Index

Adaptation strategies, 155, 158, 161-162 Affluence, 88, 151, 211, 218 Afghanistan, 89, 179 Africa, 6-7, 17, 22, 27, 30-31, 41, 46-49, 53, 68-69, 84, 91-92, 94-95, 109, 114, 116, 120, 149, 179, 194, 200, 210, 212 population growth, 17, 26-28 sub-Saharan, 17, 25-28, 65, 84-85, 88-91, 95, 97 Age cohorts, 44, 50 structures, 21, 43-44, 50 Aging, 39-57, 95, 219. See also Demographic change Agriculture cattle ranching, 192, 200 feminization of, 95 land, 8, 53, 68, 75, 85, 89, 91, 97, 180, 189–190, 193, 207 productivity, 91-92, 99, 145, 149, 154research, 93, 96, 98-99, 102 subsidies, 9, 92, 99, 101 subsistence, 190, 200 trade, 92, 99, 101 Agroforestry, 98, 200 AIDS. See HIV/AIDS AIDS mortality, 25, 28, 31 Air quality, 151, 154, 157, 162–163 Amazon, 191, 193–194, 199–200, 210 Animal and plant health standards, 99, 101

Antarctic ice sheets, 169 Anthropogenic environmental change, 52, 127, 156, 218 Aquaculture, 70, 132 Aquifers, 63-64, 91 Arrhenius, Svante August, 166 Asia, 26, 29–32, 48, 53, 69, 75, 83, 85, 95-96, 116-118, 124, 141, 149, 179,200 Central, 111, 121 South, 84-89, 91, 97, 115 (see also Bangladesh, India) Southeast, 21, 190, 192-194, 200 Asian Tigers, 22, 32 Asia-Pacific, 69, 85, 115 Atmosphere, 146–149, 155–156, 165-168, 189, 201, 209 Bangladesh, 53, 84, 87, 150-151, 179 Basic human needs, 59, 61, 63, 65, 74, 76, 78, 81 Biodiversity, 14, 59-60, 67, 70, 79, 85, 91, 146, 189, 192, 196–197, 203-215, 224 loss, 14, 189, 204, 206-207, 212-214 Bioenergy, 129-131 Bioinvasion, 15–16 Biological diversity. See Biodiversity Biomass, 11, 127-131, 141-142 Biosafety. See Animal and plant health standards Biotechnology, 17, 43, 52, 54, 72, 98-99, 101, 192-193

Birds, species diversity, 14, 205, 208, 212 - 213Birth rates, 27–28, 31, 39, 41, 45 weights, 87, 102 Black Sea, 110–111, 115, 118 Bonn, 174–175. See also Climate change negotiations Botswana, 6, 27, 48 Brazil, 50, 85, 119, 183, 188, 190–191, 193, 199–200 Brown, Lester, 8 Brundtland Commission, 187 Bush Administration George Herbert Walker (1988-1992), 171 George W. (2000-2008), 175, 184, 196 Bushmeat, 212 Byrd-Hagel Senate Resolution, 173. See also Climate change negotiations Canada, 78-79, 85, 120, 176, 184, 194, 197, 199, 209 Carbon atmospheric, 146, 148, 150, 158, 166–167, 218 (see also Greenhouse gases) banking, 175 cycle, 189 emissions, 14, 85, 108, 123, 127, 130, 141–143, 175, 178, 189, 209 (*see also* Carbon, atmospheric) sinks, 14, 174, 189 taxes, 183 Cash crops. See Export crops Caspian Pipeline Consortium (CPC), 111 Caspian Sea, 11, 109–112, 115, 118–120, 122 Cereal demand, 95-96 production, 84, 96, 98 Certification, environmental, 198-199, 214, 225 Ceyhan, Turkey, 110–111

China, 7, 10–11, 15–17, 28, 43, 51–52, 74-75, 88, 95-96, 105, 108, 111, 116, 123, 188, 193, 197, 210, 224 population growth, 51–52 Chlorofluorocarbons (CFCs), 146, 148 Cholera, 16, 169 CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), 196, 210 Cities, 18, 52, 79, 94–95, 151–153, 183 Clean Air Act, 170, 180 Clean Development Mechanism, 174-175 Clean Water Act, 170 Clear Cuts, 177, 199. See also Logging Climate change, 2, 12–13, 41, 52–53, 59, 108, 145–185, 189, 192, 207-208 adaptation to, 12-13, 150, 152, 154-159, 161-162, 224-225 impacts, 12, 53, 112, 146, 148-150, 152-155, 158, 168-169, 179 mitigation of, 157-158, 162 research, 150, 159, 168-170, 177-178, 184-185 temperature increases, 12, 14, 146, 148-149, 151, 165-169, 177, 185, 208 vulnerability to, 150–154, 159, 162, 179, 183 Climate change negotiations, 13, 165, 171–176, 181, 222 binding commitments, 171–173 diplomacy, 171-174 COP-2 (Geneva, 1996), 172-173 COP-3 (Kyoto, 1997), 156, 173 COP-4 (Buenos Aires, 1998), 174 COP-6 (The Hague, 2000), 174–175, 181 COP-10 (Buenos Aires, 2004), 176 Climate events, 149, 152, 154, 158. See also Climate change, impacts Clinton Administration (William Jefferson, 1992–2000), 111, 172-173, 175

Club of Rome, 105 Coal, 10, 107-108, 115-116, 123-124, 127-128, 130-131, 134, 145-146 Cochabamba, Bolivia, 79. See also Water, conflicts Conservation biology, 204, 212–213 Consumerism, 146, 156–157, 162, 179, 183, 195–196, 214, 219 green, 214 Contraception, 24, 29-30, 34, 51 Coral reefs, 168, 179, 204 Czech Republic, 47, 121, 180 Dams, 60, 66–69, 75, 77–78, 211. See also Water, infrastructure Death rates, 22, 24–25, 228 Debt, 9, 93, 191-192, 195 Deforestation. See Forest degradation Dematerialization, 219–220 Democracy, 18, 222 Demographic change, x, 5-7, 21-22, 40-41, 51-53 research, 22, 35 transition, 7, 41, 51, 219 trends 3, 7, 21-26, 46, 51, 57 (see also Population, projections) Desertification, 197, 207 Developed Countries, 43, 56, 83, 88, 92–93, 97–98, 101, 105, 108, 124-125, 154, 180, 199 Developing world. See Less-developed countries Development assistance, 7–9, 59, 75, 78–79, 89, 92–93, 98, 100–101, 164, 195, 201, 215 Diabetes, 88 Diarrhea, 27, 49 Dietary needs, 65, 83, 94, 101 Diplomacy. See Climate change negotiations, diplomacy; River, diplomacy Disease, 5, 17, 27, 41, 83, 87, 95, 146, 179 chronic, 51, 88, 94 communicable/infectious, 3-4, 16-18, 22, 24–25, 53, 59–60, 64, 146, 149, 152-153, 158-159, 212, 220

diet-related, 65, 87-88, 94 (see also Malnutrition) prevention, 16-17, 49, 54, 152, 160, 226 Drought, 149, 152, 160–161 Eastern Anatolia, Turkey, 74 Ebola, 17, 212 Ecological economics, 214 Ecological security, 1–19, 21, 85, 87, 91, 103, 220, 222, 225-226 aging and, 52–54 biodiversity and, 203, 211–212, 216 energy and, 106, 129 food supply and, 83 forest degradation and, 187, 189–190, 201 globalization and, 15–18 Ecological services, 60, 67, 80, 219-220 Economic growth, x, 7, 10, 15, 29, 61-62, 70-71, 92, 145-146, 153, 155, 170, 218, 225 energy and, 10, 122, 128, 145 projections, 10, 122, 125, 140–141 Ecosystem services. See Ecological services Ecotourism, 204 Education, 18, 25, 30, 34, 51, 156 demographics and, 7, 32, 41, 48-49, 55,94 females and, 23, 30, 34–35, 66, 91, 100investing in, 22, 66, 102 Ehrlich, Paul, x, 218–220 Emissions. See Greenhouse gas emissions Energy, 2, 8, 11, 105–125 crises, 1, 4, 12, 39, 114 demand, 10-11, 52, 106, 108, 110, 114–117, 123, 125, 127–131, 139-142, 155, 157, 167, 170 efficiency, 5, 106, 120, 125, 128-131, 134–136, 138–139, 141, 155–157, 163, 173, 181

Energy (cont.) electric, 114, 116, 157, 161, 163 fuelwood, 200, 220 geothermal, 127, 129, 131-133 hydroelectric, 67, 128-129 nuclear, 127-128, 160, 162, 167 prices, 12, 105 renewable, 11–12, 127–143 solar, 11, 127–129, 133–136, 162 wind, 138-139 Environmental change, 52-53, 73, 145, 147, 160, 162 policy, 172, 175, 184, 221-222 Equity issues, 13, 41, 77–78, 80, 87, 97, 113, 120, 128, 140, 194, 222, 224. See also Inequality and climate change, 178-183, 185 Estuaries, 67, 73, 209 Ethiopia, 17, 48, 74, 84, 179 Europe, 15–16, 34, 53, 69–70, 99, 114-115, 117-118, 120-124, 193–194, 198–199 demographic changes in, 6, 26, 45, 48 Eastern, 6, 15, 27, 112, 121 European Union (EU), 96, 99, 123, 173, 175–176 Exotic species. See Invasive species Extinction, species, 4, 14, 60, 167, 203–204, 206–210, 220 Family planning, 7, 28–29, 32, 34–35, 51. See also Contraception Famine, ix, 4, 12, 84, 89, 91 Fertility, 22–24, 26, 45, 47, 56 low or declining, 4, 6–7, 21–22, 24-26, 28-32, 35, 41, 43, 45-48, 51, 56 Fertilizer, 85, 91, 99, 119, 189 Fisheries, 98, 204, 207–210, 213 Flood control, 67–68, 152 Flooding, 63, 66-68, 152, 169, 205 due to global warming, 152, 169, 179 (see also Small island states)

Food availability, 8, 83-84, 95, 100 consumption, 8, 85, 88-89, 93, 95, 98-99 Food insecurity, 83, 85–95, 97, 101, 103 poverty and, 8, 88–92 Food Security, 18, 83, 92–99, 102–103 Foreign aid. See Development assistance Foreign policy, 122, 172–173, 185, 215Forest degradation, 13-14, 91, 187-191, 199–200 (see also Logging) causes of, 190-192 dwellers, 187–191, 200, 210 efforts to reduce, 196-198, 201 plantations, 188-189, 192-201, 213, 220 products, 13, 187, 189, 192-193, 220 products, demand by northern countries, 13, 187, 194, 201 reforestation, 157, 197 Forest Stewardship Council (FSC), 197 Former Soviet Union (FSU), 10, 48, 109, 113–114 Fourier, Jean Baptiste Joseph, 165–166 Fuel cells, 130–131, 140 Genetically modified organisms (GMOs), 98–99 Global 2000 Report to the President, ix, 1, 21, 39, 167-169, 218 Global Climate Protection Act (1987), 170 Global warming. See Climate change Globalization, 3, 5, 9, 182–183, 215, 226 impacts of, 14, 95, 151 opportunities from, 92, 101-102 Gore, Albert, 170, 172, 175 Green Revolution, 85 Greenhouse gases (GHGs), 11, 108, 128, 147-149, 157 atmospheric buildup, 5, 12, 168, 179

- Greenhouse gas emissions, 13, 107–108, 116, 123, 141–142, 151, 155–160, 183–184, 218, 222 reducing, 13, 141, 155–157, 162–164, 173, 175–176, 184 trading, 175
- Habitat fragmentation, 206-209, 213
- Hamburger thesis, 92, 191
- Hardin, Garrett, 8
- Health care, 19, 23, 28, 32, 34, 46, 55, 94, 100, 175
- HIV/AIDS, 6–7, 16–18, 22, 25, 27–31, 41–42, 47–51, 56, 94, 102, 211, 219 demographic impacts, 27–28 in the developing world, 48–51
- Holdren, John, 218–219
- Hotspots, 211. See also Biodiversity
- Housing, 32, 34, 152
- Hunger, 8, 83, 88, 93. See also Food insecurity
- Immigration, 8, 24, 26, 32, 41, 44-45
- Immune systems, 16–17, 87
- India, 7, 74–75, 87, 89, 179, 188, 193 demographic change, 51–52 energy needs, 10–11, 105, 108, 119 population growth, 51–52, 108, 224 potential impact of HIV/AIDS, 7, 17, 28
- Indigenous peoples, 16, 45, 60, 75–76, 89, 189–190, 194, 197, 200
- Indonesia, 190, 192–194, 198
- Industrialization, 1, 3, 5, 10, 12, 14 impacts of, 10, 14, 52, 151
- Inequality, 18–19, 66, 92, 99, 183, 200. *See also* Equity issues
- Information technology, 116–117, 154, 161, 180
- Infrastructure, 10, 39, 49, 53, 92, 95, 152–155, 159–162, 164, 191–192, 223–224
- Intergovernmental Panel on Climate Change (IPCC), 12, 165, 167–168, 173, 179, 181
- International Commission On Large Dams (ICOLD), 68, 77

International Conference On Population and Development, 34 International Food Policy Research Institute (IFPRI), 95, 100 International Tropical Timber Agreement (ITTA), 187, 196 International Tropical Timber Organization (ITTO), 187, 196 Invasive species, 15, 189, 207–208, 211, 220 Investment, 22-23, 59, 62, 72, 78-80, 93, 95-98, 102, 106, 113, 124, 136, 147, 154–155, 158, 161–163, 191-192, 195, 217, 220 Irrigation, 9, 63–68, 75, 85, 91, 96, 100, 102, 153 Japan, 26, 34, 42, 45, 99, 108, 115, 175,209 demand for forest products, 192-195, 197

- energy needs, 119
- greenhouse gas emissions, 123, 173, 176, 178 population aging, 56
- Kazakhstan, oil reserves, 111, 119–121 Kyoto protocol, 13, 123, 156, 163,
- 173–176, 178, 181, 184–185, 223. *See also* Climate change negotiations
- Latin America, 17, 29–30, 48, 68–69, 88, 91, 109, 179, 190 Less-developed countries (LDCs), 13, 61
- Life expectancy, 7, 22, 32, 39, 41, 43, 46, 48, 50–51, 54–56, 100
- Lifeboat ethics, 8, 84
- *Limits to Growth, The*, ix, 1, 4, 11, 18, 27, 39, 105, 218
- Liquefied natural gas (LNG), 106, 115
- Logging, 188, 191-199, 214

illegal, 190, 194, 198–199 (see also Forest degradation)

Longevity. See Life expectancy

Malaria, 16, 22, 25, 94, 102, 169 oil reserves, 119, 192 Malnutrition, 4-5, 8-9, 83, 94-95, 103 child, 86–89, 96–97, 100, 102 reducing, 100-102 Methane, 129, 146, 148, 150. See also Greenhouse gases Middle East oil reserves, 5, 10–11, 109, 115, 117, 125 population, 26, 47 Migration, 6, 18, 23–24, 27, 32, 44-45, 48, 56, 95, 154, 159 rates, 23-25 Montreal Protocol, ix, 197 Mortality from HIV/AIDS, 25, 27-28, 31, 49, 56 infant, 49, 89 rates, 7, 22–24, 87–88, 91, 179 Natural disasters, 169, 188 Natural gas, 10, 119, 123, 136, 145, 163 demand, 10, 106, 108, 114–115, 128, 141 prices, 12 reserves, 4–5, 10 Nongovernmental organizations (NGOs), 35, 78, 83, 171, 174, 180-181, 183, 213 environmental, 171, 182, 199 No-Regrets Strategies, 157 North American Free Trade Agreement (NAFTA), 78–79 Oil, 106–07, 111–13, 118–24 North Sea, 120, 122 pipelines, 110–112, 114–115 prices, x, 106, 110, 113, 117, 120, 122-123 reserves, 4–5, 10–11, 106, 109–110, 112, 115, 117, 119-122, 124-125 U.S. domestic production, 10, 117 OPEC, 11, 119, 121-123 Organization for Economic Cooperation and Development (OECD), 41, 43-46, 108, 171

Ozone stratospheric, ix, 59, 146, 148 tropospheric, 150 Participatory decision making, 77, 99, 162, 183. See also Democracy Pathogens, 4–5, 15–17. See also Disease Pension systems, 7, 39–43, 48, 54–56 Petroleum. See oil Pollination, 149, 205-206, 208, 213 Pollution, 1–2, 11, 28, 64, 123, 151, 180, 211 air, 153 water, 63-64, 69, 73, 91, 108, 205 Population Bomb, The, x, 5, 7-8, 15, 18, 39 Population decline, 6-7, 11, 21, 25-26, 28-29, 45, 47–48, 51 elderly, 32, 40, 44, 52, 55, 89, 153 (see also Aging) growth, ix-x, 1-2, 4-9, 17, 21-23, 25-29, 31-32, 34, 45-46, 48, 55, 59-63, 67, 70-71, 91, 95, 151, 211-212, 215, 218-219 growth rates, 6, 22–23, 25–26, 28-29, 34, 51-52, 85, 91, 219, 224 projections, 6-7, 21, 23-29, 35, 43 Poverty, feminization of, 66 Precipitation patterns, changes in, 12, 14, 168 Prenatal care, 102 Privatization of energy supplies, 106, 113 of water, 60, 62–63, 78–79 Pulp demand, 187, 193, 200 mills, 192–195 supply, 188, 192–195 Putin, Vladimir, 176 Reagan Administration, Ronald (1980 - 1988), 170 - 171Renewable energy. See Energy

Reproduction, 23, 27–28, 30 impact of HIV/AIDS, 55

Reproductive health, 22–23 Resource scarcity, 3, 11, 61, 153, 167, 217-220, 223-226 River basin-level agreements, 73-74 basins, 59-60, 63, 65-69, 72-75 (see also dams) diplomacy, 9, 71–75, 81 Russia, 69, 116, 176, 197. See also Former Soviet Union demographic change, 47–48, 56 impact of HIV/AIDS, 17 oil reserves, 110-115, 119, 121-122, 126 Saudi Arabia, oil reserves, 122–123, 125Sea level rise, 12, 14, 148–153, 168, 179,208-209 Small island states, 152, 179, 183 Social capital, 81, 102 Social security. See Pension systems Soil degradation, 85, 91, 98-99, 149, 187, 191–192, 196–197 protection, regeneration, 68, 99-100, 189, 197, 200-201, 205 Solar power. See Energy South Africa, 6, 27–28, 48, 50, 74, 80, 151 Stakeholder involvement, 9, 71, 74, 76-78, 165, 171, 183, 185, 222 Stewardship, 54, 198, 226 Substitution, 146, 156–157, 193, 219-220 Sulfur dioxide, 123, 130, 146 Sustainable development, 93, 98, 213 Technological innovation, x, 2, 4–5, 7-9, 11, 17-18, 54, 63, 70, 81, 84, 116, 140, 145, 153, 156, 209, 218, 222-223, 225 Trade liberalization, 78, 92, 101, 180, 183Tropical Forestry Action Program (TFAP), 187, 196 Tuberculosis (TB), 16, 22, 25, 94

Ukraine, demographic change, 47, 56 Ultraviolet Radiation (UVB), 146 UN Commission on Sustainable Development, 64, 66, 69 UN Development Program (UNDP), 65, 196–197, 215 UN Environment Programme (UNEP), 14, 167, 182 UN Food and Agriculture Organization (FAO), 13, 61, 187–188, 190 UN Framework Convention on Climate Change, 156, 178, 197. See also Climate change negotiations UN Population Division, 21, 23, 29-30, 34 United States census, 23, 25-26 Climate Change Network, 182 Congress, 170-173, 182, 185 Council On Environmental Quality, 1, 167, 170, 174 Council On Sustainable Development, 174 demographic change, 44, 55-56 Department of Energy, 138, 142 Energy Information Administration (EIA), 139, 141, 143 Environmental Protection Agency (EPA), 170, 174 migration, 6, 25–26, 43, 45 National Security Council, 174 natural gas reserves, 114 oil demand, 118–120, 123–124, 143 oil reserves, 10, 12, 117, 143 renewable energy use, 129–136, 138, 141-142 responses to climate change, x, 123, 143, 171–176, 185 Urbanization, 2, 52, 70, 89, 95, 146, 151Uruguay Round Trade Agreement (1994), 92 Warming. See Climate change Water

access to, 9, 63, 65, 67, 72, 75, 100

Water (cont.) availability, 59, 61, 65, 153, 179 conflicts, 63, 73-75, 79 consumption, 64-65, 70, 81, 155 efficiency, 62, 64, 70, 77-78, 80, 100 exports, 78-79 freshwater ecosystems, 60–61, 67-70, 81, 205, 211 infrastructure, 9, 59, 71, 74-76, 78, 100 pollution (see Pollution) quality, 59, 69-71, 149, 160, 209 safe drinking, 9, 59, 64, 66, 102, 158 shortages, x, 2, 61, 73 supplies, 9-10, 53, 60-61, 65, 67, 69, 74, 81, 218 treatment, 152, 158, 160, 205 Wetlands, 67-70, 169, 205, 209 Wildlife, 204–205 habitat, 85, 92, 203 World Bank, 71, 77-78, 80-81, 113, 196 World Business Council For Sustainable Development, 181 World Climate Conferences, 167, 170 World Commission On Dams (WCD), 68,77 World Conservation Union (IUCN), 14.207 World Energy Council (WEC), 140-141, 143 World Health Organization (WHO), 64-66 World Meteorological Organization (WMO), 167 World Trade Organization (WTO), 78-79, 176

Zero Population Growth (ZPG), 6