province 271–3, 275
 Zhejiang Province 280, 284–5
 climate change 23–4, 33, 70–71
 adaptation 25, 30–31, 33
 impact on hydrology 92
 impact on water management 127–8
 maladaptation 25
 potential population migration under 21
 Clinton, Bill
 administration of 47
 Colombia 335
 borders of 326, 334–6
 Communist Party of China 15, 263, 271
 Central Committee of 270
 Convention on Biological Diversity 20

 Dublin Statement (1992) 5–6, 156

 East Route Project (ERP) 295
 ecological compensation
 concept of 289–90
 European Community
 water management provisions of 12
 European Union (EU) 22, 143, 160, 166, 169, 174, 326, 331, 334, 341
 Cotonou Agreements 331
 Water Framework Directive (WFD) (2000) 12–13, 29, 144–5, 148–9, 153–5, 158–9, 164–8, 325, 347

 federalism 5, 9, 18, 42–3, 48, 57, 61, 79, 87, 144, 265–6, 331, 335–6, 347
 asymmetrical federalism 326–7
 basin federalism 179–80, 191–3
 behavioural federalism 15
 centralized federalism 42
 competitive federalism 180
 cooperative federalism 11, 42, 44, 327
 cooptive federalism 46
 devolution 42
 fiscal federalism 9
 political federalism 191–2
 pragmatic federalism 10, 42, 50–52
 problems of water management 7–8, 76, 85–6, 193, 330
 robust federalism 58

- state-based 42
- structure of federal systems 339–40, 342–4
- Food and Agricultural Organization (FAO)
 - AQUASTAT 245
- France 348
 - government of 28
 - freshwater ecosystems 21–2
 - Fundación Gonzalo Río Arronte (FGRA)
 - Development of New Models of Water Management in Mexico 110, 116
- Germany 91
- Global Water Partnership (GWP) 18, 331
 - ‘Towards water security: a framework for action’ 329
- globalization
 - impact on role of virtual water 160
- Han River Project II (YHRP II) 299–300, 302
- Han-to-Wei River Project (HRWP) 296, 298
- human security 335–6
 - concept of 331–2
- India 9, 13–14, 181, 193, 213, 222, 225–6, 232, 245, 248, 257, 339, 348, 351
 - Andhra Pradesh 231–3
 - Cauvery Water Disputes Tribunal (1990) 231
 - Central Groundwater Board 217
 - Central Water Commission (CWC) 217–18, 225
 - centrally sponsored schemes (CSSs) 218–20, 225
 - Command Area Development (CAD) 219–21
 - Constitution of 216–17, 221–2, 227, 229, 342–3
 - Delhi 234
 - Environment and Forest Ministry 218
 - government of 230–31
 - Government of India Act (1935) 216–17
 - Gujarat 230, 233–4
 - Housing and Urban Development Ministry 218
 - hydrology of 213, 216, 233, 235, 237–8
 - Indian Administrative Service 220–21
 - Inter State Water Disputes Act (1956) 226, 231, 240
 - Karnataka 231–3
 - Kerala 231
 - Kirshna Water Disputes Tribunal 231–2
 - Madhya Pradesh 230, 233–4
 - Maharashtra 230–34
 - Ministry of Agriculture 218
 - Ministry of Finance 224
 - Ministry of Rural Development 218
 - Ministry of Water Resources (MOWR) 217–18, 238–9
 - Narmada Control Authority (NCA) 234–5
 - National Development Council (NDC) 219
 - National Water Development Agency 217
 - National Water Policy 220, 224
 - National Water Resources Council 218
 - Panchayati Raj Institutions (PRIs) 216
 - Partition (1947) 216
 - Planning Commission 218–19
 - Pondicherry 231
 - Rajasthan 233–4
 - river basins of 229, 233–7, 239
 - River Boards Act (1956) 226
 - Supreme Court 226, 231
 - Tamil Nadu 231
 - upper catchments of rivers in 232
 - water infrastructure of 163, 223–4, 230–32, 235–6
- Indian Congress Party 217, 225
- Indus Basin Irrigation system (IBIS) 243, 256
 - annual actual flow of 245
 - irrigation efficiency of 246

- Indus Water Treaty (IWT) (1960)
246–8, 342
provisions of 249
- Institute for Water Education 331
- Instituto BioAtlântica (IBIO) 134
- integrated water resources management (IWRM) 5–6, 18, 121, 124, 128, 133, 136, 196, 199–200, 341
CMAs as basis for 195, 197
growth of 201
promotion of 133
sustainable 202
- Intergovernmental Panel on Climate Change (IPCC) 21, 137
sea level rise forecast 25
- International Conference on Water and the Environment (1992) 5
- International Law Association (ILA)
Helsinki Rules 230
- interstate river compacts 59–61, 65–6, 70–71
concept of 62
conflict resolution methods 67–70
examples of 65–6, 68–9, 98–9, 132
water allocation rules 69–72
- Japan
water storage infrastructure of 163
- Jiabao, Wen 282
- Lake Chad 21
- Luxembourg 326
- Mali 332
- Mekong River Agreement 23
- Mexico 9, 28–9, 105–6, 117, 339, 348–9
borders of 326–7
Chihuahua 111–12
Copaita-Zimatan-Huatulco (CZH) River Basin 11–12, 113–14
Congress of the Union 106
Marismas Nacionales 114–15
National Water Commission (CONAGUA) 107–10, 114–17
National Water Law (LAN) (1992) 11, 107–9, 114–17, 345
National Water Reserves Program 116
Partido Revolucionario Institucional (PRI) 106
- Political Constitution of 106–7
Public Registry of Water Rights 114
Revolution (1910) 105
San Pedro Mezquital (SPM) River Basin 12, 108, 114–15
Supreme Court of Justice (SCJ) 106
- Middle Route Project (MRP) 295, 297, 299
- Millennium Ecosystem Assessment (MEA) 20
- Minas Gerais Water Resources Management Institute (IGAM) 135
- Mississippi River/Gulf of Mexico Watershed Nutrient Task Force 50
- Mozambique 198
- National Oceanic and Atmospheric Administration (NOAA) 48
- Netherlands
Hague, The 329
- Nigeria 343
National Water and Sanitation Services (2000) 347
National Water Policy (2009) 347
- North American Free Trade Agreement (NAFTA) 81, 326, 333–4
- Obama, Barack
environmental policies of 47–8
opportunism 58, 63
burden shifting 57
encroachment 57
shirking 57
- Organisation for Economic Co-operation and Development (OECD) 3, 17, 78
- Organization of American States 334
- Pakistan 9, 13, 181, 245, 249–50, 339, 348–9, 351
Balochistan 243–4, 250–52, 256
Constitution of 14
Council of Common Interests (CCI) 243, 247, 250, 252, 255–7, 350
Federally Administered Tribal Areas (FATA) 252–3
GDP per capita 243
Gilgit-Baltistan 243

- hydrology of 243, 245, 251–2
- Independence of (1947) 216
- Indus Basin Project (IBP) 246, 249
- Indus River System Authority (IRSA) 246–7, 254–6
- Islamabad Capital Territory (ICT) 252–3
- Kalabagh Dam 250, 253–4
- Karachi 252
- Khyber Pakhtunkhwa (KPK) 250, 253, 255–6
- Ministry of Inter-Provincial Coordination 247, 257
- Ministry of Water and Power 246–7, 257
- population of 245
- Punjab 247–8, 252, 254–7
- Senate 255, 257
- Sindh 243, 246–8, 250, 252, 254–7
- Water and Power Development Authority Act (WAPDA) 246, 251, 254–5
- Water Apportionment Accord (1991) 14, 246–7, 346
- Pakistan Water and Power Development Authority 342
- ‘Vision 2025’ 346
- Plan Puebla Panama 333
- Portugal 149, 152

- Ramsar Convention on Wetlands 20
- Reagan, Ronald
 - environmental policies of 45–6
- Republic of Ireland
 - Dublin 5
- River, Chenab 249
- River, Colorado 21, 245, 350
 - ecosystem of 49
- River, Columbia 21
- River, (Rio) Conchos 11, 28, 111–13
- River, Crocodile 201–6
- River, Danube 29
- River, Duero 142, 152
- River, Ebro 13, 142, 150–51, 174
- River, Ganges-Brahmaputra 21, 232, 238
- River, Guadalquivir 13, 142, 151–2, 168, 171, 174
- River, Han 296–302, 304–5
- River, Huai 269, 282
- River, Indus 9, 253–4
- River, Jhelum 253
- River, Jucar 13, 142, 151, 168
- River, Komati 198, 203, 205
- River, Krishna 231–2, 238
- River, Macquarie 21
- River, Murray 311–13, 318
- River, Narmada 9, 14, 230, 232–9
- River, Nile 21
- River, Potomac 42
- River, Sabie 201, 204
- River, Saskatchewan 9, 91, 102
- River, Tajo-Segura 13, 142, 154, 168–9
- River, Tigris-Euphrates 21
- River, Wei 298
- River, Yangtze 15, 297, 299–300
- River, Yellow 295
- river basin management 5, 7–8, 10, 16–17, 23, 29–30, 33, 42–3, 58–61, 69–70, 90, 193, 344
 - adaptive institutions 24–5, 48–50, 63
 - closed river basins 6
 - inter-state river basins 229
 - plan (RBMP) 165
 - river basin district (RBD) 165–6
 - river basin organizations (RBOs) 160, 162, 170–71
 - transboundary river basins 21–4, 59, 90
- Roosevelt, Theodore
 - administration of 42–3
- Second World War (1939–45) 98
- Second World Water Forum
 - Human Right to Water 329
- South Africa 9, 16–17, 179–81, 191, 200, 207, 339, 342, 347
 - apartheid regime 13, 199, 202, 344
 - Bill of Rights 180, 189
 - catchment management areas (CMAs) 190–91, 196–7, 202, 204–6
 - Constitution of 13, 179–80, 184–5, 189
 - Department of Water Affairs (DWA) 195, 202
 - Reconstruction and Development Programme 185–6
 - Standing Committee on Water Supply and Sanitation

- (SCOWSAS) 186–90
- environmental water requirements (EWRs) (Reserve) 195–200, 204–5
- Intergovernmental Relations
 - Framework Act (IFRA) 197
- National Water Act (NWA) (1998) 13, 190, 196, 198, 201, 204–5, 349
- water management areas (WMAs) 190, 196–7, 201–6
- water management in 182–9, 191–2, 199–200
- water scarcity in 181–2
- Water Services Act (WSA) (1997) 195, 197–8
- White Paper on a National Water Policy (1997) 190
- South-to-North-Water-Diversion (SNWD) Project 295–8, 301
 - development of Danjiangkou Dam 296, 299–300, 302
- Southern African Development Community (SADC) 206
- Spain 9, 12, 17, 141–4, 149, 158–9, 163–4, 181, 339, 345, 348
 - AGUA Project 148–9, 154–5
 - Andalucía 151–2, 171, 174
 - autonomous communities (ACs) 343, 349
 - borders of 326
 - Constitution of 144, 160, 162, 170, 343
 - Council of Ministers 169
 - hydrology of 159–60
 - Ministry of Agriculture 145, 154
 - National Hydrological Plan (SNHP) 143, 145, 147–50, 169–70, 174
 - National Irrigation Plan 143, 148, 154–5
 - National Water Council 145
 - Plan of Upper Guadiana 148–9, 154–5
 - RBOs in 160, 162, 170–71
 - river basins of 145, 150–54, 156, 168–71
 - role of users in water institutions of 145–7
 - Sanitation Plans 148, 155
 - Supreme Court 152, 169
 - water scarcity in 142, 150–51, 154, 159–60, 163, 167–8, 174
- Swaziland 198
- Union of South Africa 182
 - Department of Irrigation/ Department of Water Affairs 182–3
 - Rand Water 182
- United Kingdom 91
 - Parliament 79
- United Nations 333
 - Convention on the Law of the Non-Navigational Uses of International Watercourses 24, 27–8, 33
 - Development Programme (UNDP) 328
 - General Assembly 28
 - Human Development Report 328
 - Millennium Development Goals 130, 329, 331
 - Palermo Protocols 331
- United Nations Educational, Scientific and Cultural Organization (UNESCO) 331
 - Internationally Shared Aquifer Resource Management (ISARM) Programme 325, 327–8
- United States of America 9–10, 23, 29, 41–2, 61, 78, 86, 95, 163, 193, 339, 347–8, 350
 - borders of 326–7
 - Central Valley Project (CVP) 47
 - Chesapeake Bay Agreement (1983) 46
 - Clean Water Act (CWA) (1972)
 - Clean Water State Revolving Fund 10, 44, 46–7, 49
 - climate and hydrology of 59–60
 - Congress 43–5, 50
 - Constitution of 61–2, 99
 - Department of the Interior 47, 49
 - Department of Justice 44
 - Endangered Species Act 44, 49
 - Environmental Protection Agency (EPA) 44, 46–7, 51, 284–8
 - Federal Power Act (1920) 43
 - Federal Power Commission 43

- federally-created water resource commissions 45–6
- Grand Canyon Protection Act (1992) 50
- Lake, Devils 102
- Mississippi River Basin 42
- Mississippi River Commission 42–3
- National Environmental Policy Act 45
- National Research Council 49
- New Deal 43, 183, 348, 350
- Reclamation Act (1902) 43
- Reclamation Projects Authorization and Adjustment Act (1992) 47
- Resources Planning Act (1965) 45
- Rio Grande River Basin 68
- Supreme Court 45–6, 61, 65, 67–8
- Water Resources Council 44–6
- Water Resources Research Act (1964) 45
 - water storage infrastructure of 163
- US Army Corps of Engineers (Corps)
 - xix, 48
 - river basin planning activities of 42–4
- US Geographical Survey 48
- Venezuela
 - borders of 326–7, 334–6
 - withdrawal from CAN (2006) 335–6
- water dispute tribunals 229
- water infrastructure 26–7, 130–31
- water pollution
 - algae 281–2
 - measurements to prevent 282–4, 287
- water resource management (WRM)
 - 3, 5, 7–11, 16, 41–2, 51, 80–81, 85, 92, 109, 143, 158, 180, 182–4, 191, 201, 213, 219, 277, 305, 339
 - annual water sharing rules 31
 - cap and trade markets for water 26
 - environmental works and measures 31–2
 - impact of climate change on 127–8
 - iterative planning 26, 31
 - reallocation of water for
 - environment 25, 28–31, 44, 63–6, 70–72, 100
 - provincial primacy in 87
 - relationship with federalism, 7–8
 - trans-boundary 237–8, 327
 - use of water infrastructure 26–7
 - water resources action plans (PARHs) 133
 - water pollution 15
 - water security 9, 18, 137, 167–8, 325, 329–32
 - concept of 126, 327–9, 332
 - water stress
 - concept of 330
 - water transfer 166, 170, 266, 298, 300, 302
 - Ebro water transfer 150–51
 - Tajo-Segura water transfer 152, 168
 - West Route Project (WRP) 295
 - World Bank 249
 - World Economic Forum 331
 - World Health Organization (WHO) 330
 - World Wide Fund for Nature (WWF) 11
 - Development of New Models of Water Management in Mexico 110, 116
 - Yangtze to Han River Project I (YHRP I) 300
 - Yangtze Water Resource Commission (YWRC)
 - Danjiangkou Agency (DA) 303–4